

Research report

# Quantifying the effectiveness of interventions for people with common health conditions in enabling them to stay in or return to work: A rapid evidence assessment

by Pauline Dibben, Geoffrey Wood, Rod Nicolson and Rachel O'Hara

Department for Work and Pensions

Research Report No 812

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# Abbreviations

CBT	Cognitive behavioural therapy
CHC	Common health condition
DH	Department of Health
DWP	Department for Work and Pensions
HWWB	Health Work and Wellbeing
HSE	Health and Safety Executive
IAPT	Improving Access to Psychological Therapies programme
IB	Incapacity Benefit
JRRP	Job Retention and Rehabilitation Pilots
LBP	Low back pain
MHC	Mental health conditions
MSD	Musculoskeletal disorders
NICE	National Institute for Health and Clinical Excellence
NDDP	New Deal for Disabled People
NSLBP	Non-specific low back pain
RCT	Randomised control trial
RTW	Return to work
ULD	Upper limb disorder
WHO	World Health Organisation

# Key messages

- This report is based on a rapid assessment of published research on the effectiveness of health and work interventions to help people with common health conditions to stay in work or return to work following sickness absence. Building on previous evidence reviews, the objective was to understand the quantitative impact of such interventions, considering the latest available evidence (2008–11).
- The review found that the evidence base on work-related interventions for people with common health conditions has not changed substantially since 2007, and studies generally lack robust quantification of employment outcomes and cost/benefit analysis of interventions. Additionally, relatively little quantitative evidence is apparent for interventions carried out in the UK.
- Areas where there is a reasonably strong body of evidence, with positive effects include:
  - workplace-based interventions for those with musculoskeletal disorders particularly for low back pain (LBP);
  - cognitive behavioural therapy (CBT), vocational rehabilitation and workplace rehabilitation for LBP;
  - supported employment for people with severe mental health conditions; and psychological interventions for depression.
- In general, there is some evidence of the benefits gained from coordination between rehabilitation professionals and the value of a case management approach among studies examining interventions for people with general health conditions.
- The majority of studies on **musculoskeletal conditions** focus on LBP, with some evidence that a multidisciplinary approach including CBT and workplace-focused interventions are effective in terms of benefits and costs. Evidence on other interventions is either of low quantity, poor quality or inconclusive.
- Studies looking at interventions for people with **cardio-respiratory illnesses** tend not to report occupational outcomes. Moreover, most relevant studies appear to focus on cardio, as opposed to respiratory, illness.
- Little evidence exists on the effectiveness of interventions for employment outcomes among people with **mental illnesses**. Some studies address depression, with evidence indicating the positive effects of psychological/work-based interventions. Others cover distress/burnout/stress, but tend to focus on healthcare professionals, with generally weak quantity/quality of evidence.
- The best available evidence for effect-size meta-analysis, synthesising findings from a number of studies, is that for musculoskeletal conditions (LBP), and multidisciplinary, workplace-based interventions. Here, a few recent studies provide evidence on the effectiveness of interventions for return to work. However, in order to provide strong evidence it is important to separate out clients groups according to variables such as age and previous sickness levels.

# Summary

## Purpose of the review and methods used

This report is based on a rapid assessment of the available evidence on the effectiveness of health and work interventions to help people with common health conditions to stay in work or return to work (RTW). The review was commissioned to inform policy development on how to sustain employment for those with common physical and mental health conditions, and the perceived lack of clear evidence on employment outcomes. It builds on two previous reports in this area (Campbell *et al.*, 2007; Waddell *et al.*, 2008) in a number of ways: it provides a more detailed consideration of quantitative evidence and measurable employment outcomes; examination of primary in addition to review-level studies; and inclusion of later studies published between 2008 and 2011. The methods used include quasi-systematic searches of Swetswise, JSTOR, Emerald, and Cochrane databases (covering management and medical studies) using fourteen keyword phrases. Due to the perceived significance of mental health problems, the research team decided, following consultation with Department for Work and Pension (DWP) staff, to conduct a follow-up search for studies on stress, distress and burnout. This review yielded 1,300 sources, but few were robust studies that included measurable employment outcomes.

## Overall findings

While there is evidence of the benefits of early interventions, especially in terms of health outcomes, there is insufficient good evidence on the quantifiable employment outcomes of interventions. It is, moreover, difficult to assess the effectiveness of some employment outcomes, even where evidence is available, as many studies do not include mention of whether RTW is sustained. Moreover, relatively little quantitative evidence on employment outcomes is available for the UK. Evidence from 23 other countries is available but the transferability of these interventions, if implemented in the UK, might be questionable, given potential structural, social and cultural differences. Moreover, many studies do not specify which condition the intervention is used for, although some refer to the need for coordination between stakeholders, and the potential value of a case management approach. However, evidence on this is mixed, in that there is contrasting evidence pointing to positive and negative effects, and/or no effect. In terms of specific conditions, musculoskeletal conditions are covered more extensively than mental health conditions and cardio-respiratory conditions (Table 1).

**Table 1 Overall summary of health conditions, interventions, evidence base, and effects**

Health condition	Intervention type	Quantity of evidence	Quality of evidence	Evidence on effectiveness
Musculoskeletal disorder (MSDs)	Cognitive behavioural therapy (CBT)	Reasonable	Reasonable	Mixed
Low back pain	Workplace based	Reasonable	Reasonable	Positive
	Graded activity/ exercise	Reasonable	Weak	Mixed/no effect
	CBT	Reasonable	Reasonable	Positive
	Patient education	Quite weak	Quite weak	Positive
	Vocational rehabilitation	Reasonable	Reasonable	Positive
Other MSDs	Workplace based	Reasonable	Reasonable	Positive
Cardio-resp	Workplace based	Weak	Reasonable	Positive
Mental health conditions (MHCs)	Psychological/CBT	Weak- very mixed	Reasonable	Positive
	Workplace based	Weak	Quite weak	Inconclusive
Depression	Psychological/ work-based	Mixed types	Reasonable	Positive
Severe MHCs	Vocational rehabilitation	Weak	Reasonable	Positive/mixed
Supported employment	Reasonable	Reasonable	Positive	
Stress/distress and burnout	Psychological/stress management	Reasonable	Weak	Mixed/no effect

The only areas with a reasonably strong body of evidence and positive effects are:

- workplace-based interventions for those with MSDs and particularly for low back pain;
- CBT and vocational rehabilitation for low back pain; and
- supported employment for those with MHCs.

## Musculoskeletal disorders

This report cites 102 studies on musculoskeletal conditions. Very few cover medical or clinical interventions. CBT tends to be incorporated into a broader multidisciplinary approach, but evidence suggests limited usefulness. Only one source (Huppe *et al.*, 2006) emerged on vocational rehabilitation, and did not indicate positive effects. Four studies and two reviews surfaced in the area of workplace-based interventions, and indicated that such approaches might be effective in terms of cost effectiveness and employment outcomes. Finally, diverse studies covering minimal interventions show mixed evidence of outcomes. Positive evidence on job support and placement schemes was from Hong Kong, China. Therefore, transferability might be questionable.

The majority (48 of the 102 studies on MSDs that include measurement of employment outcomes) focus on low back pain, covering:

- functional restoration/physical conditioning/work hardening programmes – evidence is relatively weak and mixed and does not involve Randomised Control Trials (RCTs);

- graded activity/exercise – a larger number of studies are listed, but evidence often tends to be weak or points toward a lack of positive employment outcomes;
- manual therapy – a limited amount of evidence, but casting doubt on the value of this form of intervention – particularly after a longer time period;
- CBT – a number of studies include RCTs, and there is some evidence of positive effects;
- medical advice/education studies – some (not strong) evidence on the value of education;
- lumbar supports – limited available evidence suggests effective employment outcomes;
- vocational rehabilitation – a reasonable amount of evidence, mostly from Germany and Scandinavia, generally pointing toward the positive effect of such interventions; and
- workplace rehabilitation – a reasonable amount of recent evidence showing positive effects in terms of employment outcomes and cost effectiveness. However, evidence is mainly from the Netherlands, where employers have a greater responsibility for the RTW process.

A number of studies also emerged for a range of other specific MSDs:

- **Neck and back pain:** Limited evidence, but some positive evidence for rehabilitation. Evidence on early mobilisation is mixed, and the value of CBT is questioned by the one study on this intervention. Available evidence is from Scandinavia.
- **Upper limb/extremities:** Interventions for upper limb disorders tend to be dominated by clinical/medical interventions, and the evidence for their effectiveness is mixed.
- **Lower limb/ankle:** Most studies are concerned with early mobilisation and exercise. Evidence for these generally seems to be positive. However, the evidence base is very weak.
- **Arthritis and rheumatism:** The evidence here is very weak, with limited and inconclusive evidence on clinical/medical interventions and rehabilitation.
- **Fibromyalgia, ankylosing spondylitis, and spinal cord injury/back surgery:** Limited evidence available.

## Cardio-respiratory conditions

There are very few studies on cardio-respiratory conditions, and none for respiratory illness. Evidence on clinical or medical interventions is very limited. Two studies give contrasting results for surgical interventions, with some support for psychological and medical advice, but a weak evidence base. Evidence on exercise is limited and contradictory. A number of studies on work-based interventions for cardio-respiratory conditions provide some support for early return to work and workplace rehabilitation. Some qualitative research suggests the potential value of social support at work.

## Mental health conditions

Mental illness is now the leading cause of both sickness absence and incapacity benefits in most high-income countries (Harvey, 2009). A total of 41 studies emerged in this area, covering a broad range of conditions. For general mental health conditions, there is little evidence on clinical or medical interventions. Some evidence points toward the benefit of psychological interventions. However, the intervention type and health condition varies greatly, including those with brain injury, schizophrenia, and general psychological complaints. There is also a lack of evidence on workplace interventions for those with MHCs. Only two studies emerged on social interventions, with some indication of a possible reduction of sick leave.

There is some evidence for psychological/work-based interventions for those with depression, but the evidence is quite diverse, including, for example, telephone-based interventions and occupational therapy. In addition, there is mixed evidence on the value of vocational rehabilitation for those with severe MHCs or brain injury, and for placement support. However, a number of studies indicate positive evidence for supported employment. There is often a blurring between the concepts of stress, distress, burnout, and the clinically diagnosed condition of depression. Many of these studies focus on healthcare professionals. Clinicians tend to exclude analysis of stress, and the research tends not to be robust. Thus, although a number of sources are cited, many are of dubious quality. The initial and follow-up searches generated a small number of studies showing employment outcomes as a result of psychological or stress management interventions. However, there is contradictory evidence on whether they are effective, and most evidence points toward a lack of effect, particularly over the longer term. Indeed, RCT studies show that interventions have not been effective. In studies on distress, a number of interventions are covered, but lack positive employment outcomes. There is limited evidence on interventions aimed at addressing burnout, both in terms of quantity and quality of evidence.

### Effectiveness of interventions: industry; firm size; job type

Of the 154 studies cited, 34 refer to the industry where the research was undertaken, 26 indicate firm size explicitly or implicitly, and 69 refer to the job type of participants. The type of industry is generally only referred to when an intervention took place within a particular organisation, or was applied, for example, to a job type such as nursing assistants or home workers. Moreover, where studies focus on work rehabilitation or physical exercise/graded activity, the type of industry is more often mentioned. There is not sufficiently robust evidence to argue that a particular intervention may work best or most effectively in a particular industry, since it is rare that comparisons between industry types are made. The job type of participants is more often referred to explicitly within studies than is the case for industry type or firm size. However, in over half of the cases (85/154) job type is not explicitly highlighted.

### Costs/benefits of interventions

Proving the economic case for investing in interventions is challenging, since many studies do not include quantitative data on the costs nor effect sizes for employment outcomes. Although the evidence base is generally limited, more recent studies provide some evidence on the effectiveness of workplace-based interventions for RTW for those with low back pain.

### Current gaps and weaknesses in evidence base

Several gaps in the evidence base were identified:

- quantitative data for employment outcomes is very limited, and particularly that which includes costs or effect sizes;
- research on MHCs and cardio-respiratory conditions is very limited;
- research often lacks acknowledgement of structural boundaries, and clarity on ‘sustained employment’;
- few studies conducted within the UK context cover employment outcomes for those with physical or MHCs;
- researchers have tended to undertake meta-analyses without ‘partitioning’ the dataset, mixing those who show strong intervention effects with those who do not. This has led to under-estimation of the optimal effectiveness of interventions.

## Priorities for future research

Areas where there is quantitative evidence available on the positive effects of interventions include:

- workplace-based interventions for people with MSDs (particularly low back pain);
- CBT and vocational rehabilitation for low back pain; and
- supported employment for those with MHCs.

Importantly, researchers should provide richer analyses of their data, separating-out variables such as age and previous sickness absence that are known to have a significant effect on treatment effectiveness. More generally, there should be further research within the UK context, and in particular, further studies on the employment outcomes of interventions for those with cardio-respiratory conditions, and also for MHCs, particularly for stress and burnout.



# 1 Introduction

## 1.1 Purpose of the review

This report is based on a rapid assessment of the available evidence on the effectiveness of health and work interventions to help people with common health conditions (CHC) to stay in work or return to work (RTW). The review was commissioned by Department for Work and Pensions (DWP) and the cross-government Health Work and Wellbeing (HWWB) Executive to inform policy development on how to sustain employment for those with common physical and mental health conditions (MHCs), and to address the perceived lack of clear evidence on employment outcomes. The motivation for the commissioning of this review was at least partly due to government interest around:

- the economic costs of ill-health;
- how work might lead to better physical and mental health;
- the business case for promoting mental well-being at work; and
- recognition of the advantage of earlier intervention to prevent people leaving employment due to CHCs.

It is intended that the report will be used to help to further develop policy and identify the effectiveness of existing interventions. A key objective of the study was to enable more precise quantification of the effectiveness of health and work interventions to develop the economic case for intervening early to help people with CHCs to stay in work or RTW.

This report builds on the review by Waddell *et al.* (2008) which found that early healthcare and workplace interventions could help people with common health conditions to retain their jobs and prevent them from moving onto incapacity benefits, and on work by Campbell *et al.* (2007) which indicated the need for early intervention after sickness absence. The present study provides more detailed consideration of quantitative evidence and measurable employment outcomes, examination of primary in addition to review-level studies, and inclusion of later studies published between 2008 and 2011. Moreover, although other studies have suggested that general workplace well-being initiatives (those aimed at all employees) can help to prevent sickness absence or job loss (Vaughan-Jones and Barham, 2010) by improving average levels of workforce health and well-being, this study focuses on interventions that have been put in place to assist the job retention and RTW of people with CHCs.

In summary, this report aims to provide clear, quantitative data sufficiently robust to determine the benefits of early intervention on health and work. The report also aims to provide a rich resource for further analysis and the basis for stimulating further developments in research and policy.

## 1.2 Policy background

Dame Carol Black's review (2008) of the health of Britain's working-age population drew attention to the economic costs associated with ill-health for the working age population. The National Institute for Health and Clinical Excellence (NICE) has also emphasised the business case for promoting mental well-being at work, referring to evidence that the annual economic costs of sickness absence and people being out of work due to ill-health are around £100 billion (Working for a Healthier Tomorrow, 2008, in NICE, 2008:7) and suggesting that the proportion of sickness absence

attributable to mental health is 41 per cent (NICE, 2009). More recently, the Government's Public Health White Paper (2011) included discussion around how work can lead to better physical and mental health and described welfare reforms which aim to make work pay. The Government also commissioned an independent review of sickness absence to look at system-wide ways to reduce the costs of sickness absence and health-related job loss to employers, individuals and the State.

Increasingly, policy in this area has moved towards earlier intervention to prevent people leaving employment due to health conditions. For example, relevant policy initiatives have included piloting of early intervention services to make access to work-related health support more widely available (multidisciplinary Fit for Work Services, employment adviser in Improving Access to the Psychology Therapies Services, Occupational Health Advice Service for Small Businesses) and the introduction of the fit note in April 2010 to help individuals who are off sick get back to work as soon as possible.<sup>1</sup>

### 1.3 Scope of the review

The scope of this project was potentially huge, and it was therefore necessary to limit the focus. Although health outcomes of interventions are interesting in their own right, the focus of the project is on employment outcomes. However, a number of the studies that address employment outcomes also include reference to employment-related health outcomes – such as functional capacity. In examining the nature of interventions, the report takes a multidisciplinary and holistic approach, including social as well as medical interventions. In doing so, it accepts the 'biopsychosocial model' (World Health Organisation, 2001 in Waddell *et al.*, 2008:109), taking account of the health condition, personal and psychological factors, and the social context. The review also considers whether the evidence indicates applicability to particular firm sizes, industrial sectors and job types – factors which are mentioned within the database accompanying this report.

In order to focus on the employment outcomes of work-related interventions, it was necessary to exclude a range of studies from the review that might have been included in a wider-scale review:

- Studies on workplace accidents or injuries, workplace injury prevention and risk analysis. The Health and Safety Executive has already commissioned useful work in these areas. Causes and prevention of injury are related to job retention, but are not included in this review, nor are the predictors of injury.
- Studies outlining the general prevalence of certain conditions among particular groups of workers.
- Studies that simply discuss the average time taken to RTW after a particular injury or surgery for different groups of workers, but do **not** mention a specific **intervention**.
- Studies that refer to outcomes such as quality of life or the perceived or possible ability to work (functional capability), but do **not** include evidence on **actual** employment outcomes.
- General studies on sickness absence where there is no evaluation of an **intervention with work outcomes**. Studies detailing the determinants of absenteeism in the broader working population, reviews of general sickness absence programmes, and predictors of sickness absence are broadly, but not directly, related to the focus of this review.

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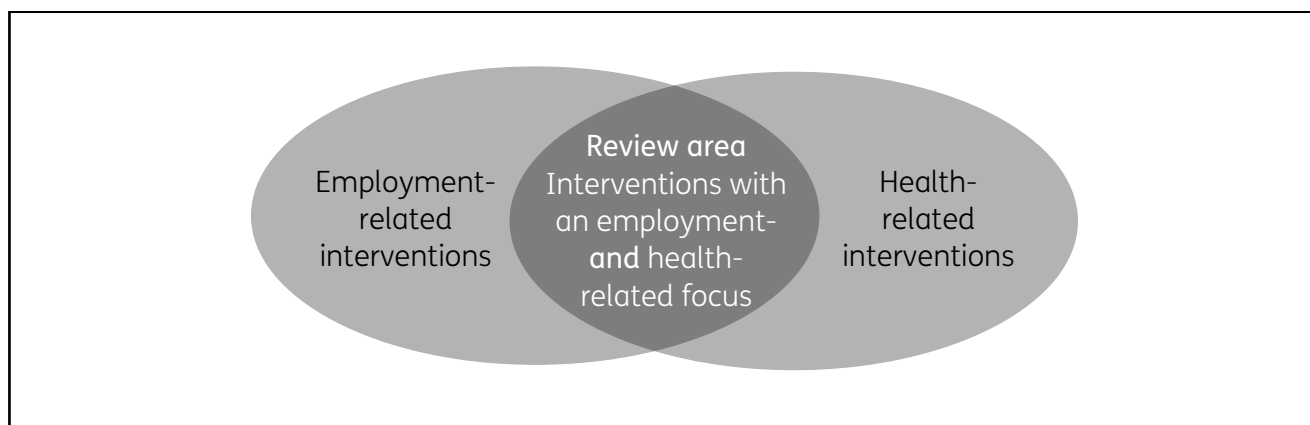
<sup>1</sup> The programme of activity in the Health, Work and Wellbeing initiative is described on the initiative website, under 'Our Work': [www.dwp.gov.uk/health-work-and-well-being/our-work/](http://www.dwp.gov.uk/health-work-and-well-being/our-work/) [accessed 9 May 2012].

For the purpose of this review, CHCs are generally taken to include (mild to moderate) MHCs, musculoskeletal conditions and cardio-respiratory conditions. These are reported to account for about two-thirds of sickness absence, long-term incapacity and ill-health retirement (Waddell *et al.*, 2008). Moreover, a large proportion of current sickness benefit payments are for those with mental health conditions and musculoskeletal conditions (DWP, 2011).

### 1.4 Types of intervention

The focus of this review is on employment-related interventions (those that are expected to have an impact on employment) and employment outcomes. Since the review involves the identification of the employment outcomes for people with CHCs, the focus is arguably on the central part of the Venn diagram in Figure 1.1.

**Figure 1.1 Focus of the review**



The interventions include:

- those that are clinical or medical interventions such as pain management relief, counselling and psychotherapy;
- workplace-based interventions such as RTW interviews and adaptations to workplace equipment;
- social interventions, such as financial support and travel arrangements; and ‘well-being’ initiatives such as physical activity, diet, and stress management initiatives.

These are listed in more detail in Chapter 2 which sets out the keywords for the review. Table 1.1 indicates the types of benefits that might be defined as ‘employment outcomes’.

**Table 1.1 Intervention outcome indicators**

Aim of interventions	Quantitative indicators
Health promotion/well-being interventions	<ul style="list-style-type: none"> <li>• Cost of interventions/who pays?</li> <li>• Reduction in sickness absence levels for those with CHCs</li> <li>• Reduction in job insecurity and subjective well-being for those with CHCs</li> <li>• Increase in productivity for those with CHCs</li> <li>• Reduction in job insecurity and subjective well-being for those with CHCs**</li> </ul>
Helping those at risk of sickness absence to stay at work	<ul style="list-style-type: none"> <li>• Cost of interventions/who pays?</li> <li>• Number of times that people with CHCs are absent from work</li> <li>• Sickness absence duration of people with CHCs</li> <li>• Sustained productivity of those with CHCs</li> </ul>
Supporting people who are off work sick to RTW**	<ul style="list-style-type: none"> <li>• Cost of interventions/who pays?</li> <li>• Duration of employment after RTW for people with CHCs</li> <li>• Type of employment following RTW for people with CHCs*</li> <li>• Numbers of those with CHCs who exit work and claim incapacity benefit or equivalent</li> <li>• Sustained productivity (same as before sickness absence) for those with CHCs</li> <li>• Sustained/improved earnings</li> <li>• Reduced duration of time off work</li> </ul>

## Notes:

\* In relation to the type of employment following RTW, Kendall and Thompson (2004, in Waddell *et al.* 2008: 105) provide the following useful hierarchy: 1) same job, same employer; 2) modified job, same employer; 3) different job, same employer; 4) same job, different employer; 5) modified job, different employer; 6) different job, different employer; 7) vocational/academic retraining for a future job.

\*\* For the purpose of this literature review, we include studies that cover clinical (e.g. reduction in pain) and functional (e.g. an increase in the range of movement) outcomes only in cases where the study also includes work-related outcomes. We do not make assumptions that clinical and functional outcomes will necessarily result in work-related outcomes.

## 2 Methods

As far as possible, within the study's time and resource constraints, an iterative approach to the evidence assessment was taken, involving Department for Work and Pensions (DWP) and Department of Health personnel in project development. The review involved:

- searching for studies by using relevant databases and selected keywords on interventions and conditions;
- looking for evidence within those studies of costs and benefits in terms of employment outcomes;
- adding the selected studies into an Excel database;
- summarising the literature that analyses costs and benefits of interventions;
- evaluating meta-analyses of those studies that included effect sizes (and costs); and
- indicating the gaps in evidence and priorities for future research.

### 2.1 Selection of sources

The following criteria were used to select studies:

- published between 2005 and 2011 (although we also include reference to directly relevant work published before that time, where appropriate);
- provide precise estimates of an intervention's effectiveness;
- include evidence from Britain or other countries including those with strong reputations for workplace adjustments or interventions such as the Netherlands, Australia, Scandinavian countries and the United States.

Sources were initially identified by:

- a search of relevant databases using main intervention keywords for articles published between 2005–11;
- additional searches of relevant key journals for articles published between 2008–11; and
- refinement of the selection to those which included clear and specific evidence on employment outcomes and robust evidence, as opposed to conceptual papers or those which did not include robust evidence.

The initial review of databases using all of the keywords listed in Box A.1 resulted in the retrieval of over 1,000 abstracts from Swetswise, JSTOR, and Emerald. These were filtered down through identifying those that included data on employment outcomes. This search was in addition to the search of 375 abstracts in the Cochrane database in response to the 'return to work' search phrase, and an additional 425 in response to the other main intervention key words. These article abstracts were then coded, and whole articles were retrieved, assessed for robustness, and checked for the criteria that will later be included within this report (and the accompanying database), including firm size, industrial sector and employee job type. The team also considered more recent relevant sources identified within the Waddell *et al.* (2008) review. Due to the significance of mental health problems, but the lack of emerging relevant sources in this area, the research team took the decision, in consultation with DWP staff, to conduct a follow-up review in order to carry out a focused search for studies on 'stress', 'distress' and 'burnout'. This review yielded 1,300 sources, but very few were robust studies that included measurable employment outcomes.

## 2.2 Keywords

The keywords were divided into three main categories: broad descriptions of the nature and purpose of the intervention (Box A.1); the health condition (Box A.2); and the intervention type (Box A.3), provided in Appendix A. The keywords were initially derived from content analysis of the Waddell *et al.* (2008) report, in addition to the research team's existing knowledge of relevant areas. It should be noted that some of the phrases are used interchangeably within research studies, such as 'return to work' and 'rehabilitation'. However, the former tends to be used to explain workplace (employer) oriented practices (such as workplace adjustments), while the latter can tend to imply clinically oriented care provided by healthcare professionals (Greenstreet Berman Ltd, 2004 in Waddell *et al.*, 2008: 103) and exclude employment outcomes. However, each of these concepts was covered within the key word search. In conducting the key word search, we aimed to include health conditions related to musculoskeletal conditions, cardio-respiratory conditions, and MHCs. The resulting list was not comprehensive, but aimed to cover the most commonly assessed conditions within job retention and return to work literature. It should be noted that in many cases people may have more than one condition. Moreover, we also aimed to include any studies with reference to the forms of intervention outlined in Box A.1. It should be noted that some interventions may not fit neatly into one category and that research studies could include a variety of interventions. Moreover, our key word search excluded clinical or medical interventions (e.g. operations or steroids) where these did not result in clear employment outcomes. In conducting the search, the research team used search engines, databases and selected journal articles, as outlined in Box A.4.

## 2.3 Assessing the robustness of evidence

In selecting studies, we sought to include those that included robust evidence. Reports of quantitative evidence form the focus of this review, but findings from qualitative research are also reported, where appropriate. The criteria used are outlined in Table A.1, and are drawn from a range of research methods texts including that by Bryman and Bell (2007). The use of this criteria resulted in the exclusion of a number of articles. However, as noted elsewhere in this report, there is a general lack of robust evidence in many of the areas considered, and therefore some articles that do not fulfil all of these criteria (i.e. small-scale studies; account taken of other potential causal variables; probability sampling; lack of indication of effect sizes) are included within this report, although not included in the cost/benefit analysis or the conclusions. Where they are included, they are generally accompanied by a note indicating their methodological weaknesses- added to the tables in Appendix B. It should be noted that a further consideration is the possibility of 'deadweight losses - those who would have remained in employment or found employment without any form of support. Randomised control trials (RCTs) have been reported in some studies, and where this is the case, this 'deadweight loss' can be minimised to some extent. However, RCT evidence is not extensive. In addition, much of the evidence does not take into account mediating or moderating factors such as: the type of workplace and industry; the job type or grade; the environmental and socio-economic context; and individual worker background.

## 2.4 Analysing the costs and benefits of interventions

In order to provide information on costs and benefits, the review includes more detailed consideration of those studies that include standard (econometric) meta-analysis of data. In these reviews, following standard procedures (that is, the articles that include means and standard deviations before and after treatment), 'effect size' data was calculated (based on the relative improvement of the treatment group versus a control group). The effect size may be considered as

the difference between the mean improvements divided by the pooled initial standard deviation. In carrying out this form of analysis, the type of control group is important, with the 'gold standard' being an RCT in which the control group have a different treatment of equivalent intensity. However, as will be shown, many studies use a 'pseudo-experimental' design in which the control group have 'treatment as usual'. Following on from the effect size data, it can sometimes be possible to derive a 'cost-effect size' measure by dividing the effect size by the cost of the intervention. However, the number of available studies including such data was very limited.

Analysis of costs and benefit should also include reference (where this is stated) to the conditions under which the intervention is effective (i.e. the 'boundary conditions' relating to optimal efficacy). These include: job-related factors (e.g. quality of work; atypical and fixed-term work); individual factors (gender; age; coping strategies); and location (urban and rural areas). Effect-size results should also aim to take account of suitable taxonomic categories (e.g. size of organisation, funding source for intervention, type of intervention). Few published studies provided detail on these factors.

### 2.5 Summary

The methods used included a keyword search, using a range of conditions and intervention types, with a focus on studies that covered employment outcomes. As will be shown below, the search revealed various gaps in evidence.

# 3 Findings: the effectiveness of interventions for different health conditions

This chapter provides a summary of the findings from a range of evidence including case studies, national surveys, and Randomised control trials (RCTs). The evidence for most of the selected sources is quantitative, and the majority are based on RCTs. Qualitative analyses of evidence are also provided, where necessary, in order to supplement the quantitative evidence and guide future research.

The studies are summarised within Appendix B. In each case, the tables include information on the author and year of the study, the type of intervention (and country where it was undertaken), the method and sample used, and key findings. Countries are referred to by code (Table B.1). The full references for each of the articles cited within the appendices are provided within the bibliography, and also included within the database accompanying this report.

The sections within this chapter are outlined in Box 3.1.

## **Box 3.1 Summary of chapter contents**

Effectiveness of interventions for those with general health conditions (health conditions not clearly specified)

Effectiveness of interventions for musculoskeletal conditions

- Low back pain (LBP).
- Back and neck problems.
- Upper limb/extremities.
- Lower limb/ankle.
- Arthritis/rheumatism.
- Fibromyalgia.
- Ankylosing spondylitis.
- Spinal cord injury/back surgery.

Cardio-respiratory conditions

- Clinical/medical interventions.
- Workplace-based interventions.



### Box 3.1 Continued

#### Mental health conditions

- Clinical/medical interventions.
- Psychological/counselling interventions.
- Vocational rehabilitation, placement support and supported employment for those with severe mental health conditions (MHCs) or brain injury.
- Social interventions for those with MHCs.
- Stress management interventions.
- Interventions for distress.
- Interventions for burnout.

A general observation is that it is difficult to assess the effectiveness of some employment outcomes, even where evidence is available. For example, many studies do not include mention of whether return to work (RTW) is sustained. A study by Clay *et al.* (2010) in Australia reinforces the problems inherent in this weakness. Of 152 participants with full follow-up, 46 (30%) returned first to full duties, 58 (38%) returned first to modified work and 48 (32%) did not return to work during the study period. They suggest that first RTW reflects a composite rather than a homogeneous outcome. Similarly, a study in Finland by Suoyrjö *et al.* (2007) sought to examine the effect of a vocationally oriented multidisciplinary intervention programme on sickness absence. Before the intervention participants had 17 per cent more annual sick leave days and a 23 per cent higher rate of absence spells lasting >21 days than controls. In the intervention year and three subsequent years, the sickness absence rate among participants reduced to that observed among controls but thereafter increased to the pre-intervention level ( $p$  for curvilinear trend <0.001 for absence days and 0.03 for absence spells). Compared to controls, risk of sickness absence among participants was lower in the first four years of follow-up but thereafter returned to the previous higher level. They concluded that the intervention temporarily reduced employees' risk of work disability. Studies with a shorter period of observation might neglect to show the change over time.

It can also be noted that relatively little quantitative evidence is apparent for interventions carried out within the UK that include reference to employment outcomes. A slightly larger body of evidence becomes available when we include studies from other countries including those within Scandinavia, the Netherlands, Germany and the United States. However, this warrants a caveat regarding the potential success of these interventions if implemented in the UK context in view of potential structural, social and cultural differences.

### 3.1 Effectiveness of interventions for people with general health conditions

There are a number of general studies that examine interventions for those with health conditions, but do not specify whether these conditions are, for example, musculoskeletal, cardio-respiratory, or related to mental health.

One of the areas where there has been some useful discussion is with regard to the need for coordination between the various actors involved (see, for example, Dibben *et al.*, 2001; James *et al.*, 2003; Cunningham *et al.*, 2004). Some studies (see Table B.2) state the need for coordination

between rehabilitation professionals (Jakobsson *et al.*, 2010). Further evidence (Table B.3) points to the potential value of a case management approach, but this is mixed in terms of whether or not interventions are effective.

In order to more carefully highlight the value of particular interventions, it is necessary to focus on those that have been used for particular health conditions. However, interventions for some types of condition appear to be covered more extensively than others (Table B.4). One reason for the imbalance of evidence is related to the actual and perceived challenges of introducing or reintroducing people with particular conditions into the workplace. In general terms, it can be noted that musculoskeletal conditions are far more often the focus of attention than MHCs and cardio-respiratory conditions.

## 3.2 Effectiveness of interventions for musculoskeletal conditions

A number of studies have been conducted in the area of musculoskeletal conditions. The majority of studies in this area (that include measurement of employment outcomes) appear to focus on LBP. As Waddell *et al.* (2008:15) similarly comment, there is a general distinction between literature that more generally refers to musculoskeletal conditions and that which focuses on specific conditions, with LBP being the most widely reported.

In terms of the use of medical or clinical interventions for general musculoskeletal conditions and injuries (Table B.5), only two reviews (Lloyd *et al.*, 2008; Hammond, 2008) and one study (Abasolo *et al.*, 2007) emerged. It is interesting to note that in both of the reviews, mental health issues are mentioned. Moreover, it is only the study by Abasolo *et al.* (2007) that clearly points to the potential value of a medical intervention (as opposed to psychological ones).

Cognitive behavioural therapy (CBT) is referred to in three studies (Table B.6), but incorporated into a broader approach. However, the evidence suggests limited usefulness of this form of intervention for general musculoskeletal disorders (MSDs). Only one source emerged for rehabilitation for musculoskeletal conditions or injuries, and did not indicate positive effects (Table B.7). However, four studies and two reviews surfaced in the area of workplace related interventions (Table B.8), with some indication that they might be effective in terms of cost effectiveness and employment outcomes.

Medical advice and minimal interventions were mixed in approach and in terms of outcome (Table B.9). It might be worthwhile to investigate in more detail the approach used in the study by Fleten and Johnson (2006), which involved sending a letter and questionnaire after 14 days' sick leave. However, it is unclear why the intervention was particularly useful for those with MHCs. Finally, one job placement intervention was found (Table B.10), but took place in Hong Kong, China, where the context would be very different to that in the UK.

### 3.2.1 Low back pain

Due to the relatively large number of studies within the area of LBP, these are broken down into the following categories: functional restoration, physical conditioning or work hardening programmes; graded activity or exercise; manual therapy; CBT; medical advice or education; questionnaires etc; rehabilitation; and workplace rehabilitation.

Functional restoration, physical conditioning and work hardening are concepts that tend to be used interchangeably. However, work hardening programmes are individualised, work-oriented activities; work conditioning emphasises issues of strength and physical ability; functional restoration refers to any intervention that aims to restore a reasonable functional level of daily living, including work

(Schaafsma *et al.*, 2010). The evidence is relatively weak in these areas, and mixed (Table B.11). Further work would need to be done to confirm or refute findings. Moreover, the evidence presented does not involve RCTs. Graded activity is defined as a programme that focuses on the use of physical exercise aimed at RTW, but which is based on operant-conditioning behavioural principles (Steenstra *et al.*, 2006c). Although there are a larger number of studies listed in this area (Table B.12), the evidence seems generally to point toward either a lack of positive outcomes, or weak evidence for them.

Again, there is a limited amount of evidence on manual therapy or physiotherapy interventions for LBP (Table B.13), and that which does exist casts doubt on the value of this form of intervention – particularly after a longer time period. However, there is some available evidence on CBT and psychological interventions for LBP (Table B.14), with some useful studies including RCTs, providing evidence for a positive effect of CBT. Although there is some apparent evidence on the value of education for patients with LBP (Table B.15), there is not strong evidence for positive outcomes. Lumbar supports could arguably be covered under either clinical or medical interventions or workplace interventions. However, in any case, the limited evidence (Table B.16) appears to suggest that they do not achieve effective employment outcomes. In contrast, there is a reasonable amount of evidence on vocational rehabilitation and LBP (Table B.17), including RCTs, and mostly undertaken in Germany and Scandinavia, which seems to generally point toward the positive effect of such interventions. Again, there seems to be a reasonable amount of recent evidence on the value of workplace rehabilitation for LBP (Table B.18), including a number of RCTs, and the evidence is generally very positive both in terms of employment outcomes and in terms of cost effectiveness for employers. However, the evidence is predominantly from the Netherlands, where employers have a greater responsibility for the return to work process than in many other countries. One important point to note is the degree of sickness absence prior to the intervention. It has already been established that early intervention is important. However, methodologically, this is also important in reviewing the studies included in this and other reviews. For example, in the study by Anema *et al.* (2007) participants are only two to six weeks sick-listed so workplace rehabilitation may be more feasible than if participants were one year sick-listed.

### **3.2.2 Neck and back problems**

The evidence on interventions for back and neck problems is relatively scarce (Table B.19); however there does seem to be some positive evidence on the value of rehabilitation. Evidence on early mobilisation is mixed, and the value of CBT is questioned by the one study on this intervention (Lindell *et al.*, 2008) in that after 18 months, RTW was equivalent between groups. The available evidence appears again to be primarily from Scandinavian countries.

### **3.2.3 Upper limb or extremities**

Interventions for upper limb disorders tend to be dominated by clinical/medical interventions (Table B.20), and the evidence for their effectiveness is mixed. A review by Kim *et al.* (2007) suggests that multimodal interventions combining both medical and ergonomic features are the best way forward.

### **3.2.4 Lower limb or ankle**

Most studies in the area of lower limb disorders are concerned with early mobilisation and exercise (Table B.21). Evidence for these generally seems to be positive, but the evidence base is very weak.

### 3.2.5 Arthritis or rheumatism

The evidence on arthritis and rheumatism appears to be generally very weak (Table B.22), with limited and inconclusive evidence on clinical or medical interventions and rehabilitation.

### 3.2.6 Fibromyalgia

Again, there is limited evidence on this condition (Table B.23), and that which does exist on rehabilitation does not provide any clear evidence on the value of interventions.

### 3.2.7 Ankylosing spondylitis

Only two studies, both on clinical or medical interventions, emerged for ankylosing spondylitis (Table B.24) and the evidence for positive outcomes was weak.

### 3.2.8 Spinal cord injury or back surgery

Two out of the four studies relevant to spinal cord injury or back surgery are concerned with surgical interventions, and there is mixed evidence of the value of interventions (Table B.25). Two studies with relatively small sample sizes that focus on the use of exercise (Raiturker *et al.*, 2005; Newsome *et al.*, 2009) appear to offer some positive evidence in favour of this form of intervention.

### 3.2.9 Summary on interventions for musculoskeletal disorders

A number of studies have been conducted in the area of MSDs. However, the majority of studies in this area appear to focus on LBP. In terms of interventions, most evidence seems to point toward the value of a multidisciplinary approach, including for example CBT and workplace-focused interventions, including social support. The evidence on graded activity and exercise is mixed. Some general points include reference, within the authors' conclusions, to the need for coordination, particularly in relation to workplace rehabilitation, as suggested by the following studies:

- Soklaridis *et al.* (2010) examines the issue of LBP, through focus groups with injured workers and large and small employers and relevant stakeholders in Canada, but refers to the issue of coordination and communication problems in large organisations preventing effective RTW.
- McCluskey *et al.* (2006) reviewed interventions for those with MSDs and found that a lack of coordination meant that interventions were often not implemented effectively.
- Faber *et al.* (2005) evaluated an intervention for LBP that entailed training for general practitioners and occupational physicians on collaboration, but little collaboration happened in practice, and patients in the intervention group returned to work significantly later.
- Carroll *et al.* (2010) reviewed workplace interventions and found that those involving employees, health practitioners and employers working together to implement work modifications for the absentee were more consistently effective than other interventions.

Additional observations include the degree to which attention was drawn in some studies to links between MSDs and depression. For example, a review of literature in Australia points toward the impact of depression on RTW of those with MSDs, but also the benefits of occupational rehabilitation (Lloyd *et al.*, 2008). Further observations include the fact that pharmaceutical interventions were often funded by the manufacturers (where indicated in tables), therefore caution is recommended with these findings. Another feature is that a delay in the start of a programme can actually delay the RTW (Steenstra *et al.*, 2006c; McCluskey *et al.*, 2006). This is particularly relevant for workplace-based interventions. Moreover, workplace-based rehabilitation may be more effective if used on those who have not had a long period of sick leave, otherwise participants may be less attached to work (see, for example, Anema *et al.*, 2007).

### 3.3 Effectiveness of interventions for cardio-respiratory conditions

As Waddell *et al.* (2008:25) have noted, when referring to this form of condition, ‘occupational outcomes are generally not reported in the literature’. This still appears to be the case (see Table B.26, which indicates the number of studies according to intervention type). There are a very limited number of studies in the area of cardio-respiratory conditions, and indeed no studies which indicate employment outcomes resulting from interventions for respiratory illness. Although studies are available on treatments for these conditions, there is apparently very little evidence on employment outcomes.

#### **3.3.1 Non workplace-based interventions for cardio-respiratory conditions**

In terms of interventions outside the workplace, available evidence covers interventions that are clinical or medical; based on psychological or counselling interventions; include medical advice; or use exercise. However, the evidence on this range of interventions is very limited (Table B.27). Two studies give contrasting results for two surgical interventions, while there is some support for psychological and medical advice, but a weak evidence base. The evidence on exercise appears to be both limited and contradictory.

#### **3.3.2 Work-based interventions for cardio-respiratory conditions**

There seems to be some support for early RTW and for workplace rehabilitation, and also some qualitative research in addition to rather general observations about the value of social support at work (Table B.28). However, in summary, there seems to be a lack of both quantity and quality of evidence on **employment outcomes** for interventions for cardio-respiratory conditions.

### 3.4 Effectiveness of interventions for mental health conditions

Mental illness is now the leading cause of both sickness absence and incapacity benefit claims in most high-income countries (Harvey, 2009), including the UK. However, there appears to have been less work carried out on the effectiveness of interventions that yield positive employment outcomes, compared to musculoskeletal conditions. For example, Krupa (2007) suggests that although there is a sense of optimism about the potential of employment interventions for those with MHCs, research in the area is limited. Blank *et al.* (2008) also reviewed factors affecting the RTW of those with MHCs. They drew attention to how poor mental health is responsible for a large percentage of long-term absence, and to how only 50 per cent of those who are off work for six months or more RTW. They suggest that successful RTW is predicted by a range of factors related to: work, family history, health-risk behaviours, social status, and medical condition.

Due to the general paucity of evidence examining work-related interventions and employment outcomes for those with MHCs, this review of MHCs covers a range of conditions, including those that may be considered to be severe, such as schizophrenia,. In the following subsections, stress, distress and burnout are referred to separately. However, there has been a lack of clarity on the definitions of these terms. Firstly, they are sometimes used interchangeably. Secondly, stress is not defined as a clinical condition (as is the case with depression or anxiety disorders), but tends to be defined in terms of a set of symptoms. In general, there is a lack of studies which provide evidence of employment outcomes for MHCs (Table B.29).

### 3.4.1 Clinical or medical interventions

There seems to be little evidence on clinical/medical interventions resulting in employment outcomes, although one study (Avesani *et al.*, 2005), conducted in Italy, does point to positive outcomes in terms of RTW (Table B.30)

### 3.4.2 Psychological or counselling interventions

There is some evidence pointing toward the benefit of psychological interventions for those with MHCs (Table B.31). However, the nature of the interventions vary greatly, and moreover, each study is based on a different group of participants including those with brain injury, schizophrenia, and general psychological complaints.

### 3.4.3 Workplace-based interventions

In general, it appears that there is a lack of evidence on workplace interventions for those with MHCs, as suggested by a review by Oostrom *et al.* (2009), which concluded that the lack of studies made it impossible to investigate the effectiveness of workplace interventions among workers with mental health problems and other health conditions. However, there does seem to be some limited evidence for psychological/work-based interventions for those with depression.

In a review of studies on common mental disorders in the workforce, Sanderson and Andrews (2006) found that depression and simple phobia were the most prevalent. They also suggest that, although there is limited data on rates of participation within the workplace, there is higher participation among people with depression, simple phobia, social phobia, and generalised anxiety disorder. However, they also note that depression and anxiety were more consistently associated with 'presenteeism' (implying lost productivity) than with absenteeism. This study's review of evidence on psychological or work-based interventions for depression finds that the evidence is diverse (Table B.32), with some studies (US and UK based) including a telephone-based intervention, while another (Schene *et al.*, 2007) considers occupational therapy in addition to psychiatric treatment as usual. Each of these studies points to positive employment outcomes.

### 3.4.4 Vocational rehabilitation, placement support and supported employment for those with severe mental health conditions or brain injury

Both vocational rehabilitation and supported employment are interventions that have been targeted at people with more severe MHCs (Table B.33). There appears to be some positive but mixed evidence on the value of vocational rehabilitation for those with severe MHCs or brain injury. Similarly, the results of placement support appear to be variable. However, there appear to be two studies that point to generally positive evidence for supported employment – but in Hong Kong (Wong *et al.*, 2008; Tsang *et al.*, 2009).

### 3.4.5 Social interventions for those with mental health conditions

Only two studies (both RCTs) emerged in this area (Table B.37). A minimal postal intervention and questionnaire appears to have been effective in reducing overall sick leave for those with mental health disorders (Fleten and Johnson, 2006). However, this was conducted in Norway. On the other hand, an intervention offered by social security offices in the same country was not more effective than usual follow-up procedures (Nystuen and Hagen, 2006).

### **3.4.6 Stress management interventions**

Stress is a difficult condition to define and treat. One definition, reflecting the implications for treatment, is that ‘stress is a term used to describe the body’s physiological and/or psychological reaction to circumstances that require behavioral adjustment’ (Nakao, 2010). However, it is also important to note that there is often a blurring between stress and the related concepts of distress and burnout, and even with the clinically diagnosed condition of depression. For example, some studies refer to an intervention as stress management, but measure the impact on depression, distress or burnout (see, for example, Grossi and Santell, 2009; De Vente *et al.*, 2008).

Whilst a moderate amount of stress may be associated with improved performance, too much stress is likely to result in reduced capabilities; whilst stress may be managed, it cannot be solved or eliminated (Kreitner and Kinicki, 2009). There is no standardised measure of stress, given that individuals cope with stress differently: stress is not only about external pressures but the adaptive responses of the individual (*ibid.*). Periodically lists of major causes of stress have been compiled, but these are by no means exhaustive. Stress may induce ‘burnout’, a term that denotes a reduced interest in work and physical exhaustion; stress management interventions are often seen as a mechanism for reducing burnout. Although there is evidence that burnout is an incremental process, there is no consensus as to the order of these phases (*ibid.*).

The initial search and subsequent follow-up search generated a small number of studies that indicated employment outcomes as a result of psychological or stress management interventions (Table B.34). However, there was contradictory evidence on whether they are effective, and most evidence pointed toward a lack of effect, particularly over the longer term. Indeed, it is noticeable that where RCTs were used, only one suggested positive effects (Limm *et al.*, 2010), while the others generally suggested that interventions had not been effective (Rebergen *et al.*, 2009a; De Vente *et al.*, 2006, 2008; Bakker *et al.*, 2007; Van Rhenen *et al.*, 2007).

Further observations include the conflation of the terms stress, distress and burnout. Additionally, stress is not considered to be a clinical condition (as is the case with depression or anxiety disorders), but tends to be defined in terms of a set of symptoms. An apparent consequence is that clinicians tend not to include analysis of stress, and the research tends not to be robust. Thus, although a number of sources are cited in this report, largely as a result of a more extensive and focused follow-up search, many are of dubious quality. Although it was possible to find a large number of studies that discussed different dimensions of stress, these studies tended not to cover the effects of organisational-level interventions or outcomes such as absenteeism and performance, and also tended not to include randomised research methods.

### **3.4.7 Interventions for distress**

In the case of studies on distress, although a number of interventions were covered, none of the research findings showed positive employment outcomes (Table B.35).

### **3.4.8 Interventions for burnout**

There was limited evidence on interventions aimed at addressing burnout in terms of quantity and quality (Table B.36). However, two studies (not RCTs) showed the positive effect of a good night’s sleep (Sonnenschein *et al.*, 2008; Ekstedt *et al.*, 2009).

### **3.4.9 Summary on interventions for mental health conditions**

The evidence base for interventions for those with MHCs was very weak. This is arguably very surprising, given the proportion of sick leave cases attributed to these conditions. Moreover, very little of the research that showed clear employment outcomes was UK based.

### 3.5 Overall summary of findings

Some research has been conducted on general health conditions, without being specific on particular conditions. This form of evidence highlights the importance of coordination and a case management approach, but strong quantitative evidence on their effectiveness has not yet been demonstrated. The review of evidence on musculoskeletal conditions shows how LBP has received a disproportionate level of attention in research studies, compared to other conditions. However, this has helped to produce a body of research on this area that includes consideration of employment outcomes and cost effectiveness. Other medical conditions within the field of musculoskeletal conditions have received less attention.

Little research has been conducted on cardio-respiratory conditions, which includes reference to employment outcomes. This gap in research is also evident for MHCs. Although stress (and the related concepts of distress and burnout) is very topical, research conducted does not yet appear to demonstrate the effectiveness of interventions aimed at addressing this condition.



## 4 Effectiveness of interventions by industry, firm size and job type

The sources included within this report were coded within the accompanying database according to whether or not they included reference to the type of industry within which the intervention took place, whether there was an indication as to the size of firm where the intervention took place, and whether job type of participants in the intervention were mentioned. Table 4.1 summarises these findings.

**Table 4.1 Inclusion of reference to industry, firm size and job type of participants within the sources**

Health condition	All studies included in this review	Number of studies including reference to:		
		Industry	Firm size	Job type
Musculoskeletal disorders	102	13	9	39
Mental health	41	18	14	19
Cardio-respiratory	11	1	1	9
Total	154	34	26	69

### 4.1. Industry and firm size

In terms of the type of industry, this was generally only referred to when an intervention took place within a particular organisation, or in the case of where it was applied, for example, to a job type such as nursing assistants or home workers.

For musculoskeletal conditions, two of the most highly researched areas appear to be work rehabilitation and physical exercise or graded activity where it is arguably likely that industry would be mentioned. For mental health conditions, again, a number of interventions were workplace based or involve stress management while others referred to placement or supportive employment. However, there was not sufficiently robust evidence to be able to clearly argue that a particular intervention would necessarily be most effective in a particular industry, since it was rare that comparisons between industry types were made. It is intended that the public sector should be an exemplar employer in the area of health and well-being, in terms of promotion of health and well-being, prevention of illness, early intervention for those with health conditions, and early rehabilitation of those who take time off work (Department for Work and Pensions, 2011a). However, existing evidence does not allow us to assess whether this is the case in practice.

In terms of firm size, in this report, we follow the European Union definition based on headcount that is consistent with UK companies. 'Large firms' are defined as those that employ over 250 people; medium-sized firms include those that employ between 50 and 250 employees; and small firms are defined as those employing less than 50 people (European Commission, 2003). A further category, micro businesses, employing less than 10 people, is not covered specifically in this review. Very few of the studies included any reference to firm size. Where industry was mentioned this was

predominantly large organisations (private or public sector), with the exception of two papers that referred to interventions for those who were self-employed. The evidence is not sufficient for any clear judgment to be made regarding the usefulness of interventions for small firms.

## 4.2 Job type

As indicated in Table 4.1, the job type of participants was more often referred to explicitly within studies than was the case for industry type or size. Part of the reason for this might be due to the way in which participants with health conditions were often recruited, which was via medical services rather than via an employer or other means. Where the intervention was intended to address employment outcomes such as return to work, it made sense for background data on employees to be included. However, it should be acknowledged that in over half of cases (85/154) job type was not explicitly highlighted. Yet, the degree to which an intervention is appropriate or effective is arguably very likely to depend on the type of job that a participant is engaged within.

## 4.3 Summary

Of 154 studies reviewed, 34 referred to industry, 26 explicitly or implicitly to firm size, and 69 to job type. However, many of these referred to supported employment for those with severe mental health conditions. Industry type was generally only referred to when an intervention took place within a particular organisation, or where a job type such as nursing assistants or home workers was the focus of the research. Also, it was rare for comparisons between industry types to be made. Very few of the studies within this report included reference to the size of the organisation within which the intervention was conducted. Job type was more often referred to, but this might have been due to the means used to recruit people.

# 5 Economic costs and benefits of interventions

This chapter of the report summarises the findings of existing meta-analyses of the available quantitative evidence on the economic benefits and costs of interventions.

‘Proving’ the economic case for investing in interventions is challenging, since many studies did not include quantitative data on costs or effect sizes. In particular, although studies examining health outcomes of interventions quite often included effect sizes, this was less often the case for those that also referred to **employment outcomes**.

The potentially most fruitful area for effect-size meta-analysis appears to be in the area of **musculoskeletal conditions (low back pain)**, and in particular, **multidisciplinary, workplace-based interventions**. Within this chapter, we briefly track the development of forms of meta-analysis, and then draw attention to the most useful findings with respect to their implications for future policy and practice.

## 5.1 The development of meta-analyses of interventions for low back pain

Non-specific low back pain (NSLBP) is one of the most common, and most costly, causes of absence from work. The effectiveness of interventions has been quite heavily researched, and there exist a series of early and recent meta-analyses considering various aspects of such interventions (Anema *et al.*, 2004; Steenstra *et al.*, 2006; Williams, Westmorland, Lin, Schmuck and Creen, 2007; Steenstra *et al.*, 2009; Carolli, Rick, Pilgrim, Cameron and Hillage, 2010; Lambeek, Bosmans *et al.*, 2010; Lambeek, van Mechelen, Knol, Loisel and Anema, 2010;). This literature has provided the basis for a step-change in the methodology for quantitative analysis of effectiveness of RTW interventions. Therefore, we have included a selected number of the above abstracts in Appendix C.

An evaluation of earlier studies suggests that systematic reviews were in general terms effective, but that higher-quality research, and greater quantitative rigour, were needed to be able to provide definitive answers (see, for example, Williams *et al.*, 2007). Promising starts on this were undertaken by the Netherlands group (Anema *et al.*, 2004), and in particular, a methodology for developing an econometric analysis was developed (Steenstra *et al.*, 2006). Nonetheless, there was little convergence of methodology, and it would be difficult to make any authoritative suggestions on the basis of the results obtained, not least because there was very great and unexplained variability in outcome.

## 5.2 Studies that provide potentially useful findings for policy and practice

More recent studies show a marked improvement in design (see, for example, Carolli *et al.*, 2010; Oesch *et al.*, 2010). Second, econometric analyses aimed at establishing true costs and benefits in financial terms have become the norm (Carolli *et al.*, 2010; Lambeek *et al.*, 2010a, 2010b). Third, the emerging study of sub-groups (Steenstra *et al.*, 2009) appears to provide, at last, the basis for significantly improving the cost-effectiveness of RTW interventions. The Steenstra *et al.* (2009) study draws attention to the following key points:

- 1 There is very great variability in the number of days before RTW.
- 2 Some of this variability is attributable to different 'sub-groups' within the population, with the major variables being age group and 'sickness in previous year'.
- 3 This sub-group effect involves an interaction with the intervention, with the older group and the 'sick previous year' group showing a much better response to the intervention.
- 4 In addition, these figures seem to suggest that, although the data are by no means linear, they are reasonably well fitted by a two-line model, with the first line being a rapid increase in those returning to work, and the second line – close to horizontal – being those who do not benefit from the intervention.

These findings have implications for how the field can move forward to substantially improve the cost-effectiveness of interventions – essentially by identifying those subgroups that cause this modifier effect on intervention efficacy.

### 5.3 The evaluation of meta-analyses on NSLBP

Firstly, the NSLBP literature includes some of the highest quality studies in the RTW field, allowing the quantitative effects on RTW to be determined using a form of RCT design, where the control intervention is 'care as usual'. Although some evidence existed to suggest that exercise was beneficial, the type of exercise was not clearly defined. In addition, the evidence suggested that ergonomic adjustments at work could also be beneficial. However, this form of intervention was likely to be undertaken subsequent to RTW, and was therefore intrinsically related not only to the risk of relapse but also to the willingness to RTW. In addition to this, evidence suggested that interventions were more beneficial to mature workers (over 44 years), and to workers who had taken sick leave in the previous year. In terms of the existing studies in this area, it is possible to make a reasonable econometric case that the total financial benefits from intervention outweigh the financial costs, with optimal approaches. However, the benefits of interventions tended to be more clear-cut after one year than at one month or two months.

It should also be noted that the studies revealed negative outcomes. For example, in the cited studies a substantial proportion (around 10 per cent to 25 per cent) of individuals remained off work after one year. Moreover, there was no clear evidence that clinical interventions were effective for NSLBP, or that there was an 'optimal' form of exercise. In addition to this, the overall effectiveness of interventions appeared to be lower than one would like, accounting for relatively small amounts of variance in RTW outcomes. This suggests that current approaches are missing important factors that may contribute toward effectiveness. Finally, there appeared to be little cross-disciplinary insight illuminating the field. The general level of analysis has improved during the last few years but this is still a general weakness in approach.

Five years ago, it would not have been possible to provide a clear answer to the following questions:

- 1 For which interventions is there a strong quantitative basis, allowing an evidence-based approach to policy formulation?
- 2 Can we be confident that the benefits of the policy-based interventions will outweigh the financial costs?
- 3 What are the key recommendations for good practice and future development?

Although it is still not possible to answer the first two questions authoritatively, there is now an emergent basis of international research that provides the potential for recommendations for further development. We return to this issue in our conclusions.

### 5.4 Summary

Most studies that cover employment outcomes do not include quantitative data on costs or effect sizes.

Moreover, the only area that currently offers sufficient evidence for effect-size meta-analysis appears to be in the area of workplace-based interventions for low back pain, where there are several early and recent meta-analyses. Earlier ones include those by the Netherlands group (Anema *et al.*, 2004), and the development of an econometric analysis (Steenstra *et al.*, 2006). More recently, econometric analyses have aimed at establishing costs and benefits in financial terms (Carolli *et al.*, 2010; Lambeek *et al.*, 2010a, 2010b), and include study of subgroups (Steenstra *et al.*, 2009). Identifying subgroups can show modifier effects on intervention efficacy. This has resulted in a moving forward in terms of the potential methods of analysis that might be used for the purpose of evaluating costs and benefits of interventions.

# 6 Current gaps and weaknesses in evidence base and priorities for further research

## 6.1 Gaps in research

There are many areas where research is either absent or limited. These gaps appear in terms of: a lack of quantitative data for employment outcomes; quantitative data that includes evaluation of costs and effects sizes; and quantitative research on employment outcomes for interventions relating to mental health conditions (MHCs) and cardio-respiratory conditions. Moreover, there is a lack of evidence allowing an evaluation of structural boundaries, and a lack of clarity on what is meant by 'sustained' employment.

### 6.1.1 Quantitative data for employment outcomes is very limited

This review raises concerns about the quality of research in the area, as is reflected in the conclusions of a range of reviews, many of which were cited earlier. For example:

- Burton *et al.* (2006) concluded that there are **few published studies** of the effectiveness of disease-modifying anti-rheumatic drugs in reducing work-related productivity loss.
- Trees *et al.* (2007) found an **absence of evidence** on outcomes of exercise programmes after knee injury such as daily activities, work and sporting activities.
- De Vries *et al.* (2006) found two studies that showed that early functional mobilisation leads to earlier return to work (RTW) than immobilisation for ankle sprains, but concluded that studies were generally of a **low quality methodology** so there were inconclusive results.
- Rubinstein *et al.* (2011) found that, regarding manipulative therapy for chronic low back pain (LBP), **data was particularly sparse** for recovery, RTW, quality of life and costs of care.
- Choi *et al.* (2010) reviewed studies on the value of exercise for the prevention of LBP disability. They concluded that there was **very low quality evidence** that the days on sick leave were reduced by post-treatment exercise at half to two years follow-up.
- Krupa (2007) suggests that although there is a sense of optimism about the potential of employment interventions for those with MHCs, **research is limited**.
- Fadyl (2009) reviewed evidence for vocational rehabilitation after brain injury and found that there was **very little evidence** for best practice in this area.
- Richardson and Rothstein (2008) carried out a meta-analysis of stress management intervention programmes and concluded that studies of stress management tend **not to cover** the effects of organisational-level interventions or outcomes such as absenteeism and performance, and also **tend not to include** randomised research methods, possibly due to the difficulty of carrying out experiments on organisational outcomes.
- Oostrom *et al.* (2009) concluded that the **lack of studies** made it impossible to investigate the effectiveness of workplace interventions among workers with MHCs and other health conditions.

Clinical research tends to be more robust in terms of quantitative outcomes, however, pharmaceutical interventions were often funded by the manufacturers (as indicated in the tables within Appendix B). Therefore, caution is recommended with these findings. On the other hand, occupational research can include employment outcomes as a focus, but the research can tend to be less quantitative. Arguably, health researchers need to be more aware of employment as an outcome, and researchers focusing on employment could perhaps learn lessons from health researchers in terms of design and impacts. Due to the lack of available evidence it might be better for research to be conducted by a multidisciplinary team.

It is, moreover, difficult to measure occupational outcomes of treatment or interventions, which might also contribute toward the lack of research in this area. As Pransky *et al.* (2000) argue, occupational outcomes have many dimensions and are very complex. At the same time, the degree to which particular employment outcomes will be of value to individual employers or employees will depend on the organisational context and employees' subjective feelings. For example, Levack *et al.* (2004) highlight how a return to employment might not result in health benefits, and how success at work can be defined in different ways, including the number of hours worked, productivity, or pay earned.

### **6.1.2 Quantitative data that includes costs or effect sizes is very limited**

Although studies examining health outcomes of interventions can quite often include effect sizes, this is less often the case for those that examine **work-related interventions**, and detail specific **employment outcomes**. Moreover, very little evidence includes information on the costs of interventions. This review raises concerns about the quality of research in the area, but also acknowledges the difficulty in measuring occupational outcomes (as outlined above). Various reviews of the literature also point to the need for more methodological rigour (see, for example, Clay *et al.*, 2010).

### **6.1.3 Relevant research on mental health conditions and cardio-respiratory conditions is very limited**

There is very limited evidence on the **employment outcomes of work-related interventions** for those with MHCs or cardio-respiratory conditions. Moreover, there are very few studies conducted within the UK which refer to employment outcomes for those with physical or MHCs. Yet, the context for the research might affect whether or not the intervention is effective. For example, as Lander *et al.* (2009) comment, in Denmark, the policy of 'flexicurity' means that there is promotion of a flexible labour market, but at the same time a degree of individual income security. Employers are able to dismiss employees at relatively short notice, and although unemployment compensation lasts for at least four years, the benefit is paid at a low rate. This system is different to that in the Netherlands, where employers have a much greater responsibility for the reintegration of employees into the workplace (Lander *et al.*, 2009).

### **6.1.4 Research often lacks acknowledgement of the structural boundaries**

Acknowledgement of the structural boundaries (e.g. large or small firm size, region, job type, individual worker background) is often not included in studies.

### 6.1.5 Research lacks clarity on what is meant by sustained employment

Longitudinal studies – tracking participants six months, one year, and two years after the intervention are rare. Moreover, where RTW is discussed it is often not stated whether the RTW is **sustained**, and the **type** of work that people return to. The Department for Work and Pensions (DWP) tends to use 13 weeks as a cut-off point. It is used as an indication that an ‘early intervention’ should take place before this time and also that a period of 13 weeks is regarded as sustained employment. Some of the research studies in this review usefully use a number of measurement points, tracking participants over a period of time. However, there seems to be a lack of consistency in the time points used, which may partly be a matter of pragmatism – depending on the type of intervention and the length of a research contract. Nevertheless, it could be argued that there is a need to consider longer-term outcomes, as is suggested by several studies where substantially different outcomes emerged at different time points (see Table 6.1).

**Table 6.1 The importance of measuring ‘sustained’ employment**

Author/date	Intervention	Method and sample	Country	Key findings
Leon <i>et al.</i> (2009)	Early cognitive behavioural therapy (CBT) in addition to rheumatologic care programme for those with musculoskeletal disorders (MSDs)	Randomised control trial (RCT) 181 patients (66 control-rheum only; 115 intervention)	Spain	No differences in duration of sick leave six months after intervention; relapse less in intervention group after 24 months
Bogefeldt <i>et al.</i> (2008)	Manual therapy programme including corticosteroid injections for LBP	RCT 160 patients	Sweden	After ten weeks, those on intervention significantly more likely to RTW; after two years no significant differences
Lie <i>et al.</i> (2008)	Vocational rehabilitation	RCT 467 patients sick-listed for 8-12 weeks for LBP	Norway	Individuals shifted between being sick-listed, RTW, and benefits an average of six times over three years. Intervention was effective after six months but not after three years. There was a decrease in the time spent on sick leave, but not better RTW

It should also be noted that if only assessing early RTW, this may not provide an accurate picture of outcomes. For example, people may continue at work although they are in severe pain. A study by Oostrom *et al.* (2010a) found that RTW was higher for those who had been determined to stay in work, irrespective of medical condition. Moreover, loss of employment is not necessarily due to the health condition. After two years there is more time for other factors (e.g. redundancy, personal problems, lifestyle choice) to impact on sustained employment. Therefore, the follow-up should also ideally include an assessment of why the person left employment.

### 6.1.6 Existent research does not usually separate out different client groups

Despite extensive published research, the evidence base on which to make informed decisions as to whether or not to intervene is generally limited. Where available, appropriately controlled studies have not led to strong effect sizes on key indicators such as RTW days.



However, studies which separate out different client groups for RTW (e.g. Steenstra *et al.*, 2009) lead to considerably more positive conclusions. These authors established a major benefit of the intervention on LBP, but only for clients aged over 44 years. For these clients, the RTW percentage after six months was over 90 per cent for the intervention group but only 62 per cent for the no-intervention group. By contrast, the intervention was much less effective (differentially) for the younger clients with 82 per cent RTW within six months in both the intervention and the no-intervention group (see Appendix C, study 8). Examination of the previous sickness records led to a further interesting dissociation. For the intervention group, RTW within three months for a group with no sick leave in the previous year was 50 per cent whereas the percentage for those with previous sick leave was 80 per cent. By contrast there was less difference between sick-leave groups in the no-intervention condition (50 per cent who were previously sick versus 40 per cent who were not previously sick). The outcome of this study is therefore two strong recommendations: that the interventions are of value for RTW in some circumstances, and that optimal effectiveness occurs for those who are over 44 years old and have had sick leave in the previous year. In contrast, if the researchers had not distinguished these groupings, their results would have suggested, at best, a very weak overall effect for the intervention because it would conflate three conditions with weak or non-existent benefits with one condition (44+, sickness in previous year) with very strong benefits. These findings therefore suggest that:

- there are subgroups in the population for which interventions have differing effectiveness including the under versus the over-45 age ranges, and those with and without illness in the previous year; and
- attempts to undertake a meta-analysis without this ‘partitioning’ of the dataset will lead to: a mixing of ‘sheep’ (those who show strong intervention effects) with ‘goats’ (those who don’t); excessive variability in the data and thus reduced effect sizes; and under-estimates of the optimal effectiveness of interventions.

It is therefore important to recommend that researchers provide richer analyses of their data, specifically separating out those ‘variables’ – such as age and previous sickness – known to have a significant effect on treatment effectiveness.

## 6.2 Priorities for future research

This review does not include learning disabilities or difficulties, since this is generally not included under ‘MHCs’. However, this would be a useful area to include in future research.

In addition, further work could be justified in order to address the gaps in knowledge detailed in Box 6.1.

### **Box 6.1 Overview of evidence gaps**

Areas where there is some research evidence, but little from the UK:

- MSDs, and in particular LBP;
- workplace multidisciplinary rehabilitation and exercise – for MSDs.

Areas where there seems to be a definite overall gap in research evidence:

- cardio-respiratory;
- MHCs, and in particular, stress or burnout, given the significant contribution of these to sickness absence and leaving the workplace for health reasons.

It is acknowledged elsewhere in this report that it is difficult to measure occupational outcomes. Nevertheless, the methods chapter of this report included a list of 'benefit indicators' that could be used. It is therefore recommended that firstly, clinical or medical research should include measurement of the effect of interventions on employment outcomes such as those referred to in Box 1.2 as intervention outcome indicators. This might be particularly relevant for research on cardio-respiratory conditions and depression. Secondly, it is suggested that further evaluative research should be developed and conducted which focuses on the latter two areas mentioned above: cardio-respiratory conditions and MHCs. These are, however, very large areas, encompassing a vast array of conditions (as noted earlier in Chapter 2). The initial focus might therefore be on more common respiratory conditions such as asthma, and less severe MHCs such as stress. Research in the latter field would, however, need to be undertaken with a clear conceptual understanding of what was understood by the term 'stress' in order to ensure that interventions were measuring the same condition. It is also suggested that, due to the lack of quantitative research in this area, the use of either carefully constructed surveys or randomised (or quasi-randomised) control methods should be used. Where quantitative methods are used, researchers should provide richer analyses of their data, specifically separating out those 'variables' such as age and previous sickness that are known to have a significant effect on treatment effectiveness. This research might then be complemented by the use of rigorous qualitative methods in order to evaluate subjective experiences.

# 7 Conclusions

As explained within the report, the evidence base on interventions that address employment outcomes for those with common physical and mental health conditions (MHCs) is generally very weak. Table 7.1 provides a snapshot of the findings of this report.

**Table 7.1 Overall summary of conditions, interventions, evidence base, and effects**

Health condition	Intervention type	Evidence base – quantity	Evidence base – quality	Evidence on effectiveness: positive/mixed/no effect/negative
Musculoskeletal disorders (MSDs)	Cognitive behavioural therapy (CBT)	Reasonable	Reasonable	Mixed
	Workplace based	Reasonable	Reasonable	Positive
Low back pain (LBP)	Graded activity/exercise	Reasonable	Weak	Mixed/no effect
	CBT	Reasonable	Reasonable	Positive
	Patient education	Quite weak	Quite weak	Positive
	Vocational rehabilitation	Reasonable	Reasonable	Positive
	Workplace based	Reasonable	Reasonable	Positive
Other MSDs				
Cardio-respiratory MHCs	Workplace based	Weak	Reasonable	Positive
	Psychological interventions	Weak – very mixed	Reasonable	Positive
Depression	Workplace based	Weak	Quite weak	Inconclusive
	Psychological/work-based interventions	Mixed types	Reasonable	Positive
Severe MHCs	Vocational rehabilitation	Weak	Reasonable	Positive/mixed
	Supported employment	Reasonable	Reasonable	Positive
Stress/distress and burnout	Psychological/stress management	Reasonable	Weak	Mixed/no effect

It can be seen that the only areas where there is a reasonably strong body of evidence, with positive effects, are:

- workplace-based interventions for those with MSDs and particularly for LBP;
- CBT and vocational rehabilitation for LBP; and
- supported employment for those with MHCs.

In terms of costs/benefits of interventions, however, even in these areas, evidence on costs is very weak. Moreover, there is limited reference to type of industry and firm-size, although some reference is made in a number of studies to job type, suggesting that the interventions may be limited to specific groups of workers.

This review therefore points to the need for additional and focused research to address the many gaps in the evidence base.

# Appendix A

## Methodology

### Box A.1 Main keyword search

Return to work; vocational/medical/occupational rehabilitation/therapy; work/job retention; workplace intervention; bio/psychosocial interventions; back to work; sickness absence; sickness management; absenteeism; sick leave; sick pay; early intervention; work/job loss; incapacity benefit.

### Box A.2 Health conditions

#### Musculoskeletal

Back/neck/shoulder injury/damage/pain; disc degeneration; vertebrae damage; upper limb/muscle/ligament injury/disorder/damage/sprain; upper extremity disorders (UEDs); thoracic pain; calcific tendonitis (shoulder); shoulder capsulitis; tension neck syndrome; whiplash associated disorder (WAD); impingement syndrome; tenosynovitis/peritenonitis (of wrist/forearm); tendonitis/epicondylitis/carpal tunnel syndrome (arm); repetitive strain injury (RSI); upper extremity disorder; upper limb disorder (ULD); spinal pathologies; spinal cord injury; backache; degenerative disc disease/prolapsed disc; sciatica; fibromyalgia; osteo/inflammatory arthritis; rheumatoid arthritis; ankylosing spondylitis; knee, foot and ankle injuries.

#### Cardio-respiratory disease

Angina; myocardial infarction (MI); abnormal heart rhythm; cardiovascular disease; cardiac failure; arterial disease; coronary heart/artery disease; hypertension; ischaemic heart disease; cardiopulmonary problems; respiratory conditions; (occupational/work exacerbated) asthma; chronic obstructive pulmonary disease (COPD); (occupational) lung disease; airflow limitation; rhinitis (nose).

#### Mental health

Dysthymia; anxiety disorders; personality disorders; panic disorders; social anxiety and phobia; post-traumatic disorders; obsessive compulsive disorders; eating disorders; affective disorders; neurological disorders; depression; major depressive disorder; stress; distress; burnout.

**Box A.3 Type of intervention****Clinical/medical/psychological**

Counselling; psychotherapy (interpersonal, psychodynamic; supportive); psychoanalysis; cognitive behavioural therapy/exposure therapy (CBT); hypnotherapy; psychiatric treatment; psychological interventions; psychoeducational interventions; private medical appointment; pain management/relief/control; physiotherapy; manipulation; early mobilisation; physical therapy; 'back school' electrotherapy; acupuncture; pharmacologic treatment; pharmaceutical treatment; antidepressant medication; functional capacity evaluation; functional restoration programme; physical conditioning programme (e.g. neck/back pain); on-line/internet support, e.g. psychotherapy; community mental health teams (CMHTS); community-based rehabilitation programmes; disease management programmes (for depression); early health assessment; primary care; fast-track referral; cardiac rehabilitation; cardiovascular therapy; pulmonary rehabilitation; complementary therapies.

**Primarily workplace-based**

Stress management; relaxation techniques; work hardening programme; occupational health support; exercise/gym/massage; health promotion at work; well-being at work; ergonomic assessment; workstation adjustments (e.g. mouse/keyboard); case management approach (workplace based/medical); line managers early contact; line manager awareness training; involvement of senior managers/Human Resources managers; worker representation/union involvement; management information systems (e.g. absence); changes in communication; participation in decision-making; employee engagement; return to work coordinator; rehabilitation plan; return to work interview; workplace equipment/adaptations/accommodations; working time adaptations/reduced hours/flexible hours; light/alternative duties; transitional work arrangements; job content re-evaluation; retraining; change to job; job (re)design; person-job-fit.

**Social**

Self-help; self-management (e.g. bibliotherapy); job search/job brokers; supported employment programmes/job placement; employee assistance programmes; vocational guidance/training; subsidised job placement; supported employment; employment service provision; financial/debt/benefits advice; loan/grant; transport; childcare arrangements; marital and family interventions; lifestyle modification.

#### **Box A.4 Databases, search engines and journals**

The main review covered the main intervention keywords: return to work; vocational/medical/occupational rehabilitation/therapy; work/job retention; workplace intervention; psychosocial interventions; back to work; sickness absence management; absenteeism; sick leave/pay; and work/job loss.

This was facilitated through using the following search engines and databases:

- Swetswise: a key to a range of databases in the field of social science.
- JSTOR: an archive covering scanned and original electronic versions of some 1,000 journals, mostly based in the US, with a primary focus on the humanities.
- EMERALD-INSIGHT: the electronic access facility for the Emerald stable of journals, which encompasses journals in the business and management sciences, policy, and related areas. Many of the Emerald journals have a strong practitioner focus or relevance.
- Cochrane Collaboration ([www.cochrane.org](http://www.cochrane.org)): Cochrane studies are included within PubMed, and focus on quantitative studies, particularly including randomised control trials. They include published research from National Institute for Health Research.

**Following discussion with Department for Work and Pensions, and as a result of a lack of data on stress/distress/burnout, a supplementary keyword search was undertaken through Ovid, and included the following databases:**

PsycINFO (psychological, social, behavioural and health sciences); Medline; Pubmed; and psycArticles (American Psychological Association).

The supplementary search involved reviewing:

- 500 sources for a keyword search of stress and return to work between the years 2008-11;
- 200 sources for stress and sickness absence (which mostly generated the same sources);
- 200 sources for distress and return to work;
- 200 sources for burnout and return to work;
- 200 sources for depression and return to work.

In addition to searching through the above search engines, the team also scanned the contents pages of the following journals for the years 2008-11:

#### **Clinical/medical journals**

American Journal of Occupational Therapy; Archives of Physical Medicine and Rehabilitation; British Medical Journal; Journal of Mental Health; Occupational and Environmental Medicine; Social Science and Medicine; Spine.

#### **Psychology/psychiatry journals**

American Psychologist; British Journal of Psychiatry; European Journal of Work and Organisational Psychology; Health Psychology Review; International Journal of Stress Management; Journal of Clinical Psychology; Journal of Occupational Health Psychology; Psychiatric Services.

#### **Vocational rehabilitation journals**

Disability and Rehabilitation; International Journal of Rehabilitation Research; Journal of Occupational Rehabilitation.

**Table A. 1 Robustness of evidence**

<b>Criteria for assessing all empirical studies</b>	<b>Additional criteria for evaluating quantitative research</b>	<b>Additional criteria for evaluating qualitative research</b>
Design of study (appropriate to the research aims)	Aims clear, focused and realisable. Identifiable objectives, leading to associated conclusions; appropriate and scholarly method	Aims clear, focused and realisable. Rigorous measurement and analysis of chosen phenomena
Appropriate use of longitudinal studies – time series studies (random) or panel data (same people)	Use of similar sampling methods (in the case of series studies) and measuring instrument	Less relevant. However, results should be transferable
Appropriate use of cross-national studies and comparative research	When appropriate, use of similar sampling methods and measuring instruments	When appropriate, relevant comparative case studies
Elimination of bias	Objective approaches to questionnaire construction (where relevant), sampling (where relevant), experiment design (where relevant) and analysis	Due reflection on the role of the researcher
Ethical considerations taken into account	In the case of experimental research, safety of subjects and when desired by the latter, anonymity; anonymity in survey responses, when desired by respondents	Anonymity when desired by respondents In observation based research, ethical issues covered Securing access ethically
Appropriate population and sampling frame	Degree to which the study is representative and replicable; appropriate sampling method Survey – appropriateness of scale	Appropriate style of interviewing (semi-structured; in-depth; unstructured)
	Validity (whether a measure/group of measures really measures a concept; internal reliability (correlation between indicators, e.g. using Cronbach's Alpha)	Validity
Use of pilot study	Access secured, measuring instrument and sampling procedure prove appropriate	Access secured; methods prove appropriate for study, and yielding useful results
Appropriate forms of analysis	Appropriate statistical tests establishing associations/the direction of causality; account taken of other potential causal variables; statistical significance; effect size; cost-effect size	Appropriate use of structured tools, e.g. Nvivo, Atlas etc. or effective and coherent open-ended analysis; appropriate use of quantification; reflexivity
Appropriate generalisation	Probability sampling for surveys	Findings have broader relevance; methods replicable

# Appendix B

## Summary tables of the findings of evaluated studies

**Table B.1** Country codes used in tables to indicate where interventions took place

<b>Country code</b>	<b>Country</b>
Aus	Australia
C	Canada
Ch	China
Cz	Czech Republic
Dk	Denmark
E	England
F	Finland
Fr	France
G	Germany
HK	Hong Kong China
I	Ireland
Is	Israel
J	Japan
NL	Netherlands
N	Norway
NZ	New Zealand
SK	South Korea
Sl	Slovenia
Sp	Spain
Sw	Sweden
Switz	Switzerland
T	Turkey
Tw	Taiwan
UK	United Kingdom



**Table B.2 Coordination**

<b>Author/date</b>	<b>Intervention and country</b>	<b>Method and sample</b>	<b>Key findings</b>
Kärrholm <i>et al.</i> (2006)	Co-ordinated rehab Country=Sw	64 rehabilitees employed by a public sector employer	Reduced sick leave and costs
Veiersted and Heggnes (2007)	Multi-disciplinary rehabilitation Country=N	Randomised control trial (RCT). Intervention group, 183 patients with long-term sick leave (mean 12.2 months); control group 96, on sickness insurance Note: Two different sources were used for the sample	Improved RTW for intervention group
Franche <i>et al.</i> (2005)	Workplace interventions for return to work (RTW)	Review. Systematic review of the quantitative literature	Strong evidence that work disability duration is significantly reduced by contact between healthcare provider and workplace
Tompa <i>et al.</i> (2008)	Disability management interventions	Review. A systematic review of disability management interventions with economic evaluations	Moderate evidence for interventions including a work accommodation offer, contact between health care provider and workplace, early contact with worker by workplace, ergonomic work site visits, and interventions with a RTW coordinator
Carroll <i>et al.</i> (2010)	Workplace interventions for RTW	Review. Controlled intervention studies and economic evaluations examining interventions for RTW for those with MSDs and long-term sickness absence	The majority of trials were of good or moderate quality. Interventions involving coordination between employees, health practitioners and employers to implement work modifications were more consistently effective than other interventions

**Table B.3 Case management**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Høgelund and Anders (2006)	Case management interviews Country=Dk	1,000 sick-listed employees	Improved RTW for an existing employer but not new employer
Drews <i>et al.</i> (2007)	Motivation, goal setting, and planning of return to work/ case management Country=Dk	2,795 people in six municipalities on sick leave for at least 21 days. 264 in intervention group; 746 in control group	Standard case management approach as effective as intervention in reducing sick leave and return to work

**Table B.4 Summary table of interventions for musculoskeletal conditions**

Condition	Clinical or medical	Physical exercise/ graded activity	Functional restoration	Manual or physical	Education/ counselling	Medical advice	Psychological/ CBT	Rehabilitation	Work rehabilitation	Job placement	Social	Total
MSDs/injuries	3					4	3	1	6	1		18
Low back pain (LBP)	2	13	3	3	6	1	4	8	8			48
Neck and back		2					1	2	2			7
Upper limb	4	2	1					2				9
Lower limb		4	1									5
Arthritis/rheum	2								3		1	6
Fibromyalgia								2				2
Ank spond	2											2
Spine/back surgery	2	2								1		5
Total	15	23	5	3	6	5	8	15	19	1	2	102

**Table B.5 Medical and clinical interventions for musculoskeletal conditions and injuries**

Author/date	Intervention	Method and sample	Key findings
Lloyd <i>et al.</i> (2008)	Occupational rehabilitation Country=Aus	Review	Impact of depression on those with MSDs and usefulness of occupational rehabilitation for RTW
Abasolo <i>et al.</i> (2007) Co-author Lajas is also a co-author in a number of MSD sources cited in this review	Intervention run by rheumatologists Country=Sp	Randomised study. 13,077 patients with MSDs (most frequent cause: back pain)	Follow up at 12 months. Temporary work disability episodes were significantly shorter in the intervention group (except for knee pain and excluding osteoarthritis)
Hammond (2008)	Various	Review	Vocational rehabilitation prevents job loss in rheumatic diseases. Moderate to good evidence for work conditioning programmes using CBT for LBP and early RTW for subacute LBP

**Table B.6 CBT interventions for musculoskeletal conditions and injuries**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Leon <i>et al.</i> (2009)	Early CBT in addition to rheumatologic care programme Country=Sp	RCT. 181 patients: 66 control with rheumatologic care only; 115 intervention	No differences in duration of sick leave six months after intervention; relapse less in intervention group after 24 months
Bethge <i>et al.</i> (2010) Could not access whole article	Intensified work-related programme following a CBT approach Country=G	Cluster randomised trial -236 patients	After six months, higher work-related self-efficacy and higher chance of RTW with better mental condition
Heinrich <i>et al.</i> (2009)	Physical training with CBT and workplace-specific exercises (PTCBWE) or physical training Country=NL	Pragmatic RCT Self-employed people with new work disability claim due to MSDs. 76 allocated to PTCBWE intervention and 75 control; 53 physical training and 50 control	Measured at baseline, six months and 12 months. After 12 months no difference in claim durations in either arm of the study

**Table B.7 Rehabilitation for musculoskeletal conditions and injuries**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Huppe <i>et al.</i> (2006) Could not access whole article	Multidisciplinary medical rehab Country=G	RCT. 230 workers with work disability for MSDs	Sick leave reduced for both groups compared to six months prior to study. No difference between intervention and controls

**Table B.8 Workplace-related interventions for musculoskeletal conditions and injuries**

Author/date	Intervention	Method and sample	Key findings
Bultmann <i>et al.</i> (2009)	Coordinated and tailored work rehabilitation Country=Dk	RCT with economic evaluation. Workers on sick leave with MSDs	Measured at baseline, three months and 12 months, sickness absence hours significantly lower for intervention group
Clayton and Verow (2007) Mixed treatments	Advice by healthcare professionals; work modifications Country=UK	Postal questionnaire. 453 patients who had hip resurfacing/hysterectomy	Advice given on when to RTW appeared to have greatest influence on RTW times. Temporary work modifications for 36 hip patients had no effect on sickness absence
McCluskey <i>et al.</i> (2006)	Occupational health guidelines-based rehabilitation early contact; addressing psychosocial barriers; temporarily modified work; coordination Country=UK	Non-randomised controlled trial within UK company. 1,435 workers intervention group; 1,483 workers usual care	At site where intervention delivered per protocol, absence significantly less than control group. Organisational obstacles affected uptake and delivery in other site
Van Oostrom <i>et al.</i> (2009)	Workplace interventions Country=UK	Review of RCTs	Moderate quality evidence to support use of workplace interventions to reduce sickness absence
Streibelt <i>et al.</i> (2006) Could not access whole article. In German only	Work-related medical rehabilitation Country=G	Randomised follow-up study of 494 patients of a regional insurance company. Need for Medical Occupational Orientation (MBO – Medizinisch-berufliche Orientierung) diagnosed in 222 patients randomised into intervention and control group, as were others	Six months after intervention, risk of unemployment is decreased for intervention groups
Carroll <i>et al.</i> (2010) Also reported above	Workplace interventions for RTW	Review of controlled intervention studies	Economic evaluations indicate that interventions with workplace component likely to be more cost effective than others

**Table B.9 Medical advice and minimal interventions for musculoskeletal conditions and injuries**

Author/date	Intervention	Method and sample	Key findings
Nystuen and Hagen (2006)	Voluntary solution-focused intervention offered by social-security offices Country=N	RCT. 703 employees on long-term sick leave with psychological problems or MSD	No more effective than regular follow up for employees on long-term sick leave due to psychological problems or musculoskeletal pain
Dunstan and Covic (2007)	Clinical guidelines-informed multidisciplinary work-related activity programme (community based) Country=Aus	Uncontrolled, repeated-measures pilot study. 30 participants with MSDs and off work for average 13 months	After six months no significant change in employment status (but there were changes in health outcomes)
Busch et al. (2007)	Self-efficacy beliefs (not intervention as such) Country=Sw	Questionnaire and register data. 233 people with non-specific chronic MSDs	After one year, subjects with negative recovery beliefs were more likely to be receiving sickness benefits
Fleten and Johnson (2006) Also see mental health section of this review report	Minimal postal intervention-letter and questionnaire after 14 days' sick leave Country=N	RCT. 495 sick-listed people	The intervention significantly reduced length of sick leave in subgroups with mental disorders, (and with rheumatic disorders and arthritis) and overall for sick leave lasting 12 weeks or more

**Table B.10 Job placement interventions for musculoskeletal conditions and injuries**

Author/date	Intervention	Method and sample	Key findings
Li-Tsang et al. (2008)	Job placement and support programme/self placement as control Country=HK	RCT. 66 workers with MSDs having difficulties in RTW	RTW significantly higher in intervention group

**Table B.11 Functional restoration, physical conditioning and work hardening programs for LBP**

Author/date	Intervention	Method and sample	Key findings
Sivan et al. (2009)	Functional restoration programme (exercise, hydrotherapy, gym, CBT) Country=UK	Uncontrolled clinical series. 118 low back pain patients	The proportion of patients who were seriously affected in the workplace had dropped from 59 to 22 per cent. Functional restoration programme improves the functional activity and vocational status of patients with chronic low back pain
Bontoux et al. (2009) No control group	Intensive functional restoration Country=Fr	Evaluation of work status and sick leave. 87 severely impaired LBP patients	Sick leave reduced by 60 per cent compared to two years prior to the programme
Schaafsma et al. (2010)	Physical conditioning programmes	Review of RCTs and cluster RCTs	Workers with acute back pain – no effect on sickness absence; chronic back pain conflicting results; subacute back pain conflicting results but positive effect if workplace involvement

**Table B.12 Graded activity and exercise interventions for LBP**

Author/date	Intervention	Method and sample	Key findings
Staal et al. (2008)	Graded activity Country=NL	Subgroup analysis of previous RCT of 134 Dutch airline workers after 12 months	After 12 months, some RTW. Disability, fear-avoidance beliefs and physical activity affected RTW
Hagen et al. (2010) Could not access whole article	Physical exercise programme Country=Dk	RCT. 246 patients sick-listed 8-12 weeks for LBP (intervention group, 124; control group, 122)	Two year follow-up. Intervention had no additional effect on sick leave and RTW
Reme et al. (2009) Lack of clarity on whether results are causal or associational	Brief intervention (BI) program/BI and physical exercise Country=N	RCT. 246 patients sick listed 8-12 weeks for LBP	No significant differences in RTW. After 12 months, predictor of RTW (negative association) was visit to physiotherapist
Linton et al. (2005) Could not access whole article	CBT and exercise Country=Sw	RCT. 185 patients seeking care for LBP. Three groups: CBT; CBT and exercise; minimal treatment	Both intervention groups had fewer days absent from work within 12 months, and were less likely to develop long-term sick disability leave than minimal intervention. No difference between intervention groups

Continued

Table B.12 Continued

Author/date	Intervention	Method and sample	Key findings
Nordin <i>et al.</i> (2006) Could not access whole article	Graded activity with CBT and exercise/surgery	Review of systematic reviews and RCTs	Weak to moderate evidence that graded activity assists RTW for those with subacute nonspecific LBP; moderate evidence that surgery is as effective as CBT for those with chronic nonspecific LBP
Brox <i>et al.</i> (2010)	Cognitive intervention and exercise/surgery Country=N	24 patients with disc degeneration and at least one year of chronic LBP	After four years, no difference in RTW
Hlobil <i>et al.</i> (2005)	Graded activity Country=NL	RCT. 134 sick-listed workers (126 men) with non-specific LBP	After 12 months, intervention group RTW faster, and better outcomes regarding number of recurrent episodes of sick leave, total number of days sick leave but not statistically significant
Hlobil <i>et al.</i> (2007) (Same study as Hlobil <i>et al.</i> , 2005)	Graded activity Country=NL	RCT. 134 sick-listed workers (126 men) with non-specific LBP	After one year and after three years, productivity savings in intervention group
Steenstra <i>et al.</i> (2006c)	Graded activity Country=NL	RCT. 112 workers absent from work for more than eight weeks due to LBP	Graded activity prolonged RTW (delay in the start of the graded activity programme)
Van der Roer <i>et al.</i> (2008) Recruited from one health insurance company that would fund the protocol. Van Mechelen is a co-author in many other studies covered within this review	Graded activity Country=NL	Pragmatic RCT. 114 patients with non-specific chronic LBP of more than 12 weeks duration	No significant differences in sick leave between treatment groups at 6, 13, 26, 52 weeks
Wright <i>et al.</i> (2005) Does not compare with a 'usual care' control group	Exercise Country=UK	RCT. Participants off work for less than year with LBP. Two fast track interventions	Those with individual treatment and group exercise less days off of work since entry into intervention
Petersen <i>et al.</i> (2007) No control groups	Exercise therapy intervention Country=Dk	RCT. 260 patients with chronic LBP. Two groups: exercise intervention and strengthening training	After 14 months no difference in disability or sick leave outcomes between treatment groups
Choi <i>et al.</i> (2010)	Exercise	Review. Exercise for prevention of LBP disability up to 2009	Very low quality evidence that the days on sick leave were reduced by post-treatment exercise at half to two years follow-up

**Table B.13 Manual therapy and physiotherapy interventions for LBP**

Author/date	Intervention	Method and sample	Key findings
Bogefeldt et al. (2008)	Manual therapy programme including corticosteroid injections. Country=Sw	RCT over ten week period. 160 patients	After ten weeks, those on intervention significantly more likely to RTW; after two years no significant differences
Rubinstein et al. (2011)	Manipulative therapy for chronic LBP	Review: RCTs	Data was particularly sparse for recovery, RTW, quality of life and costs of care
Nordeman et al. (2006)	Early access to physical therapy. Country=Sw	RCT: 60 patients. Early (within two days) access to physical therapy/four week waiting list	No significant difference in sick leave between groups

**Table B.14 CBT and psychological interventions for LBP**

Author/date	Intervention	Method and sample	Key findings
Menzel and Robinson (2006). High drop-out rate in intervention group	CBT. Country=US	RCT. 32 registered nurses and nursing assistants with history of back pain	After 12 weeks, depression scores accounted for one-third of variance in hours absent because of back pain
Schweikert et al. (2006)	CBT. Country=G	RCT. 409 patients with LBP	Six months after rehab, patients in intervention group absent from work less than usual care
Linton and Nordin (2006)	CBT (five-year follow-up) Country=Sw	RCT. 213 original participants. CBT/usual care plus information on self-care. Note: does not include usual care control group	CBT group had lower risk of long-term sick leave, less lost productivity, and lower total cost than information comparison group
Hoffman et al. (2007)	Psychological interventions for chronic LBP	Review: Meta-analysis of RCTs (up to 2004). Only 36 per cent of 22 studies covered employment outcomes	Multidisciplinary approaches that included a psychological component, had positive (moderate) long-term effects on return to work



**Table B.15 Medical advice, education and counselling for LBP**

Author/date	Intervention	Method and sample	Key findings
Caitriona <i>et al.</i> (2008)	Working Backs Project intervention – changes to pathways and guideline-based health promotion Country= <i>Ir</i>	Questionnaire	LBP-related sickness absenteeism in previous year had not decreased significantly
Faber <i>et al.</i> (2005)	Training GPs and occupational physicians to collaborate Country= <i>NL</i>	Controlled clinical trial. 112 patients with LBP	Patients in intervention region returned to work significantly later
McGuirk and Bogduk (2007)	Evidence-based care – pain management for LBP Country= <i>Aus</i>	Audit of data, workers in health service	Workers with intervention had less time off work and spent less time on modified duties
Engers <i>et al.</i> (2008)	Patient education	Review of RCTs	For patients with subacute LBP there is strong evidence that 2.5 hour educational intervention is more effective for short-term and long-term RTW, but less intensive education was not more effective than no intervention
Godges <i>et al.</i> (2008)	Education and counselling Country= <i>US</i>	RCT. 34 participants unable to RTW following LBP	After 4-5 days, intervention group higher rate of RTW
Magnussen <i>et al.</i> (2007)	Brief vocational-oriented intervention – education, reassurance, motivation, vocational counselling Country= <i>N</i>	RCT. Participants who had received disability pension for more than a year	After one year, intervention had no statistically significant effect on RTW, although twice as many in intervention group had entered the RTW process

**Table B.16 Lumbar supports for those with LBP**

Author/date	Intervention	Method and sample	Key findings
Roeiofs <i>et al.</i> (2007). Could not access whole article	Short course on healthy working methods, with and without use of lumbar support Country= <i>NL</i>	RCT. 360 home care workers with self-reported history of LBP	Over 12 months, intervention group with lumbar support did not have decreased sick days
Van Duijvenbode <i>et al.</i> (2008)	Lumbar support	Review	Conflicting evidence on whether RTW. Little evidence for reduction of sick leave

**Table B.17 Rehabilitation interventions for LBP**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Norlund et al. (2009)	Multidisciplinary rehabilitation <i>Country=mainly studies from Scandinavia</i>	Review of RCTs or controlled clinical trials. Effectiveness on RTW for people on sick leave due to LBP	Intervention significantly increased the rate of RTW in patients with subacute pain. No significant difference in the rate of RTW for patients with chronic pain.
Lie et al. (2008)	Vocational rehabilitation <i>Country=N</i>	RCT. 467 patients sick-listed for 8-12 weeks for LBP	Individuals shifted between being sick-listed, RTW, disability pension an average of six times over three years. Intervention was effective after six months but not after three years. So it decreased the time that individuals were on sick leave
Kool et al. (2007)	Function-centred rehabilitation/(FCT) pain centred treatment (PCT) <i>Country=Switz</i>	RCT. 174 patients with more than six weeks sick leave	After one year, intervention group (FCT) had significantly more work days than PCT control group. Differences in unemployment rate and numbers receiving permanent disability pension not significant
Hagen (2006) Whole article in Norwegian and not translated	Light mobilisation treatment – including advice on staying active <i>Country=N</i>	Randomised trial. 451 patients sick-listed 8-12 weeks for LBP	After one year and three years, intervention programme had significant effect on reducing sick leave and sickness compensation
Dibbelt et al. (2006) Greitemann et al., 2006, published same study elsewhere. Could not access whole articles, which were in German	Multidisciplinary in-patient treatment programme <i>Country=G</i>	Prospective longitudinal study. 307 patients intervention; 176 patients standard rehab	Ten months after discharge, positive effects on sick days and RTW for intervention group
Westman et al. (2010) Employment outcomes not sufficiently defined; control group used different health care unit.	Multidisciplinary pain rehab programme <i>Country=Sw</i>	Controlled three year follow-up: 89 patients intervention group; 69 patients control group – but different health care unit	After three years, work capacity slightly higher in intervention group
Bahrke et al. (2006) Could not access whole article	Psychological – pain management <i>Country=G</i>	Controlled clinical trial, 163 participants were blue-collar insurants with pain history of average 9.6 years; 252 had standard orthopaedic rehabilitation	Greater decrease in sick leave days for intervention group
Schiltenswolf et al. (2006)	Biopsychosocial intervention including psychotherapy <i>Country=G</i>	RCT. 64 patients with first time sick leave between 3-12 weeks due to LBP. Two groups-biomedical therapy/ biopsychosocial therapy	Two years after therapy, higher proportion of those in intervention group required no further sick leave due to LBP

**Table B.18 Workplace rehabilitation interventions for LBP**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Williams <i>et al.</i> (2007)	Workplace rehabilitation interventions-systematic review 1982-2005	Review. Workers with LBP	Clinical interventions with occupational interventions and RTW or modified work interventions were effective in achieving quicker RTW.
Lambeek <i>et al.</i> (2010a)	Integrated care – patient directed and workplace directed intervention-ergonomics, graded activity based on CBT Country=NL	RCT. 134 patients with LBP	Earlier median duration until sustainable return to work for intervention group (88 days/208 days)
Lambeek <i>et al.</i> (2010b)	Integrated care – patient directed and workplace directed intervention-ergonomics, graded activity based on CBT Country=NL	RCT. 134 patients with LBP and economic evaluation	After 12 months follow up, costs for intervention group were lower than for usual care group
Van Duijn <i>et al.</i> (2010)	Structured interventions including work-focused ones	Review, interventions for workers with LBP and costs/benefits	The only early interventions likely to be cost beneficial are inexpensive work-focused enhancements
Anema <i>et al.</i> (2004)	Ergonomic interventions Country=Dk, G, Israel, Sw, NL	Questionnaires and interviews Multinational cohort of 1,631 workers fully sick-listed for three to four months due to LBP	Workplace adaptations were effective for RTW. Adaptation of job tasks and working hours were effective for RTW after more than 200 days' sick leave
Steenstra <i>et al.</i> (2006)	Multi-stage RTW programme – work modifications, case management, physio, and usual care by occupational physician Country=NL	RCT. Workers sick-listed for two to six weeks due to LBP	Measured at start, 12 weeks, 26 weeks, 52 weeks of sick leave. Intervention group RTW earlier than usual care group and slightly higher costs
Steenstra <i>et al.</i> (2009)	Workplace intervention Country=NL	RCT subgroup analysis. 196 workers with sick leave due to subacute nonspecific LBP	Intervention is more effective for workers with previous sick leave for RTW

Continued

**Table B.18 Continued**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Anema <i>et al.</i> (2007)	Workplace rehabilitation/ graded activity	RCT. 196 participants sick-listed two to six weeks for non-specific LBP randomised to workplace rehabilitation/usual care. 112 participants still sick-listed at eight weeks randomised into graded activity	Follow-up at 12, 26, 52 weeks after sick leave started. Time until RTW for those in workplace rehab less than control group. Graded activity had a negative effect on RTW

Note: participants were sick-listed for two to six weeks so workplace rehabilitation more feasible than if one-year sick-listed. Graded activity was delivered after workplace rehabilitation – this may not be a true comparison of interventions.

**Table B.19 Neck and back pain: interventions**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Sjostrom <i>et al.</i> (2008) No control group	Multidisciplinary rehab programme – exercise, relaxation, ed, guidance Country=Sw	Forty women and 20 men MSDs and particularly neck and back pain	At two-year follow-up, full-time sick leave had decreased by 37 per cent for women and 25 per cent for men
Kongsted <i>et al.</i> (2007) Could not access whole article	Active mobilisation for whiplash injury Country=Dk	Randomised parallel-group trial. 458 participants. Three groups – immobilisation then active mobilisation; advice to act as usual; active mobilisation	Follow-up 3, 6, 12 months post injury. No significant difference in RTW in intervention groups
Baltov <i>et al.</i> (2008)	Intensive rehabilitation programme (Social support at work.) Country=Ca	Interviews: 28 patients with chronic whiplash associated disorders	Greater social support at work was prognostic of RTW at programme completion
Lindell <i>et al.</i> (2008)	CBT Country=Sw	RCT. 125 Swedish primary care patients	After 18 months, RTW equivalent between groups.

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Table B.19 Continued

Author/date	Intervention	Method and sample	Key findings
Jensen et al. (2009)	Work-oriented rehab – two different evidence-based interventions Country=Sw	Prospective observational study with follow up seven years after rehab	Those in full-time multidisciplinary programme with less than 60 sick days before rehab had less sickness absence than matched controls Those in low-intensity programme with more than 60 days sick leave before rehab have significantly higher risk of disability pension
Blangsted et al. (2008)	Two worksite physical activity programs to reduce MSD symptoms in neck and shoulders Country=Dk	RCT. 549 Office workers. Specific resistance training; all-round physical exercise; information only	Neither work ability index scores nor sick leave affected by physical activity interventions (Conclusions suggest that this is because of low levels prior to interventions)
Rosenfeld et al. (2006) Could not access whole article	Active intervention using early mobilisation/standard intervention of rest, short-term immobilisation, self-exercise programme Country=Sw	RCT. Participants with whiplash trauma	Active intervention significantly better in reducing sick leave

Table B.20 Interventions for upper limb and extremities

Author/date	Intervention	Method and sample	Key findings
Meijer et al. (2006)	Outpatient multidisciplinary treatment – psych and phys sessions Country=SI	RCT. Sick-listed patients with non-specific upper extremity MSDs 38 participants	Measured at 2, 6 and 12 months. Intervention was as effective as usual care in achieving RTW. After 21 months, extra costs and gains not significantly higher for intervention
Burger et al. (2007) Small sample	Prosthetic hand after partial hand amputation Country=SI	112 questionnaires (48 returned)	Less than half able to do same work as before amputation
Cheng et al. (2007)	Workplace-based work hardening/clinic-based work hardening for rotator cuff disorder (shoulder) Country=NL	RCT, 103 workers	After four weeks, higher RTW for workplace-based intervention group (and health benefits)

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**Table B.20 Continued**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Osteras <i>et al.</i> (2008) No 'usual care' control groups	Exercise Country=N	RCT. 61 patients randomly assigned to high dosage medical exercise therapy/low dosage exercise therapy	Reduction in costs of sick leave for high dosage group significantly higher than low dosage group
Katz <i>et al.</i> (2005)	Surgery for carpal tunnel syndrome Country=US	Questionnaires at 2, 6, 12 months after operation. 181 patients.	Sustained absence due to a range of variables including less supportive organisational policies and practices
Ratzon <i>et al.</i> (2006)	Surgery for carpal tunnel syndrome Country=Is	Questionnaires and objective testing. 50 employed patients	RTW up to 90 days varied greatly. Surgeon's recommendations of when to RTW were strongest predictor of delayed RTW (See also Clayton and Verrow 2007 – MSDs)
Kilicaslan <i>et al.</i> (2009) Could not access whole article	Surgery for carpal tunnel syndrome Country=T	30 patients post surgery – random selection for open and endoscopic method	Faster RTW for endoscopic method
Pomerance and Fine (2007)	Post-operative therapy for carpal tunnel syndrome Country=US	Prospective randomised study. 150 patients randomised into therapist-led exercises/home therapy exercises	No difference in RTW times for both groups. However patients covered by workers compensation insurance slower to RTW
Kim <i>et al.</i> (2008)	Various interventions Country=various	Review. Best evidence synthesis of articles published 1996-2007	Multimodal interventions (biomedical and ergonomic) offer the optimal solution for RTW/work retention

**Table B.21 Interventions for lower limb and ankle**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Trees <i>et al.</i> (2007) Also published in another journal, 2005	Exercise programmes after knee injury	Review. Included RCTs and quasi-experimental trials	Absence of evidence on outcomes of exercise programmes after knee injury such as daily activities, work and sporting activities
Kerkhoffs <i>et al.</i> (2002) Reviewed trials were of low quality	Immobilisation versus functional treatment for ankle sprains	Review. Included RCTs and quasi-randomised controlled trials	Patients returned to work more quickly after functional treatment – but trials were low quality

Continued

Table B.21 Continued

Author/date	Intervention	Method and sample	Key findings
De Vries <i>et al.</i> (2006) Low quality methodology. Data up to 2005	Various interventions for ankle sprains	Review of RCTs and quasi-randomised trials	Two studies showed that early functional mobilisation leads to earlier RTW than immobilisation for ankle sprains, but generally low quality methodology so inconclusive results
Van Rijn <i>et al.</i> (2010) Authors report that most of included studies had high risk of bias.	Supervised exercises for patients with acute lateral ankle sprains	Review of RCTs and quasi-randomised controlled trials	Follow-up at two weeks, three months, three months+ (referred to as long term). No strong evidence of effectiveness of intervention
Vioreanu <i>et al.</i> (2007)	Early mobilisation Country= <i>Ir</i>	RCT. 62 patients with ankle fractures	Reviewed after 9 and 12 weeks. Intervention group had earlier RTW

Table B.22 Arthritis and rheumatism interventions

Author/date	Intervention	Method and sample	Key findings
Van den Hout <i>et al.</i> (2007)	Multidisciplinary job retention voc rehab programme Country= <i>NL</i>	Random assignment to intervention or usual care 121 patients with chronic arthritis	No significant differences in productivity or health outcomes
Lacaille <i>et al.</i> (2008) Small study	Employment and arthritis making it work self-management program Country= <i>Ca</i>	Proof of concept study. 19 employed women with inflammatory arthritis	General findings related to participants successfully making work accommodations and work productivity
Allaire <i>et al.</i> (2005)	Job retention intervention Country= <i>US</i>	Randomised trial. 122 participants with rheumatic diseases; 120 controls with written materials	Employment status assessed at six month intervals up to 48 months. Job loss was delayed in experimental participants
Bejarano <i>et al.</i> (2008) Researchers employed by the private sector funder of research	Pharmaceutical intervention Country= <i>UK</i>	RCT. Early rheumatoid arthritis patients, 75 with drug, 73 without	Treatment reduced job loss and improved productivity

Continued

**Table B.22 Continued**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Burton <i>et al.</i> (2006) No intervention – paper refers to lack of evidence	(no intervention)	Review of productivity loss due to rheumatoid arthritis	There are few published studies of the effectiveness of disease-modifying anti-rheumatic drugs in reducing work-related productivity loss
De Buck <i>et al.</i> (2006)	Sick leave Country=NL	Multicentre randomised controlled trial. 112 participants with chronic arthritis and disease-related problem at work	After two years, complete (full-time) sick leave was found to be an independent risk factor for job loss [Note: If health problems worsened, employees would be more likely to leave their job so the effect of sick leave per se on job loss is questionable]

**Table B.23 Fibromyalgia interventions**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Skouen <i>et al.</i> (2006)	Multidisciplinary treatment programme – cognitive strategies, exercise Country=N	Randomised study. Extensive/light programme/treatment as usual. 208 patients on sick leave for average three months	Follow-up 54 months after treatment. Extensive programme resulted in significantly fewer days' absence for women. For men, light programme significantly more days' absence than usual treatment
Torres <i>et al.</i> (2009) No control group	Multidisciplinary pain programme Country=Sp	Questionnaires. 98 patients on sick leave	48 RTW at discharge; 50 at 12 month follow-up

**Table B.24 Ankylosing spondylitis interventions**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Keat <i>et al.</i> (2008)	Biologic therapy Country=UK	65 patients receiving TNF blockade therapy at two hospitals	'Successful' outcomes. Four out of 19 patients previously unable to work returned to employment; two increased from part-time to full-time; those working (50) reduced sick leave
Barkham <i>et al.</i> (2010). Funder is pharmaceutical company	Pharmaceutical – etanercept Country=UK	Randomised trial. 40 patients with active ankylosing spondylitis in unstable work	After 12 weeks, risk of job loss lower for intervention group



**Table B.25 Spinal cord injury and back surgery interventions**

Author/date	Intervention	Method and sample	Key findings
Lidal <i>et al.</i> (2007)	Various (country= various)	Systematic review of studies published 2000-06	Low employment rates after spinal cord injury. Social factors influencing RTW such as: transport, work experience, education, training, employer discrimination, benefits
Newsome <i>et al.</i> (2009)	Immediate commencement of exercise after surgery Country=UK	RCT, 30 patients	Significantly reduced time to RTW for intervention group
Heller <i>et al.</i> (2009) Funder is pharmaceutical industry	Different forms of surgery for cervical disc - artificial cervical disc/fusion Country=US	RCT. 242 and 221 patients as control group	Two-year follow-up. Patients who received the artificial cervical disc RTW nearly two weeks earlier than fusion patients
Hackel <i>et al.</i> (2009) Could not access whole article	Different forms of surgery Country=Cz	Questionnaire, 178 patients	After three months, different forms of surgery did not influence RTW
Raiturker <i>et al.</i> (2005)	Postoperative exercise programme Country=SK	RCT, 75 patients	Proportion RTW within four months after surgery significantly greater in intervention group and health benefits

**Table B.26 Summary table of interventions for cardio-respiratory conditions**

Health condition	Clinical or medical	Medical advice	Physical exercise/ graded activity	Intervention type			Total
				Psychological, CBT or counselling	Work-based rehabilitation	Social	
Cardio/heart	1	1	3	1	2	0	8
Stroke	1				2		3
Respiratory	2	1	3	1	4	0	11

**Table B.27 Interventions for cardio-respiratory conditions**

Author/date	Intervention	Method and sample	Key findings
<b>Clinical/medical interventions</b>			
Vohra <i>et al.</i> (2008)	Surgery – Carotid endarterectomy following stroke Country=UK	Questionnaire to 270 patients (174 responded)	Improved return to work – 75 per cent of respondents employed preoperatively returned to work following CEA
Bradshaw <i>et al.</i> (2005)	Surgery – coronary artery bypass graft Country=Aus	Postal questionnaire sent to 2,500 patients (2,061 responded)	Employment fell from 56 per cent in the year prior to CABG to 42 per cent in the year after. Workers in blue-collar occupations were more likely to reduce their work status
<b>Psychological/counselling</b>			
Monpere <i>et al.</i> (2009)	Occ physician – exercise and counselling Country=Sw	57 post CABG patients	Increased return to work; no increased costs for employer
<b>Medical advice</b>			
Broadbent <i>et al.</i> (2009)	Illness perception intervention Country=NZ	RCT, 103 myocardial infarction patients	Faster return to work, and full-time work within three months
<b>Exercise</b>			
Vermeulen (2009)	Six-week intensive cardiac rehabilitation programme after myocardial infarction Country=NL	98 male patients randomly assigned to intervention or control group	No significant difference in RTW
Brink <i>et al.</i> (2008)	Exercise Small sample size	Convenience sample – 88 patients, myocardial infarction (MI). Assessments of employment, health-related quality of life and physical activity (footsteps per day) four to six months after MI.n	Age, physical dimension of health-related quality of life and footsteps per day predicted return to work

Table B.28 Work-based interventions for cardio-respiratory conditions

Author/date	Intervention	Method and sample	Key findings
Kovoor <i>et al.</i> (2006)	Early RTW after myocardial infarction Country=Aus	RCT. 72 patients returned to normal activities at two weeks; 70 patients standard cardiac rehabilitation and return to normal activities at six weeks after AMI	Safe early return to work for low-risk workers
Koch <i>et al.</i> (2005) (qual research) Could not access whole article	Support by social network healthcare professionals and reasonable accommodations by employer after a stroke Country=US		Return to work was associated with both internal resources (e.g., patience, determination, sense of humour) and external resources (e.g., emotional support and encouragement from caregivers, family, and friends; emotional and instrumental support from healthcare professionals; employer willingness to provide reasonable accommodations)
Kittel and Karoff (2008)	Job-oriented rehab programme Country=G	RCT, 212 myocardial infarction patients	Improved return to work – 79.1 per cent of the patients from the intervention group had returned to work, whereas of control group only 62.9 per cent had returned to work
Alaszewski <i>et al.</i> (2007) Vague results but quotes are interesting	Flexible working environment and supportive social networks Country=E	Qualitative, using diaries. 43 patients after stroke	Improved return to paid employment

**Table B.29 Summary of interventions for mental health conditions**

Health condition	Intervention type						Total
	Clinical or medical	Psychological and counselling	Psychological/ work based	Vocational rehabilitation	Job placement/ supported employment	Stress management	
Distress		3					3
Burnout		1	1				4
Stress		4				6	10
Mental health conditions	1	7				2	8
Mental health disorders							0
Severe mental health conditions and schizophrenia			3		6		9
Brain injury			2				2
Total	1	15	6	5	6	6	41

**Table B.30 Clinical and medical interventions for mental health conditions**

Author/date	Intervention	Method and sample	Key findings
Avesani et al. (2005)	Intensive rehabilitation <i>Country=It</i>	Retrospective study. 353 patients	Improved return to work

**Table B.31 Psychological and counselling interventions for mental health conditions**

Author/date	Intervention	Method and sample	Key findings
Klonoff et al. (2007)	Cognitive retraining <i>Country=US</i>	Experimental. 101 brain injury patients	Improved return to work
Søgaard and Bech (2008)	Recognition of undetected psychiatric disorder <i>Country=Scandinavia</i>	RCT. 2,414 with nearly eight weeks' sickness absence – 1,121 respondents	Return to work higher for those without a psychiatric sick-leave diagnosis, but not for others

Continued

Table B.31 Continued

Author/date	Intervention	Method and sample	Key findings
Bell <i>et al.</i> (2008)	Neurocognitive enhancement therapy with vocational services Country=US	Randomised experiment. 72 patients with schizophrenia	Higher rate of competitive employment
Blank <i>et al.</i> (2006)	Combined intervention- CBT and workplace/individual techniques Country=NL	Randomised controlled design. 122 self-employed who had applied for sickness benefit from an insurance company	Ten months after onset of intervention, significant effects on partial and full return to work, and a decrease in psychological complaints were found in favour of the combined intervention
Corbiere and Shen (2006)	CBT	Review. People with mental health conditions	Improved return to work (but lack of reliable data)
Rebergen <i>et al.</i> (2009b)	Guideline-based care by occupational physicians Country=NL	RCT. 240 police officers on sick leave	Economic evaluation – lower healthcare costs, but no significant differences in days of sick leave and productivity loss costs
Duijts <i>et al.</i> (2008)	Coaching intervention Country=NL	RCT. Employees at risk of sickness absence	No effect of coaching on self-reported sickness absence, but effect on general well-being.

Table B.32 Psychological and work-based interventions for depression

Author/date	Intervention	Method and sample	Key findings
Wang <i>et al.</i> (2008) See also Wang 2007 – same study.	Compared telephone outreach, care management, and optional psychotherapy to usual care Country=US	RCT, 604 employees with depression	Significantly improved depression outcomes, work retention, and hours worked among the employed
Lo Sasso <i>et al.</i> (2006)	Enhanced depression treatment Country=US	RCT, 198 employed primary care patients with depression	Increased self-reported productivity and reduced costs (showing industry breakdown)
Bee <i>et al.</i> (2010)	Telephone cognitive behavioral therapy Country=UK	Pilot RCT. 53 consenting employees of telecom company	Medium-large effect sizes on clinical outcomes and work productivity scores in a large communications company

Continued

**Table B.32 Continued**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Nieuwenhuijsen <i>et al.</i> (2008)	Work-directed and worker-directed interventions	Review of 11 studies (RCTs and cluster RCTs), involving 2,556 participants	No evidence of an effect of medication alone, enhanced primary care, psychological interventions or the combination of those with medication on sickness absence of depressed workers
Schene <i>et al.</i> (2007)	Occupational therapy (in addition to psychiatric treatment as usual) Country=NL	RCT. 62 people with work-related major depression	Reduced work-loss days, did not increase work stress, and more cost effective. But did not improve depression

**Table B.33 Vocational rehabilitation, placement support and supported employment for those with severe mental health conditions or brain injury**

<b>Author/date</b>	<b>Intervention</b>	<b>Method and sample</b>	<b>Key findings</b>
Vocational rehabilitation			
Reker <i>et al.</i> (2000)	Vocational rehabilitation programme Country=G	‘Naturalistic follow-up study’ 471 Long term psychiatric patients from out-patient work therapy programmes	After three years 11 per cent of the patients were in competitive employment, 67 per cent (still) in sheltered employment, seven per cent in out-patient work therapy programmes and 15 per cent were unemployed
Watzke <i>et al.</i> (2006)	Vocational rehabilitation Country=G	Cluster analysis. 125 people with severe mental disorders	Not all subjects profit equally from vocational rehabilitation in terms of improvement of work performance. Unfavourable courses of work skills for participants with schizophrenia and low education
Lysaker <i>et al.</i> (2009)	Vocational intervention programme – CBT group and individual interventions Country=US	RCT, 100 participants with schizophrenia	Participants in CBT group intervention worked greater number of weeks and better work performance than others
Fadyl (2009)	Vocational rehabilitation	Review. RTW after traumatic brain injury	There is little clear evidence to suggest what should be considered as the ‘best practice’ approach to vocational rehabilitation

Continued

Table B.33 Continued

Author/date	Intervention	Method and sample	Key findings
Murphy <i>et al.</i> (2006)	Specialist rehabilitation programme Country=UK	Evaluation of Rehab UK programme. 232 clients with brain injury	41 per cent into paid competitive employment, 16 per cent voluntary work, 15 per cent mainstream training or education, and 28 per cent referred to other services or withdrew from the programme
Vanderploeg <i>et al.</i> (2008)	Rehabilitation: cognitive didactic versus functional-experiential Country=US	Randomised controlled intent-to-treat trial. 360 veterans or in active service	Younger participants had a higher rate of returning to work or school in functional arm of trial
<b>Job/placement support and supported employment</b>			
Leff <i>et al.</i> (2005)	Job Development and job support. Country=US	Random effects meta-analysis. Employment data collected for up to 24 months for 1,340 with severe mental illness	Job development increased the probability of obtaining competitive employment
Job support found to be associated with retention of a first competitive job, but causal role is questionable as participants also received counselling			
Tsang <i>et al.</i> (2009)	Supported employment programme including IPS and social skills (ISE) Country=HK	163 participants with persistent and severe mental illness assigned to ISE, IPS and voc rehab	After 15 months, ISE participants had significantly higher employment rates and job tenures
Kin Wong <i>et al.</i> (2008)	Supported employment programme with IPS/conventional voc rehab Country=HK	RCT, 92 unemployed individuals	Those in supported employment more likely to obtain competitive jobs
Cook <i>et al.</i> (2008)	Supported employment programme or usual services Country=US	Multi-site (7) randomised trial 1,273 outpatients with severe mental illness	Supported employment better at assisting those with schizophrenia to obtain employment
Koletsis <i>et al.</i> (2009)	Individual placement and support (IPS)/vocational services Country=UK	Qualitative interviews with 48 people with psychotic disorders	IPS clients reported having received more help seeking and maintaining employment; Vocational service clients reported having received more help in finding sheltered employment or placements
Howard <i>et al.</i> (2010)	IPS (vocational services as control group) Country=UK	RCT, 219 people with severe mental illness; 90 per cent assessed one year later	No significant differences between the treatment as usual and intervention groups in obtaining competitive employment

**Table B.34 Interventions for stress**

Author/date	Intervention	Method and sample	Key findings
Limm <i>et al.</i> (2011)	Stress management intervention (SMI) based on the effort-reward imbalance (ERI) model Country=G	RCT. 174 lower and middle management employees (99 per cent male)	Reducing perceived stress reactivity and sympathetic activation in lower and middle management employees (and sickness absence)
Rebergen <i>et al.</i> (2009a)	Guideline-based care (counselling) by occupational physicians Country=NL	RCT. 240 police officers on sick leave	No earlier return to work than usual, except for those with administrative functions and/or 'minor' stress-related symptoms
Lee <i>et al.</i> (2006)	Work-related stress management programme. Country=Tw	Single-blind randomised crossover design. 29 patients with schizophrenia	Short-term positive effects on perceived work-related stress
De Vente <i>et al.</i> (2006)	Individual and group CBT; care as usual Country=NL	RCT. Eighty-two patients on sick leave	No significant group difference
De Vente <i>et al.</i> (2008)	CBT-based stress management training (SMT); care as usual	82 patients on sick leave with work-related stress <b>Note:</b> stress management intervention, but measures impact on distress and burnout	Across treatment conditions, complaints and sickness absence reduced considerably between baseline and four months. Thereafter, complaints remained approximately stable, whereas sickness absence further reduced. Hardly any significant group difference emerged, and no consistent pattern could be discerned in favour of any treatment condition
Bakker <i>et al.</i> (2007)	MISS – minimal intervention for stress-related mental disorders by primary care physicians Country=NL	Cluster-randomised controlled educational trial – 433 patients with stress-related mental disorders and sick leave (227 MISS; 206 usual care)	No superior effect on duration of sick leave nor on severity of self-reported symptoms
Van Rhenen <i>et al.</i> (2007)	Stress reduction programmes- CBT; exercise and relaxation Country=NL	A priori RCT – 242 stressed and non-stressed employees in various jobs in telecom company; one year follow up	Sickness absence not reduced for stressed employees, but period between intervention and first period of sick leave increased

Continued



Table B.34 Continued

Author/date	Intervention	Method and sample	Key findings
Netterstrom <i>et al.</i> (2010) Could not access whole article	Multidisciplinary stress treatment programme Country=Dk	Non-randomised controlled study from a stress clinic. 63 persons with work-related stress; 34 as control group	Levels of sick leave lower than control groups at four months, but no statistically significant difference after one and two years
Grossi and Santell (2009) Could not access whole article. Intervention is for stress management, but study measures impact on depression and burnout	Stress management intervention – group intervention aimed at coping with psychological/somatic symptoms of stress; standard individual treatment for stress	Quasi-experimental – 24 female patients – country and municipal employees – on sick leave due to work-related psychological complaints [Small sample]	Rates of return to work were assessed for up to five years Levels of depression decreased. Intervention superior in alleviating burnout. At five-year follow-up 40 per cent of participants in both intervention and control had returned to work
Ro <i>et al.</i> (2008) Found decreased sickness absence but also increased psychotherapy and reduced working hours, Is the study measuring the effect of the intervention per se?	Counselling lasting one day (individual) or one week (group based) Country=N	Cohort study followed by self reported assessment 227 doctors – 185 doctors (81 per cent, 88 men, 97 women) completed one year follow-up	There was a considerable reduction in the proportion of doctors on full-time sick leave at follow-up

Table B.35 Interventions for distress

Author/date	Intervention	Method and sample	Key findings
Brouwers <i>et al.</i> (2007) Also Brouwers <i>et al.</i> 2006 published elsewhere	Activating social work intervention Country=NL	RCT. 194 people with emotional distress or minor mental disorders on sick leave	Compared with usual GP care, the activating social work intervention was not superior in reducing sick leave duration, improving clinical symptoms, and decreasing medical consumption
Van Oostrom <i>et al.</i> (2010a)	Participatory workplace intervention – consensual RTW plan for sick-listed workers with distress Country=NL	RCT. 73 intervention; 72 usual care	After 12 month follow-up, no overall effect of intervention on lasting RTW, except for those who at baseline intended to return to work despite symptoms. For employees who showed no baseline intention to return to work, the intervention did not have any effect

Continued

**Table B.35 Continued**

Author/date	Intervention	Method and sample	Key findings
Van Oostrom ( 2010b)	Participatory workplace intervention – consensual RTW plan Country=NL	RCT. 73 intervention; 72 usual care	A related article found that there was no economic benefit from intervening with a consensual return to work plan
Kobayashi et al. (2008)	Mental health action checklist for worker participation Country=J	Controlled trial, manufacturing enterprise. 321 workers intervention; 750 control	After six months, psych distress and job satisfaction improved for women but not men (not RCT; not objective work outcomes)
Umanodan et al. (2009) [Intervention type referred to as stress management, but aimed at psychological distress]	Stress management training Country=	Controlled trial, Japanese steel company. 96 intervention; 53 control group	After one month no significant effects on psych distress or job performance
Lander et al. (2009) [Intervention type referred to as stress management, but aimed at psychological distress]	Psychological stress management and case management Country=Dk	Controlled intervention study. 72 emotionally distressed patients, who received support during 2006; 89 control individuals also sick listed for emotional distress	There were no differences in the rate of resuming work between the two groups

**Table B.36 Interventions for burnout**

Author/date	Intervention	Method and sample	Key findings
Ekstedt et al. (2009)	Sleep (for recovery from burnout) Country=Sw	Experimental. 23 white collar workers on long term sick leave and 16 controls	Recovery from fatigue – best predictor of RTW
Sonnenschein et al. (2008) Not very robust, but interesting approach	Sleep (for recovery from burnout) Country=NL	Diary. 59 burnout employees on extended sick leave	After six months, all burnout symptoms had decreased significantly, and full RTW was achieved by 37 per cent of the burnt-out individuals. Symptom levels at six months of follow-up among those who had fully RTW similar to healthy levels and significantly lower than those still on sick leave. Trouble falling asleep and less refreshing sleep at baseline hampered eventual full work resumption
Hatinen et al. (2007)	Participatory intervention Country=F	Quasi-experimental. 21 female white collar workers	Both interventions improved perceived workplace climate; participatory method better for treating burnout
Stenlund et al. (2009)	Rehabilitation program A (cognitively oriented behavioral rehabilitation (CBR) and Qigong) was compared with rehabilitation programme B (Qigong only) Country=Sw	Randomised clinical trial. 96 women and 40 men	No significant difference in treatment efficacy between the groups for health conditions or sick leave

**Table B.37 Social interventions for those with mental health conditions**

Author/date	Intervention	Method and sample	Key findings
Fleten and Johnson (2006) Also referred to under MSD section of this report	Minimal postal intervention-letter and questionnaire after 14 days' sick leave Country=N	RCT. 495 sick-listed people	The intervention significantly reduced length of sick leave in subgroups with mental disorders, (and with rheumatic disorders and arthritis) and overall for sick leave lasting 12 weeks or more
Nystuen and Hagen (2006)	Voluntary solution-focused intervention offered by social-security offices (Country= N)	RCT. 703 employees on long-term sick leave with psych problems/MSD	No more effective than regular follow up for employees on long-term sick leave due to psychological problems (or musculoskeletal pain)

# Appendix C

## Meta-analyses of interventions for low back pain

### Earlier meta-analyses of interventions for low back pain

The following abstracts provide a summary of the most useful meta-analyses that have been conducted on interventions for low back pain (LBP). More detailed consideration of the analyses used is provided in Chapter 6 of this report.

#### Study 1

Williams, R.M., Westmorland, M.G., *et al.* (2007). *Effectiveness of workplace rehabilitation interventions in the treatment of work-related low back pain: A systematic review*. *Disability and Rehabilitation*, 29(8): 607-624.

**Purpose.** A systematic review was conducted to evaluate the effectiveness of workplace rehabilitation interventions for injured workers with LBP. **Method.** MEDLINE, CINAHL (Cumulative Index to Nursing and Allied Health Literature), EMBASE, and AMED (Allied and Complementary Medicine) were searched from 1982 to 2005 for peer-reviewed studies of rehabilitation interventions that were provided at the workplace to workers with musculoskeletal work-related LBP. Methodological quality appraisal and data extraction were conducted by five reviewers. **Results.** Of a total of 1,224 articles that were identified by the search, 15 articles, consisting of 10 studies, were of sufficient quality to be included in the review. The best evidence was that clinical interventions with occupational interventions as well as early return to work (RTW)/modified work interventions were effective in returning workers to work faster, reducing pain and disability, and decreasing the rate of back injuries. Ergonomic interventions also were found to be effective workplace interventions. **Conclusion.** The need for further research in this area is necessary to reduce the burden of back pain on employees and their families, employers, and the health care system' (Williams *et al.*, 2007: 607).

#### Study 2

Anema *et al.* (2004). *The effectiveness of ergonomic interventions on return-to-work after low back pain; a prospective two year cohort study in six countries on low back pain patients sicklisted for 3-4 months*. *Occupational and Environmental Medicine*, 61(4): 289-294.

**Aims:** To study occurrence and effectiveness of ergonomic interventions on RTW applied for workers with LBP) **Methods:** A multinational cohort of 1,631 workers fully sicklisted three to four months due to LBP (ICD-9 codes 721, 722, 724) was recruited from sickness benefit claimants databases in Denmark, Germany, Israel, Sweden, the Netherlands, and the United States. Medical, ergonomic, and other interventions, working status, and RTW were measured using questionnaires and interviews at three months, one and two years after the start of sick leave. Main outcome measure was time to RTW. Cox's proportional hazards model was used to calculate hazard ratios regarding the time to RTW, adjusted for prognostic factors. **Results:** Ergonomic interventions varied considerably in occurrence between the national cohorts: 23.4 per cent (mean) of the participants

reported adaptation of the workplace, ranging from 15.0 per cent to 30.5 per cent. Adaptation of job tasks and adaptation of working hours was applied for 44.8 per cent (range 41.0 – 59.2 per cent) and 46.0 per cent (range 19.9 – 62.9 per cent) of the participants, respectively. Adaptation of the workplace was effective on RTW rate with an adjusted hazard ratio (HR) of 1.47 (95 per cent CI 1.25 to 1.72;  $p < 0.0001$ ). Adaptation of job tasks and adaptation of working hours were effective on RTW after a period of more than 200 days of sickleave with an adjusted HR of 1.78 (95 per cent CI 1.42 to 2.23;  $p < 0.0001$ ) and 1.41 (95 per cent CI 1.13 to 1.76;  $p = 0.002$ ), respectively. **Conclusions:** Results suggest that ergonomic interventions are effective on RTW of workers long-term sicklisted due to LBP (Anema *et al.*, 2004: 289).

### Study 3

Steenstra *et al.* (2006). *Economic evaluation of a multi-stage return to work program for workers on sick-leave due to low back pain.* *Journal of Occupational Rehabilitation*, 16(4): 557-578.

**Objective:** To evaluate the cost-effectiveness and cost-utility of a return to work (RTW) programme for workers on sick-leave due to LBP, comparing a workplace intervention implemented between two to eight weeks of sick-leave with usual care, and a clinical intervention after eight weeks of sick-leave with usual care. **Design:** Economic evaluation alongside a randomised controlled trial (RCT). **Study population:** Workers sick-listed for a period of two to six weeks due to LBP. **Interventions:** 1. Workplace assessment, work modifications and case management). 2. Physiotherapy based on operant behavioural principles. 3. Usual care: provided by an occupational physician. **Outcomes:** The primary outcome was RTW. Other outcomes were pain intensity, functional status, quality of life and general health. The economic evaluation was conducted from a societal perspective. Outcomes were assessed at baseline (after two to six weeks on sick leave), and 12 weeks, 26 weeks, and 52 weeks after the first day of sick-leave. **Results:** The workplace intervention group returned to work 30.0 days (95 per cent CI=[3.1, 51.3]) earlier on average than the usual care group at slightly higher direct costs (ratio of one day: 19 euro). Workers in the clinical intervention group that had received usual care in the first eight weeks returned to work 21.3 days (95 per cent CI= [-74.1, 29.2]) later on average. The group that had received the workplace intervention in the first eight weeks and the clinical intervention after eight weeks returned to work 50.9 days (95 per cent CI=[-89.4, -2.7]) later on average. A workplace intervention was more effective than usual care in RTW at slightly higher costs and was equally effective as usual care at equal costs on other outcomes. A clinical intervention was less effective than usual care and associated with higher costs. **Conclusion:** The workplace intervention results in a safe and faster RTW than usual care at reasonable costs for workers on sick-leave for two to six weeks due to LBP (Steenstra *et al.*, 2006: 557).

## More recent meta-analyses of interventions for low back pain

### Study 4

Carrolli, C. *et al.* (2010). *Workplace involvement improves return to work rates among employees with back pain on long-term sick leave: a systematic review of the effectiveness and cost-effectiveness of interventions.* *Disability and Rehabilitation*, 32(8): 607-621.

**Purpose.** Long-term sickness absence among workers is a major problem in industrialised countries. The aim of the review is to determine whether interventions involving the workplace are more effective and cost-effective at helping employees on sick leave RTW than those that do not involve the workplace at all. **Methods.** A systematic review of controlled intervention studies and economic evaluations. Sixteen electronic databases and grey literature sources were searched, and reference and citation tracking was performed on included publications. A narrative synthesis was performed.

**Results.** Ten articles were found reporting nine trials from Europe and Canada, and four articles were found evaluating the cost-effectiveness of interventions. The population in eight trials suffered from back pain and related musculoskeletal conditions. Interventions involving employees, health practitioners and employers working together, to implement work modifications for the absentee, were more consistently effective than other interventions. Early intervention was also found to be effective. The majority of trials were of good or moderate quality. Economic evaluations indicated that interventions with a workplace component are likely to be more cost effective than those without. **Conclusion.** Stakeholder participation and work modification are more effective and cost effective at returning to work adults with musculoskeletal conditions than other workplace-linked interventions, including exercise (Carrolli *et al.*, 2010: 607).

## Study 5

Lambeek *et al.* (2010). *Effect of integrated care for sick listed patients with chronic low back pain: economic evaluation alongside a randomised controlled trial.* *British Medical Journal*, 341.

**Objective:** To evaluate the cost effectiveness, cost utility, and cost-benefit of an integrated care programme compared with usual care for sick listed patients with chronic LBP. **Design:** Economic evaluation alongside a randomised controlled trial with 12 months' follow-up. **Setting:** Primary care (ten physiotherapy practices, one occupational health service, one occupational therapy practice) and secondary care (five hospitals) in the Netherlands, 2005-9. **Participants:** 134 adults aged 18-65 sick listed because of chronic LBP: 66 were randomised to integrated care and 68 to usual care. **Interventions:** Integrated care consisted of a workplace intervention based on participatory ergonomics, with involvement of a supervisor, and a graded activity programme based on cognitive behavioural principles. Usual care was provided by general practitioners and occupational physicians according to Dutch guidelines. **Main outcome measures:** The primary outcome was duration until sustainable RTW. The secondary outcome was quality adjusted life years (QALYs), measured using EuroQol. **Results:** Total costs in the integrated care group (13 pound 165, SD 13 pound 600) were significantly lower than in the usual care group (18 pound 475, SD 13 pound 616). Cost effectiveness planes and acceptability curves showed that integrated care was cost effective compared with usual care for RTW and QALYs gained. The cost-benefit analyses showed that every one pound invested in integrated care would return an estimated 26 pound. The net societal benefit of integrated care compared with usual care was 5,744 pound. **Conclusions:** Implementation of an integrated care programme for patients sick listed with chronic LBP has a large potential to significantly reduce societal costs, increase effectiveness of care, improve quality of life, and improve function on a broad scale. Integrated care therefore has large gains for patients and society as well as for employers (Lambeek *et al.*, 2010).

## Study 6

Lambeek *et al.* (2010). *Randomised controlled trial of integrated care to reduce disability from chronic low back pain in working and private life.* *British Medical Journal* 340.

**Objective:** To evaluate the effectiveness of an integrated care programme, combining a patient-directed and a workplace-directed intervention, for patients with chronic LBP. **Design:** Population-based randomised controlled trial. **Setting:** Primary care (ten physiotherapy practices, one occupational health service, one occupational therapy practice) and secondary care (five hospitals). **Participants:** 134 adults aged 18-65 sick listed for at least 12 weeks owing to LBP. Intervention patients were randomly assigned to usual care (n=68) or integrated care (n=66). Integrated care consisted of a workplace intervention based on participatory ergonomics, involving a supervisor,

and a graded activity programme based on cognitive behavioural principles. **Main outcome measures:** The primary outcome was the duration of time off work (work disability) due to LBP until full sustainable RTW. Secondary outcome measures were intensity of pain and functional status. **Results:** The median duration until sustainable RTW was 88 days in the integrated care group compared with 208 days in the usual care group ( $P=0.003$ ). Integrated care was effective on RTW (hazard ratio 1.9, 95 per cent confidence interval 1.2 to 2.8,  $P=0.004$ ). After 12 months, patients in the integrated care group improved significantly more on functional status compared with patients in the usual care group ( $P=0.01$ ). Improvement of pain between the groups did not differ significantly. **Conclusion:** The integrated care programme substantially reduced disability due to chronic LBP in private and working life (Lambeek *et al.*, 2010).

## Study 7

Oesch *et al.* (2010). *Effectiveness of exercise on work disability in patients with non-acute non-specific low back pain: Systematic review and meta-analysis of randomized controlled trials.* *Journal of Rehabilitation Medicine* 42(3): 193-205.

**Objectives:** To determine whether exercise is more effective than usual care to reduce work disability in patients with non-acute non-specific LBP, and if so, to explore which type of exercise is most effective. **Methods:** Systematic review and meta-analysis of randomised controlled trials investigating the effectiveness of exercise in non-acute non-specific LBP, and reporting on work disability. Data sources: MEDLINE, EMBASE, PEDro, Cochrane Library databases, NIOSHTIC-2, and PsycINFO until August 2008. Work disability data were converted to odds ratios. Random effects meta-analyses were conducted. **Results:** A total of 23 trials met the inclusion criteria, 20 of which were suitable for inclusion in meta-analysis allowing 17 comparisons of exercise interventions with usual care and 11 comparisons of two different exercise interventions. A statistically significant effect in favour of exercise on work disability was found in the long term (odds ratio (OR) = 0.66, 95 per cent confidence interval (CI) 0.48-0.92) but not in the short (OR = 0.80, 95 per cent CI 0.51-1.25) and intermediate term (OR = 0.78, 95 per cent CI 0.45-1.34). Meta-regression indicated no significant effect of specific exercise characteristics. **Conclusion:** Exercise interventions have a significant effect on work disability in patients with non-acute non-specific LBP in the long term. No conclusions can be made regarding exercise types. (Oesch *et al.*, 2010: 193).

## Study 8

Steenstra *et al.* (2009). *What Works Best for Whom? An Exploratory, Subgroup Analysis in a Randomized, Controlled Trial on the Effectiveness of a Workplace Intervention in Low Back Pain Patients on Return to Work.* *Spine*, 34(12): 1243-1249.

**Study design:** Exploratory subgroup analysis in a RCT. **Objective:** To detect possible moderators in the effectiveness of a workplace intervention in a population of workers with sick leave due to sub acute nonspecific LBP. **Summary of background data:** In a recently published RCT, a workplace intervention was effective on RTW, compared to usual care. Examining the heterogeneity of effect sizes within the population in this RCT ( $n = 196$ ) can lead to information on the effectiveness of the intervention in subgroups of patients. **Methods:** A subgroup analysis was performed by adding interaction terms to the statistical model. Before analysis the following possible moderators for treatment were identified: age, gender, pain, functional status, heavy work, and sick leave in the previous 12 months. Cox regression analyses were performed and survival curves were plotted. **Results:** The interaction ( $P = 0.02$ ) between age (dichotomized at the median value) and the workplace intervention indicates a modifying effect. The workplace intervention is more effective for workers  $\geq 44$  years (HR, 95 per cent CI = 2.5, [1.6, 4.1] compared to 1.2 [0.8, 1.8] for workers  $<44$  years old). The interaction

between sick leave in the previous 12 months and the workplace intervention is significant ( $P = 0.02$ ). The intervention is more effective for workers with previous sick leave (HR, 95 per cent CI = 2.8 [1.7, 4.9] compared to 1.3 [0.8, 2.0]). A modifying effect of gender, heavy work, and pain score and functional status on the effectiveness of this intervention was not found. **Conclusion:** The findings from these exploratory analyses should be tested in future RCTs. This workplace intervention seems very suitable for RTW of older workers and workers with previous sick leave. Gender, perceived heavy work, and baseline scores in pain and functional status should not be a basis for assignment to this intervention' (Steenstra *et al.*, 2009: 1243).



# References

- Abásolo, L., Carmona, L., Hernández-García, C., Lajas, C., Loza, E., Blanco, M., Candelas, G., Fernández-Gutiérrez, B. and Jover, J. (2007). Musculoskeletal work disability for clinicians: time course and effectiveness of a specialized intervention program by diagnosis. *Arthritis and Rheumatism – Arthritis Care and Research*, 57(2), 335–42.
- Alaszewski, A., Alaszewski, H., Potter, J. and Penhale, B. (2007). Working after a stroke: survivors' experiences and perceptions of barriers to and facilitators of the return to paid employment. *Disability and Rehabilitation*, 29(24), 1858–69.
- Allaire, S.H., Jingbo, N. and LaValley, M. (2005). Employment and Satisfaction Outcomes From a Job Retention Intervention Delivered to Persons with Chronic Diseases. *Rehabilitation Counseling Bulletin*, 48(2), 100–9.
- Anema, J.R., Cuelenaere, B., van der Beek, A.J., Knol, D.L., de Vet, H.C. and van Mechelen, W. (2004). The effectiveness of ergonomic interventions on return-to-work after low back pain; a prospective two year cohort study in six countries on low back pain patients sicklisted for 3–4 months. *Occupational & Environmental Medicine*, 61(4), 289.
- Anema, J.R., Steenstra, I.A., Bongers, P.M., de Vet, H.C., Knol, D.L., Loisel, P. and van Mechelen, W. (2007). Multidisciplinary rehabilitation for subacute low back pain: graded activity or workplace intervention or both? A randomized controlled trial. *Spine*, 32(3), 291–8.
- Arends, I., van der Klink, J.J.L. and Bültmann, U. (2010). Prevention of recurrent sickness absence among employees with common mental disorders. *BMC Public Health*, 10, 132.
- Aust, B. and Ducki, A. (2004). Comprehensive Health Promotion Interventions at the workplace: experiences with health circles in Germany. *Journal of Occupational Health Psychology*, 9(3), 258–70.
- Avesani, R., Salvi, L., Rigoli, G. and Gambini, M.G. (2005). Reintegration after severe brain injury: a retrospective study. *Brain Injury*, 19(11), 933.
- Bahrke, U., Bandemer-Greulich, U., Fikentscher, E., Müller, K., Schreiber, B. and Konzag, T.A. (2006). Chronic low back pain with enduring pain coping--optimizing rehabilitation success in a hitherto neglected patient group. *Die Rehabilitation*, 45(6), 336.
- Bakker, I.M., Terluin, B., van Marwijk, H.W., van der Windt, D.A., Rijmen, F., van Mechelen, W. and Stalman, W.A. (2007). A Cluster-Randomised Trial Evaluating an Intervention for Patients with Stress-Related Mental Disorders and Sick Leave in Primary Care. *PLoS Clinical Trials*. 2(6), 26.
- Baltov, P., Côté, J., Truchon, M. and Feldman, D.E. (2008). Psychosocial and socio-demographic factors associated with outcomes for patients undergoing rehabilitation for chronic whiplash associated disorders: A pilot study. *Disability and Rehabilitation*, 30(25), 1947.
- Barkham, N., Coates, L.C., Keen, H., Hensor, E., Fraser, A., Redmond, A., Cawkwell, L. and Emery, P. (2010). Double-blind placebo-controlled trial of etanercept in the prevention of work disability in ankylosing spondylitis. *Annals of the rheumatic diseases*, 69(11), 1926.
- Bee, P.E., Bower, P., Gilbody, S. and Lovell, K. (2010). Improving health and productivity of depressed workers: a pilot randomized controlled trial of telephone cognitive behavioral therapy delivery in workplace settings. *General Hospital Psychiatry*, 32(3), 337–40.

- Bejarano, V., Quinn, M., Conaghan, P.G., Reece, R., Keenan, A.M., Walker, D., Gough, A., Green, M., McGonagle, D., Adebajo, A., Jarrett, S., Doherty, S., Hordon, L., Melsom, R., Unnebrink, K., Kupper, H. and Emery, P. (2008). Effect of the early use of the anti-tumor necrosis factor adalimumab on the prevention of job loss in patients with early rheumatoid arthritis. *Arthritis and Rheumatism – Arthritis Care and Research*, 59(10), 1467.
- Bell, M.D., Zito, W., Greig, T., Wexler, B.E. (2008). Neurocognitive enhancement therapy with vocational services: work outcomes at two-year follow-up. *Schizophrenia Research*, 105(1–3):18–29.
- Bethge, M., Herbold, D., Trowitzsch, L. and Jacobi C. (2010). Return to work following work-related orthopaedic rehabilitation: a cluster randomized trial. *Die Rehabilitation*, 49(1), 2.
- Black, C. (2008). *Working for a healthier tomorrow. Dame Carol Black's Review of the health of Britain's working age population.*
- Blangsted, A.K., Søgaard, K., Hansen, E.A., Hannerz, H. and Sjøgaard, G. (2008). One-year randomized controlled trial with different physical-activity programs to reduce musculoskeletal symptoms in the neck and shoulders among office workers. *Scandinavian Journal of Work, Environment & Health*, 34(1), 55–65.
- Blank, L. et al. (2008). A systematic review of the factors which predict return to work for people suffering episodes of poor mental health. *Journal of Occupational Rehabilitation*, 18(1), 27–34.
- Blonk, R.W., Brenninkmeijer, V., Lagerveld, S.E. and Houtman, I.L. (2006). Return to work: A comparison of two cognitive behavioural interventions in cases of work-related psychological complaints among the self-employed. *Work and Stress*, 20(2), 129.
- Bluvol, A. and Ford-Gilboe, M. (2004). Hope, health work and quality of life in families of stroke survivors. *Journal of Advanced Nursing*, 48(4),322–32.
- Bogefeldt, J., Grunnesjö, M., Svärdsudd, K. and Blomberg, S. (2008). Sick leave reductions from a comprehensive manual therapy programme for low back pain: the Gotland Low Back Pain Study. *Clinical Rehabilitation*, 22(6), 529.
- Bontoux, L., Dubus, V., Roquelaure, Y., Colin, D., Brami, L., Roche, G., Fanello, S., Penneau-Fontbonne, D. and Richard, I. (2009). Return to work of 87 severely impaired low back pain patients two years after a program of intensive functional restoration. *Annals of Physical and Rehabilitation Medicine*, 52(1):17–29.
- Braathen, T.N., Veiersted, K.B. and Heggenes, J. (2007). Improved work ability and return to work following vocational multidisciplinary rehabilitation of subjects on long-term sick leave. *Journal of Rehabilitation Medicine: official journal of the UEMS European Board of Physical and Rehabilitation Medicine*, 39(6), 493–9.
- Bradshaw, P.J., Jamrozik, K., Gilfillan, I.S., Thompson, P.L. (2005). Return to work after coronary artery bypass surgery in a population of long-term survivors. *Heart Lung and Circulation*, 14(3), 191.
- Brink, E., Brändström, Y, Cliffordsson, C., Herlitz, J. and Karlson, B.W. (2008). Illness consequences after myocardial infarction: problems with physical functioning and return to work. *Journal of Advanced Nursing*, 64(6), 587.
- Broadbent, E., Ellis, C.J., Thomas, J., Gamble, G. and Petrie, K.J. (2009). Further development of an illness perception intervention for myocardial infarction patients: a randomized controlled trial. *Journal of Psychosomatic Research*, 67(1), 17–23.

- Brouwers, E.P., Tiemens, B.G., Terluin, B. and Verhaak, P.F. (2006). Effectiveness of an intervention to reduce sickness absence in patients with emotional distress or minor mental disorders: a randomized controlled effectiveness trial. *General Hospital Psychiatry*, 28(3), 223.
- Brouwers, E.P., de Bruijne, M., Terluin, B., Tiemens, B.G. and Verhaak, P.F. (2007). Cost-effectiveness of an activating intervention by social workers for patients with minor mental disorders on sick leave: a randomized controlled trial. *European Journal of Public Health*, 17(2), 214.
- Brox, J.I., Nygaard, Ø.P., Holm., Keller, A., Ingebrigtsen, T. and Reikerås, O. (2010). Four-year follow-up of surgical versus non-surgical therapy for chronic low back pain. *Annals of the Rheumatic Diseases*, 69(9), 1643.
- de Buck, P.D., de Bock, G.H., van Dijk, F., van den Hout, W.B., Vandenbroucke, J.P. and Vliet Vlieland, T.P. (2006). Sick leave as a predictor of job loss in patients with chronic arthritis. *International Archives of Occupational and Environmental Health*. (80)2, 160.
- Buijs, P.C., Lambeek, L.C., Koppenrade, V., Hoofman, W.E. and Anema, J.R. (2009). Can workers with chronic back pain shift from pain elimination to function restore at work? Qualitative evaluation of an innovative work related multidisciplinary programme. *Journal of Back and Musculoskeletal Rehabilitation*, 22 (2), 65.
- Bültmann, U., Sherson, D., Olsen, J., Hansen, C.L., Lund, T. and Kilsgaard, J. (2009). Coordinated and tailored work rehabilitation: a randomized controlled trial with economic evaluation undertaken with workers on sick leave due to musculoskeletal disorders. *Journal of Occupational Rehabilitation*, 19(1), 81.
- Burton, A.K. et al. (2008). Management of work-relevant upper limb disorders: a review. *Occupational Medicine*, 59(1):44–52.
- Burton, W. et al. (2006). Systematic review of studies of productivity loss due to rheumatoid arthritis. *Occupational Medicine*, 56(1), 18.
- Busch, H. et al. (2007). Self-efficacy beliefs predict sustained long-term sick absenteeism in individuals with chronic musculoskeletal pain. *Pain Practice*, 7(3):234–40.
- Campbell, J., Wright, C., Moseley, A., Chilvers, R., Richards, S. and Stabb, L. (2007). *Avoiding long-term incapacity for work: Developing an early intervention in primary care*. Universities of Exeter & Plymouth Peninsula Medical School.  
[www.dwp.gov.uk/docs/hwwb-developing-an-early-intervention-in-primary-care.pdf](http://www.dwp.gov.uk/docs/hwwb-developing-an-early-intervention-in-primary-care.pdf) (accessed 17 October 2012).
- Campolieti, M., Gunderson, M. and Krashinsky, H. (2007). Labor Supply Decisions of Disabled Male Workers. *Journal of Labor Research*, 28(3), 502.
- Carroll, C. Rick, J., Pilgrim, H., Cameron, J. and Hillage, J. (2010). Workplace involvement improves return to work rates among employees with back pain on long-term sick leave: a systematic review of the effectiveness and cost-effectiveness of interventions. *Disability and Rehabilitation*. 32(8): 607–21.
- Cay, E. (1988). Psychological factors and return to work. *European Heart Journal*, 9(0/95), 74.
- Clay, F.J., Newstead, S.V., D'Elia, A. and McClure, R.J. (2010). First return to work following injury: does it reflect a composite or a homogeneous outcome? *Occupational Environmental Medicine*, 67, 730–6.

- Cheng, A.S. and Hung, L.K. (2007). Randomized controlled trial of workplace-based rehabilitation for work-related rotator cuff disorder. *Journal of Occupational Rehabilitation*, 17(3), 487–503.
- Choi, G., Raiturker, P.P., Kim, M.J., Chung, D.J., Chae, Y.S. and Lee, S.H. (2005). The effect of early isolated lumbar extension exercise program for patients with herniated disc undergoing lumbar discectomy. *Neurosurgery*, 57(4), 764–72.
- Choi, B.K., Verbeek, J.H., Tam, W.W. and Jiang, J.Y. (2010). Exercises for prevention of recurrences of low-back pain. *Cochrane Database of Systematic Reviews*, Reviews Issue 1.
- Clay, F. et al. (2010). A systematic review of early prognostic factors for return to work following acute orthopaedic trauma. *Injury – International Journal of the Care of the Injured*, 41(8), 787.
- Clayton, M. and Verow, P. (2007). A retrospective study of return to work following surgery. *Occupational Medicine*, 57(7):525–31.
- Cole, J.D. (2002). Psychotherapy with the chronic pain patient using coping skills development: outcome study. *Journal of Occupational Health Psychology*, 3(3) 217–226.
- Cook, J.A., Blyler, C.R., Burke-Miller, J.K., McFarlane, W.R., Leff, H.S., Mueser, K.T., Gold, P.B., Goldberg, R.W., Shafer, M.S., Onken, S.J., Donegan, K., Carey, M.A., Razzano, L.A., Grey, D.D., Pickett-Schenk, S.A. and Kaufmann, C. (2008). Effectiveness of supported employment for individuals with schizophrenia: results of a multi-site, randomized trial. *Clinical Schizophrenia & Related Psychoses*, VL: 2(1), 37.
- Costa-Black, K.M. et al. (2010). Back pain and work. *Best Practice and Research in Clinical Rheumatology*, 24(2), 227.
- Cunningham, C. G. et al. (2008). Working Backs Project-implementing low back pain guidelines. *Occupational Medicine*, 58(8), 580.
- Cunningham, I., James, P. and Dibben, P. (2004). Bridging the Gap between Rhetoric and Reality: Line Managers and the Protection of Job Security for Ill Workers in the Modern Workplace. *British Journal of Management*, 15, 273–290.
- D'Amato, A. and Zijlstra, F. (2010). Toward a climate for work resumption: the nonmedical determinants of return to work. *Journal of Occupational and Environmental Medicine*, 52(1), 67–80.
- Danchin, N. (1988). Work capacity after myocardial revascularization: factors related to work resumption. *European Heart Journal*, 9(0/95), 44.
- Danchin, N. and Goepfert, P.C. (1988). Exercise training, cardiac rehabilitation and return to work in patients with coronary artery disease. *European Heart Journal*, 9(0/95), 43.
- Darvall, K. et al. (2009). Recovery after ultrasound-guided foam sclerotherapy compared with conventional surgery for varicose veins. *British Journal of Surgery*, 96(11), 1262.
- Darwood, R. et al. (2009). Return to Work; Driving and Other Activities After Varicose Vein Surgery is Very Variable and is Influenced Little By Advice From Specialists. *European Journal of Vascular and Endovascular Surgery*, 38(2), 213.
- Davidson, J. and Kemp, P. A. (2008). Sickness benefits in a polarised labour market. *Journal of Poverty and Social Justice*, 16(3), 225–33.
- de Vente, W., Kamphuis, J.H., Emmelkamp, P.M. and Blonk, R.W. (2008). Individual and group cognitive-behavioral treatment for work-related stress complaints and sickness absence: a randomized controlled trial. *Journal of Occupational Health Psychology*, 13(3), 214–31.

- Dibben, P., James, P. and Cunningham, I.R. (2001). Absence management in the public sector: an integrative model? *Public Money and Management*, 21 (4), 55–60.
- Department of Health (2011). *Healthy lives, healthy people: our strategy for public health in England*.
- Department for Work and Pensions (2011a). Health Work Wellbeing. [www.dwp.gov.uk/health-work-and-well-being/our-work/](http://www.dwp.gov.uk/health-work-and-well-being/our-work/) (accessed 25 March 2011).
- Dibbelt, S., Greitemann, B. and Büschel, C. (2006). Long-term efficiency of orthopedic rehabilitation in chronic back pain--the integrative orthopedic psychosomatic concept (IopKo). *Die Rehabilitation*, 45(6), 324–35.
- Drews, B., Nielsen, C.V., Rasmussen, M.S., Hjort, J., Bonde, J.P. (2007). Improving motivation and goal setting for return to work in a population on sick leave: a controlled study. *Scandinavian Journal of Public Health*, 35(1), 86.
- Duijts, S.F., Kant, I., van den Brandt, P.A. and Swaen, G.M. (2008). Effectiveness of a preventive coaching intervention for employees at risk for sickness absence due to psychosocial health complaints: results of a randomized controlled trial. *Journal of Occupational and Environmental Medicine*, 50(7), 765.
- Dunstan, D.A. and Covic, T. (2007). Can a rural community-based work-related activity program make a difference for chronic pain-disabled injured workers? *Australian Journal of Rural Health*, 15(3), 166.
- Ekstedt, M., Söderström, M. and Akerstedt, T. (2009). Sleep physiology in recovery from burnout. *Biological Psychology*, 82(3), 267.
- Ektor-Andersen, J., Ingvarsson, E., Kullendorff, M. and Orbaek, P. (2008), High cost-benefit of early team-based biomedical and cognitive-behaviour intervention for long-term pain-related sickness absence. *Journal of Rehabilitation Medicine: official journal of the UEMS European Board of Physical and Rehabilitation Medicine*, 40(1),1–8.
- Engers, A., Jellema, P., Wensing, M., van der Windt, D.A., Grol, R. and van Tulder, M.W. (2008). Individual patient education for low back pain. *Cochrane Database of Systematic Reviews*, Issue 1 .
- European Commission (2003). Small and medium-sized enterprises (SMEs): SME Definition. [http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index\\_en.htm](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm) (accessed 29 March, 2011).
- Faber, E., Bierma-Zeinstra, S.M., Burdorf, A., Nauta, A.P., Hulshof, C.T., Overzier, P.M., Miedema, H.S. and Koes. B.W. (2005). In a controlled trial training general practitioners and occupational physicians to collaborate did not influence sickleave of patients with low back pain. *Journal of Clinical Epidemiology*, 58(1),75–82.
- Fadyl, J.K. and McPherson, K.M. (2009). Approaches to vocational rehabilitation after traumatic brain injury: a review of the evidence. *Journal of Head Trauma Rehabilitation*, 24(3):195–212.
- Filiz, M., Cakmak, A. and Ozcan, E. (2005). The effectiveness of exercise programmes after lumbar disc surgery: a randomized controlled study. *Clinical Rehabilitation*, 19(1), 4–11.
- Fleten, N. and Johnsen, R. (2006). Reducing sick leave by minimal postal intervention: a randomised, controlled intervention study. *Occupational and Environmental Medicine*, 63 (10), 676.
- Fukuoka, Y., Dracup, K., Takeshima, M., Ishii, N., Makaya, M., Groah, L. and Kyriakidis, E. (2009). Effect of job strain and depressive symptoms upon returning to work after acute coronary syndrome. *Social Science and Medicine*, 68(10), 1875.

- Godges, J.J., Anger, M.A., Zimmerman, G. and Delitto, A. (2008). Effects of education on return-to-work status for people with fear-avoidance beliefs and acute low back pain. *Physical Therapy*, 88(2), 231–9.
- Greitemann, B., Dibbelt, S. and Büschel, C. (2006). Multidisciplinary orthopedic rehabilitation program in patients with chronic back pain and need for changing job situation -- long-term effects of a multimodal, multidisciplinary program with activation and job development. *Zeitschrift für Orthopädie und ihre Grenzgebiete*, 144(3), 255–66.
- Grossi, G. and Santell, B. (2009). Quasi-experimental evaluation of a stress management programme for female county and municipal employees on long-term sick leave due to work-related psychological complaints. *Journal of Rehabilitation Medicine*, 41, 632–8.
- Häckel, M., Masopust, V., Bojar, M., Ghaly, Y. and Horínek, D. (2009). The epidural steroids in the prevention of epidural fibrosis: MRI and clinical findings. *Neuro Endocrinology Letters*, 30(1), 51–5.
- Hagen, E.M., Odelien, K., Lie, S.A., Eriksen, H.R. (2010). Adding a physical exercise programme to brief intervention for low back pain patients did not increase return to work. *Scandinavian Journal of Public Health*, 38(7):731–8.
- Hagen, E.M. (2006). Does light mobilization treatment reduce long-term sick leave for low back pain? *Norsk Epidemiologi*, 16(2), 137–44.
- Hammond, A. (2008). Rehabilitation in musculoskeletal diseases. *Clinical Orthopaedics and Related Research*, 22(3), 435.
- Harvey, S.B., Henderson, M., Lelliott, P. and Hotopf, M. (2009). Mental health and employment: much work still to be done. *British Journal of Psychiatry*, 194(3), 201–3.
- Hätinen, M., Kinnunen, U., Pekkonen, M. and Kalimo, R. (2007). Comparing Two Burnout Interventions: Perceived Job Control Mediates Decreases in Burnout. *International Journal of Stress Management*, 14(3), 227–48.
- Heinrich, J., Anema, J.R., de Vroome, E.M. and Blatter B.M. (2009). Effectiveness of physical training for self-employed persons with musculoskeletal disorders: a randomized controlled trial. *BMC Public Health*, 9, 200.
- Heller, J.G., Sasso, R.C., Papadopoulos, S.M., Anderson, P.A., Fessler, R.G., Hacker, R.J., Coric, D., Cauthen, J.C. and Riew, D.K. (2009). Comparison of BRYAN cervical disc arthroplasty with anterior cervical decompression and fusion: clinical and radiographic results of a randomized, controlled, clinical trial. *Spine*, 34(20), 101.
- Hlobil, H., Staal, J.B., Twisk, J., Köke, A., Ariëns, G., Smid, T. and van Mechelen, W. (2005) The effects of a graded activity intervention for low back pain in occupational health on sick leave, functional status and pain: 12-month results of a randomized controlled trial. *Journal of Occupational Rehabilitation*, 15(4), 569–80.
- Hlobil, H., Uegaki, K., Staal, J.B., de Bruyne, M.C., Smid, T. and van Mechelen, W. (2007). Substantial sick-leave costs savings due to a graded activity intervention for workers with non-specific sub-acute low back pain. *European Spine Journal: official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society*, 16(7), 919–24.
- Høgelund, J. and Holm, A. (2006). Case management interviews and the return to work of disabled employees. *Journal of Health Economics*, 25(3), 500.

- Høgelund, J., Holm, A. and McIntosh, J. (2010). Does graded return-to-work improve sick-listed workers' chance of returning to regular working hours? *Journal of Health Economics*, 29(1), 158.
- Hüppe, A., Glaser-Möller, N. and Raspe, H. (2006). Offering multidisciplinary medical rehabilitation to workers with work disability due to musculoskeletal disorders: results of randomized controlled trial. *Gesundheitswesen*, 68(6), 347.
- van den Hout, W.B., de Buck, P.D. and Vliet Vlieland, T.P. (2007). Cost-utility analysis of a multidisciplinary job retention vocational rehabilitation program in patients with chronic arthritis at risk of job loss. *Arthritis and Rheumatism – Arthritis Care and Research*, 57(5), 778.
- Hoffman, B.M, Papas, R.K., Chatkoff, D.K. and Kerns, R.D. (2007). Meta-analysis of psychological interventions for chronic low back pain. *Health Psychology*, Volume 26(1), January 2007, 1–9.
- Howard, L.M., Heslin, M., Leese, M., McCrone, P., Rice, C., Jarrett, M., Spokes, T., Huxley, P. and Thornicroft, G. (2010). Supported employment: randomised controlled trial. *British Journal of Psychiatry*, 196(5), 404–11.
- Jakobsson, B., Ekholm, J., Bergroth, A. and Ekholm, K.S. (2004). Improved employment rates after multiprofessional cross-sector cooperation in vocational rehabilitation: a 6-year follow-up with comparison groups. *International Journal of Rehabilitation Research*, 33(1), 72–80.
- James, P., Cunningham, I. and Dibben, P. (2003). Job retention and vocational rehabilitation: The development and evaluation of a conceptual framework. *Research Report 106*. London: Health and Safety Executive.
- Jensen, I.B., Busch, H., Bodin, L., Hagberg, J., Nygren, A. and Bergström G. (2009). Cost effectiveness of two rehabilitation programmes for neck and back pain patients: A seven year follow-up. *Pain*, 142(3), 202.
- Kärrholm, J., Ekholm, K., Jakobsson, B., Ekholm, J., Bergroth, A. and Schüldt, K. (2006). Effects on work resumption of a co-operation project in vocational rehabilitation. Systematic, multi-professional, client-centred and solution-oriented co-operation. *Disability and Rehabilitation*, 28(7), 457.
- Kant, I., Jansen, N.W., van Amelsvoort, L.G., van Leusden, R. and Berkouwer, A. (2008). Structured early consultation with the occupational physician reduces sickness absence among office workers at high risk for long-term sickness absence: a randomized controlled trial. *Journal of Occupational Rehabilitation*, 18(1), 79–86.
- Katz, J.N., Amick, B.C., Keller, R., Fossel, A.H., Ossman, J., Soucie, V. and Losina, E. (2005). Determinants of work absence following surgery for carpal tunnel syndrome. *American Journal of Industrial Medicine*, 47(2), 120.
- Keat, A.C., Gaffney, K., Gilbert, A.K., Harris, C. and Leeder, J. (2008). Influence of biologic therapy on return to work in people with work disability due to ankylosing spondylitis. *Rheumatology – Oxford*, 47(4), 481–3.
- Kerkhoffs, G.M., Rowe, B.H., Assendelft, W.J., Kelly, K.D., Struijs, P.A., and van Dijk, C.N. (2002). Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults. *Cochrane Database of Systematic Reviews*, Issue 3.
- Kin Wong, K., Chiu, R., Tang, B., Mak, D., Liu, J. and Chiu, S.N. (2008). A randomized controlled trial of a supported employment program for persons with long-term mental illness in Hong Kong. *Psychiatric Services (Washington, D.C.)*, 59(1), 84.

- Kittel, J. and Karoff, M. (2008). Improvement of worklife participation through vocationally oriented cardiac rehabilitation? Findings of a randomized control group study. *Die Rehabilitation*, 47(1), 14–22.
- Klonoff, P.S., Talley, M.C., Dawson, L.K., Myles, S.M., Watt, L.M., Gehrels, J.A., Henderson, S.W. (2007). The relationship of cognitive retraining to neurological patients' work and school status. *Brain Injury*, 21(11), 1097.
- Knekt, P., Lindfors, O., Laaksonen, M.A., Raitasalo, R., Haaramo, P. and Järvikoski, A. (2008). Effectiveness of short-term and long-term psychotherapy on work ability and functional capacity – a randomized clinical trial on depressive and anxiety disorders. *Journal of Affective Disorders*, 107(1-3), 95.
- Kobayashi, Y., Kaneyoshi, A., Yokota, A. and Kawakami, N. (2008). Effects of a worker participatory program for improving work environments on job stressors and mental health among workers: a controlled trial. *Journal of Occupational Health*, 50(6), 455.
- Koch, L., Egbert, N., Coeling, H. and Ayers, D. (2005). Returning to Work After the Onset of Illness. *Rehabilitation Counseling Bulletin*, 48(4), 209–18.
- Kongsted, A., Qerama, E., Kasch, H., Bendix, T., Bach, F.W., Winther, F., Korsholm, L. and Jensen, T.S. (2007). Neck collar, 'act-as-usual' or active mobilization for whiplash injury? A randomized parallel-group trial. *Spine*, 32(6), 618.
- Kool, J., Bachmann, S., Oesch, P., Knuesel, O., Ambergen, T., de Bie, R. and van den Brandt, P. (2007). Function-centered rehabilitation increases work days in patients with nonacute nonspecific low back pain: 1-year results from a randomized controlled trial. *Archives of Physical Medicine and Rehabilitation*, 88(9), 1089–94.
- Koletsis, M., Niersman, A., van Busschbach, J.T., Catty, J., Becker, T., Burns, T., Fioritti, A., Kalkan, R., Lauber, C., Rössler, W., Tomov, T. and Wiersma, D. (2009). Working with mental health problems: clients' experiences of IPS, vocational rehabilitation and employment. *Social Psychiatry and Psychiatric Epidemiology*. 44(11), 961.
- Kovoor, P., Lee, A.K., Carrozzi, F., Wiseman, V., Byth, K., Zecchin, R., Dickson, C., King, M., Hall, J., Ross, D.L., Uther, J.B. and Denniss, A.R. (2006). Return to full normal activities including work at two weeks after acute myocardial infarction. *American Journal of Cardiology*, 97(7):952–8.
- Krupa, T. (2007). Interventions to improve employment outcomes for workers who experience mental illness. *Canadian Journal of Psychiatry – Revue Canadienne de Psychiatrie*. 52(6), 339–45.
- Lacaille, D., White, M.A., Rogers, P.A., Backman, C.L., Gignac, M.A., Esdaile, J.M. (2008). Employment and arthritis: Making it work program. *Arthritis and Rheumatism – Arthritis Care and Research*, 59(11), 1647.
- Lai, H.S. and Chan, C.C. (2007). Implementing a pilot work injury management program in Hong Kong. *Journal of Occupational Rehabilitation*, 17(4), 712–26.
- Lambeek, L.C., van Mechelen, W., Knol, D.L., Loisel, P. and Anema, J.R. (2010). Randomised controlled trial of integrated care to reduce disability from chronic low back pain in working and private life. *British Medical Journal (Clinical research ed.)*, 340, 1035.
- Lambeek, L.C., Bosmans, J.E. et al. (2010). Effect of integrated care for sick listed patients with chronic low back pain: economic evaluation alongside a randomised controlled trial, *British Medical Journal*, 341.



- Lander, F., Friche, C., Tornemand, H., Andersen, J.H. and Kirkeskov L. (2009). Can we enhance the ability to return to work among workers with stress-related disorders? *BMC Public Health*, 9, 372.
- Lee, H.L., Tan, H.K., Ma, H.I., Tsai, C.Y. and Liu, Y.K. (2006). Effectiveness of a work-related stress management program in patients with chronic schizophrenia. *American Journal of Occupational Therapy*, 60(4),435–41.
- Leff, H.S., Cook, J.A., Gold, P.B., Toprac, M., Blyler, C., Goldberg, R.W., McFarlane, W., Shafer, M., Allen, I.E., Camacho-Gonsalves, T. and Raab, B. (2005). Effects of job development and job support on competitive employment of persons with severe mental illness. *American Psychiatric Publishing Group*. 56(10). 1237.
- Levack, W., McPherson, K. and McNaughton, H. (2004). Success in the workplace following traumatic brain injury: are we evaluating what is most important? *Disability and Rehabilitation*, 26 (5), 290.
- Leon, L., Jover, J.A., Candelas, G., Lajas, C., Vadillo, C., Blanco, M., Loza, E., Perez, M.A., Redondo, M. and Abasolo, L. (2009). Effectiveness of an early cognitive-behavioral treatment in patients with work disability due to musculoskeletal disorders. *Arthritis and Rheumatism – Arthritis Care and Research*, 61(7), 996.
- Levinson, D. et al. (2010). Associations of serious mental illness with earnings: results from the WHO World Mental Health surveys. *British Journal of Psychiatry*, 197(2),114–121.
- Lidal, I.B., Huynh, T.K. and Biering-Sørensen, F. (2007). Return to work following spinal cord injury: a review. *Disability and Rehabilitation*, 29(17):1341–75.
- Limm, H. et al. (2010). Stress management interventions in the workplace improve stress reactivity: a randomised controlled trial. *Occupational and Environmental Medicine*, 68,126–33.
- Lindell, O., Johansson, S.E. and Strender, L.E. (2008). Subacute and chronic, non-specific back and neck pain: cognitive-behavioural rehabilitation versus primary care. A randomized controlled trial. *BMC Musculoskeletal Disorders*, 9, 172.
- Linton, S.J., Boersma, K., Jansson, M., Svärd, L. and Botvalde, M. (2005). The effects of cognitive-behavioral and physical therapy preventive interventions on pain-related sick leave: a randomized controlled trial. *The Clinical Journal of Pain*, 21(2), 109–19.
- Linton, S.J. and Nordin E. (2006). A 5-year follow-up evaluation of the health and economic consequences of an early cognitive behavioral intervention for back pain: a randomized, controlled trial. *Spine*, 31(8), 853.
- Li-Tsang, C. W., Li, E. J., Lam, C.S., Hui, K.Y. and Chan, C.C. (2008). The effect of a job placement and support program for workers with musculoskeletal injuries: a randomized control trial (RCT) study. *Journal of Occupational Rehabilitation*, 18(3), 299–306.
- Liu, K.W., Hollis, V., Warren, S. and Williamson, D. L. (2007). Supported-employment program processes and outcomes: experiences of people with schizophrenia. *American Journal of Occupational Therapy*., 61(5), 543–54.
- Lloyd, C., Waghorn, G. and McHugh, C. (2008). Musculoskeletal disorders and comorbid depression: implications for practice. *Australian Occupational Therapy Journal*, 55(1):23–9.
- Lo Sasso, A.T., Rost, K. and Beck A. (2006). Modeling the impact of enhanced depression treatment on workplace functioning and costs: a cost-benefit approach. *Medical Care*. 44(4), 352.

- Lock, S., Jordan, L., Byran, K. and Maxim, J. (2005). Work after stroke: focusing on barriers and enablers. *Disability and Society*, 20(1), 33.
- Londos, E., Boschian, K., Linden, A., Persson, C., Minthon, L. and Lexell, J. (2008). Effects of a goal-oriented rehabilitation program in mild cognitive impairment: a pilot study. *American Journal of Alzheimer's Disease and Other Dementias*, 23(2), 177.
- Lysaker, P.H., Davis, L.W., Bryson, G.J. and Bell, M.D. (2009). Effects of cognitive behavioral therapy on work outcomes in vocational rehabilitation for participants with schizophrenia spectrum disorders. *Schizophrenia Research*, 107(2-3), 186.
- Magnussen, L., Strand, L.I., Skouen, J.S. and Eriksen, H.R. (2007). Motivating disability pensioners with back pain to return to work--a randomized controlled trial. *Journal of Rehabilitation Medicine: official journal of the UEMS European Board of Physical and Rehabilitation Medicine*, 39(1), 81-7.
- Mangels, M., Schwarz, S., Worringer, U., Holme, M. and Rief, W. (2011). Long sick leave after orthopaedic inpatient rehabilitation: treatment failure or relapse? *International Journal of Rehabilitation Research*, 34(1), 29.
- Mavin, S. and Robson, F. (2011). Managing absenteeism in local government. *Public Money and Management*, 31(2), 107.
- McCluskey, S., Burton, A.K. and Main, C.J. (2006). The implementation of occupational health guidelines principles for reducing sickness absence due to musculoskeletal disorders. *Occupational Medicine*, 56(4), 237-42.
- McCrone, P., Craig, T.K., Power, P. and Garety, P.A. (2010). Cost-effectiveness of an early intervention service for people with psychosis. *British Journal of Psychiatry*, 196(5), 377-82
- McGuirk, B. and Bogduk, N. (2007). Evidence-based care for low back pain in workers eligible for compensation. *Occupational Medicine*, 57(1), 36.
- Meijer, E.M., Sluiter, J.K., Heyma, A., Sadiraj, K. and Frings-Dresen, M.H. (2006). Cost-effectiveness of multidisciplinary treatment in sick-listed patients with upper extremity musculoskeletal disorders: a randomized, controlled trial with one-year follow-up. *International Archives of Occupational and Environmental Health*, 79(8), 654-64.
- Menzel, N. and Robsinson, M.E. (2006). Back pain in direct patient care providers: early intervention with cognitive behavioral therapy. *Pain Management Nursing*, 7(2), 53.
- Monpere, C., Francois, G., Rondeau Du Noyer, C., and Phan Van, J. Return to work after rehabilitation in coronary bypass patients. Role of the occupational medicine specialist during rehabilitation. *European Heart Journal*, 9(0/95), 48.
- Muijzer, A. et al. (2010). The assessment of efforts to return to work in the European Union. *European Journal of Public Health*, 20(6), 689-94.
- Mulcahy, R., Kennedy, C. and Conroy, R. (1988). The long-term work record of post-infarction patients subjected to an informal rehabilitation and secondary prevention programme. *European Heart Journal*, 9(0/95), 84.
- Munir, F., Yarker, J. and Haslam, C. (2008). Sickness absence management: Encouraging attendance or 'risk-taking' presenteeism in employees with chronic illness? *Disability and Rehabilitation*, 30(19), 1461.
- Murphy, L., Chamberlain, E., Weir, J., Berry, A., Nathaniel-James, D. and Agnew, R. (2006). Effectiveness of vocational rehabilitation following acquired brain injury: preliminary evaluation of a UK specialist rehabilitation programme. *Brain Injury*, 20(11), 1119.

- Myette, T.L. (2008). Research on Depression in the workplace: where do we go from here? *Journal of Occupational & Environmental Medicine*, 50(4), 492.
- Nakao, M. (2010). Work-related stress and psychosomatic medicine. *BioPsychoSocial Medicine*, 4(1), 4.
- National Institute for Health and Clinical Excellence. (2008). Promoting wellbeing at work. Business case: Implementing NICE guidance. NICE public health guidance 22.
- National Institute for Health and Clinical Excellence. (2009). Promoting mental wellbeing through productive and healthy working conditions: guidance for employers. [www.nice.org.uk/nicemedia/live/12331/45893/45893.pdf](http://www.nice.org.uk/nicemedia/live/12331/45893/45893.pdf) (accessed 25 March 2011).
- Netterstrøm, B. (2010). Effect of a multidisciplinary stress treatment programme on the return to work rate for persons with work-related stress. A non-randomized controlled study from a stress clinic. *BMC Public Health*, 10, 658.
- Newsome, R.J., May, S., Chiverton, N. and Cole., A.A. (2009). A prospective, randomised trial of immediate exercise following lumbar microdiscectomy: a preliminary study. *Physiotherapy*, 95(4), 273.
- Nice, K. and Thornton, P. (2004). *Job Retention and Rehabilitation Pilot: Employers' management of long-term sickness absence*. DWP Research Report No. 227.
- Nieuwenhuijsen, K., Bültmann, U., Neumeyer-Gromen, A., Verhoeven, A.C., Verbeek, J. H. and van der Feltz-Cornelis, C.M. (2008). Interventions to improve occupational health in depressed people. *Cochrane Database of Systematic Reviews: Reviews*, Issue 2.
- Noordik, E., van Dijk, F.J., Nieuwenhuijsen, K. and van der Klink, J.J. (2009). Effectiveness and cost-effectiveness of an exposure-based return-to-work programme for patients on sick leave due to common mental disorders: design of a cluster-randomized controlled trial. *BMC Public Health*, 9, 140.
- Nordeman, L., Nilsson, B., Möller, M. and Gunnarsson, R. (2006). Early access to physical therapy treatment for subacute low back pain in primary health care: a prospective randomized clinical trial. *The Clinical Journal of Pain*, 22(6), 505.
- Nordin, M., Balagué, F. and Cedraschi, C. (2006). Nonspecific lower-back pain: Surgical versus nonsurgical treatment. *Clinical Orthopaedics and Related Research*, 443(0), 156.
- Nuechterlein, K.H., Subotnik, K.L., Turner, L.R., Ventura, J., Becker, D.R. and Drake, R.E. (2008). Individual placement and support for individuals with recent-onset schizophrenia: Integrating supported education and supported employment. *Psychiatric Rehabilitation Journal*. 31(4), 340.
- Nystuen, P. and Hagen, K. B. (2006). Solution-focused intervention for sick listed employees with psychological problems or muscle skeletal pain: a randomised controlled trial, *BMC Public Health*, 6(1), 69.
- Oesch, P., Kool, J. et al. (2010) Effectiveness of exercise on work disability in patients with nonacute non-specific low back pain: Systematic review and meta-analysis of randomized controlled trials, *Journal of Rehabilitation Medicine*, 42 (3), 193–205.
- Østerås, H., Arild Torstensen, T., Arntzen, G. and S Østerås, B. (2008). A comparison of work absence periods and the associated costs for two different modes of exercise therapies for patients with longstanding subacromial pain. *Journal of Medical Economics*, 11(3), 371–81.
- Osterås, N., Gulbrandsen, P., Kann, I.C. and Brage, S. (2010). Structured functional assessments in general practice increased the use of part-time sick leave: a cluster randomised controlled trial. *Scandinavian Journal of Public Health*, 38(2), 192–9.

- Petersen, T., Larsen, K. and Jacobsen, S. (2007). One-year follow-up comparison of the effectiveness of McKenzie treatment and strengthening training for patients with chronic low back pain: outcome and prognostic factors. *Spine*, 32(26), 2948.
- Pomerance, J. and Fine, I. (2007). Outcomes of carpal tunnel surgery with and without supervised postoperative therapy. *The Journal of Hand Surgery*, 32(8), 1159–63.
- Post, M., Krol, B. and Groothoff, J. (2005). Work-related determinants of return to work of employees on long-term sickness absence. *Disability and Rehabilitation*, 27(9), 481.
- Pransky, G., Benjamin, K., Hill-Fotouhi, C., Himmelstein, J., Fletcher, K.E., Katz, J.N. and Johnson, W.G. (2000). Outcomes in work-related upper extremity and low back injuries: results of a retrospective study. *American Journal of Industrial Medicine*. 37(4), 400.
- Puhani, P. and Sonderhof, K. (2010). The Effects of a Sick Pay Reform on Absence and on Health-Related Outcomes. *Journal of Health Economics*, 29(2), 285.
- Ratzon, N., Schejter-Margalit, T. and Froom, P. (2006). Time to return to work and surgeons' recommendations after carpal tunnel release. *Occupational Medicine*, 56(1), 46.
- Rebergen, D.S., Bruinvels, D.J., Bezemer, P.D., van der Beek, A.J. and van Mechelen, W. (2009). Guideline-based care of common mental disorders by occupational physicians (CO-OP study): a randomized controlled trial. *Journal of Occupational and Environmental Medicine/American College of Occupational and Environmental Medicine*, 51( 3), 305–12.
- Rebergen, D.S., Bruinvels, D.J., van Tulder, M.W., van der Beek, A.J. and van Mechelen, W. (2009). Cost-effectiveness of guideline-based care for workers with mental health problems. *Occupational and Environmental Medicine*, 51(3), 313.
- Reker, T., Hormung, W.P., Schonauer, K. and Eikelmann, B. (2000). Long-term psychiatric patients in vocational rehabilitation programmes: a naturalistic follow-up study over 3 years. *Acta Psychiatrica Scandinavica*, 101(6), 457.
- Reme, S.E., Hagen, E.M. and Eriksen H.R., (2009). Expectations, perceptions, and physiotherapy predict prolonged sick leave in subacute low back pain. *BMC Musculoskeletal Disorders*, 10, 139.
- Richardson, K.M and Rothstein, H.R. (2008). Effects of occupational stress management intervention programs: a meta-analysis. *Journal of Occupational Health Psychology*. 13 (1): 69–93.
- Roelofs, P.D., Bierma-Zeinstra, S.M., van Poppel, M.N., Jellema, P., Willemsen, S.P., van Tulder, M.W., van Mechelen, W. and Koes, B.W. (2007). Lumbar supports to prevent recurrent low back pain among home care workers: a randomized trial. *Annals of Internal Medicine*, 147(10), 685–92.
- Rosenfeld, M., Seferiadis, A. and Gunnarsson, R. (2006). Active Involvement and Intervention in Patients Exposed to Whiplash Trauma in Automobile Crashes Reduces Costs: A Randomized, Controlled Clinical Trial and Health Economic Evaluation. *Spine*, 31(16), 1799.
- Rubinstein, S.M., van Middelkoop, M., Assendelft, W.J., de Boer, M.R. and van Tulder, M.W. (2011). Spinal manipulative therapy for chronic low-back pain. *Cochrane Database of Systematic Reviews*, No. 2.
- Sanderson K. and Andrews G. (2006). Common mental disorders in the workforce: recent findings from descriptive and social epidemiology. *Canadian Journal of Psychiatry – Revue Canadienne de Psychiatrie*. 51(2):63–75.

Scerri, M., de Goumoens, P., Fristch, C., Van Melle, G., Stifel, F. and So, A. (2006). The INTERMED questionnaire for predicting return to work after a multidisciplinary rehabilitation program for chronic low back pain. *Joint Bone Spine*, 73(6), 736.

Schaafsma, F., Schonstein, E., Whelan, K.M., Ulvestad, E., Kenny, D.T. and Verbeek, J.H., (2010). Physical conditioning programs for improving work outcomes in workers with back pain. *Cochrane Database of Systematic Reviews*, No. 1.

Schene, A.H., Koeter, M.W., Kikkert, M.J., Swinkels, J.A. and McCrone, P. (2007). Adjuvant occupational therapy for work-related major depression works: randomized trial including economic evaluation. *Psychological Medicine*, 37(3), 351.

Schiltenswolf, M., Buchner, M., Heindl, B., von Reumont, J., Müller, A. and Eich, W. (2006). Comparison of a biopsychosocial therapy (BT) with a conventional biomedical therapy (MT) of subacute low back pain in the first episode of sick leave: a randomized controlled trial. *European Spine Journal*, 15(7), 1083.

Schweikert, B., Jacobi, E., Seitz, R., Cziske, R., Ehlert, A., Knab, J. and Leidl, R. (2006). Effectiveness and cost-effectiveness of adding a cognitive behavioral treatment to the rehabilitation of chronic low back pain. *The Journal of Rheumatology*, 33(12), 2519-26.

Sivan, M., Sell, B. and Sell, P. (2009). The outcome of a functional restoration programme for chronic low back pain. *Irish Journal of Medical Science*, 178(4):461-7.

Sjöström, R., Alricsson, M. and Asplund, R. (2008). Back to work--evaluation of a multidisciplinary rehabilitation programme with emphasis on musculoskeletal disorders. A two-year follow-up. *Disability and Rehabilitation*, 30(9):649-55.

Søgaard, H. and Bech, P. (2009). The effect on length of sickness absence by recognition of undetected psychiatric disorder in long-term sickness absence. A randomized controlled trial. *Scandinavian Journal of Public Health*, 37(8), 864.

Soklaridis, S., Ammendolia, C. and Cassidy, D. (2010). Looking upstream to understand low back pain and return to work: psychosocial factors as the product of system issues. *Social Science and Medicine*, 71(9), 1557.

Sonnenschein, M. et al. (2008). Influence of sleep on symptom improvement and return to work in clinical burnout. *Scandinavian Journal of Work, Environment & Health*, 34, 23-32.

Spierdijk, L., van Lomwel, G. and Peppelman, W. (2009). The determinants of sick leave durations of Dutch self-employed. *Journal of Health Economics*, 28(6), 1185.

Staal, J.B., Hlobil, H., Köke, A.J., Twisk, J. W., Smid, T. and van Mechelen W. (2008) Graded activity for workers with low back pain: who benefits most and how does it work? *Arthritis and Rheumatism - Arthritis Care and Research*, 59(5), 642.

Steenstra, I.A., Anema, J.R., Bongers, P.M., de Vet, H.C., Knol, D.L. and van Mechelen, W. (2006). The effectiveness of graded activity for low back pain in occupational healthcare. *Occupational and Environmental Medicine*, 63(11), 718-25.

Steenstra, I.A., Anema, J.R., van Tulder, M.W., Bongers, P.M., de Vet, H.C. and van Mechelen, W. (2006). Economic evaluation of a multi-stage return to work program for workers on sick-leave due to low back pain. *Journal of Occupational Rehabilitation*, 16(4), 557-78.

- Steenstra, I.A., Knol, D.L., Bongers, P.M., Anema, J.R., van Mechelen, W. and de Vet, H.C. (2009). What works best for whom? An exploratory, subgroup analysis in a randomized, controlled trial on the effectiveness of a workplace intervention in low back pain patients on return to work. *Spine*, 34(12), 1243–9.
- Stratford, N., Taylor, R., Legard, R., Natarajan, L., Purdon, S. and Shaw, A. (2005). *The Job Retention and Rehabilitation Pilot: Reflections on running a randomised control trial*. DWP Research Report No. 305.
- Streibelt, M., Hansmeier, T. and Müller-Fahrnow, W. (2006). Effects of work-related medical rehabilitation in patients with musculoskeletal disorders. *Die Rehabilitation*, 45(3), 161.
- Suoyrjö, H., Oksanen, T., Hinkka, K., Kivimäki, M., Klaukka, T., Pentti, J. and Vahtera, J. (2009). The effectiveness of vocationally oriented multidisciplinary intervention on sickness absence and early retirement among employees at risk: an observational study. *Occupational & Environmental Medicine*, 66, 235–42.
- Taimela, S., Malmivaara, A., Justén, S., Läärä, E., Sintonen, H., Tiekso, J. and Aro, T. (2008). The effectiveness of two occupational health intervention programmes in reducing sickness absence among employees at risk. Two randomised controlled trials. *Occupational & Environmental Medicine*, 65(4), 236–41.
- Taimela, S., Justén, S., Aronen, P., Sintonen, H., Läärä, E., Malmivaara, A., Tiekso, J. and Aro, T. (2008). An occupational health intervention programme for workers at high risk for sickness absence. Cost effectiveness analysis based on a randomised controlled trial. *Occupational & Environmental Medicine*, 65(4), 242.
- Thorslund, K.W. (2007). Solution-focused group therapy for patients on long-term sick leave: A comparative outcome study. *Journal of Family Psychotherapy*, 18(3), 11–24.
- Tian, Y., Zhao, H. and Wang, T. (2007). Prospective comparison of endoscopic and open surgical methods for carpal tunnel syndrome. *Chinese Medical Sciences Journal = Chung-kuo i hsüeh k'o hsüeh tsa chih/Chinese Academy of Medical Sciences*, 22(2), 104–7.
- Tompa, E., de Oliveira, C., Dolinschi, R. and Irvin E. (2008). A systematic review of disability management interventions with economic evaluations. *Journal of Occupational Rehabilitation*. 18(1), 16–26.
- Torres, X., Collado, A., Arias, A., Peri, J. M., Bailles, E., Salamero, M. and Valdes, M. (2009). Pain locus of control predicts return to work among Spanish fibromyalgia patients after completion of a multidisciplinary pain program. *General Hospital Psychiatry*, 31(2), 137.
- Trees, A.H., Howe, T.E., Dixon, J. and White L. (2005). Exercise for treating isolated anterior cruciate ligament injuries in adults. *Cochrane Database of Systematic Reviews*, No 4.
- Trees, A.H., Howe T.E., Grant M. and Gray, H.G. (2007). Exercise for treating anterior cruciate ligament injuries in combination with collateral ligament and meniscal damage of the knee in adults. *Cochrane Database of Systematic Reviews*, No 3.
- Tsang, H.W., Chan, A., Wong, A. and Liberman, R.P. (2009). Vocational outcomes of an integrated supported employment program for individuals with persistent and severe mental illness. *Journal of Behavior Therapy and Experimental Psychiatry*, 40(2), 292.
- Tveito, T.H. and Eriksen, H.R. (2009). Integrated health programme: a workplace randomized controlled trial. *Journal of Advanced Nursing*, 65(1) 110.

- Umanodan, R., Kobayashi, Y., Nakamura, M., Kitaoka-Higashiguchi, K., Kawakami, N. and Shimazu, A. (2009). Effects of a worksite stress management training program with six short-hour sessions: a controlled trial among Japanese employees. *Journal of Occupational Health*, 51(4) 294.
- van der Roer, N., van Tulder, M., Barendse, J., Knol, D., van Mechelen, W. and de Vet, H. (2008). Intensive group training protocol versus guideline physiotherapy for patients with chronic low back pain: a randomised controlled trial. *European Spine Journal : official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society*, 17( 9), 1193–200.
- Van Duijn, M., Eijkemans, M.J., Koes, B.W., Koopmanschap, M.A., Burton, K.A. and Burdorf, A. (2010). The effects of timing on the cost-effectiveness of interventions for workers on sick leave due to low back pain. *Occupational & Environmental Medicine*, 67(11), 744.
- van Duijvenbode, I., Jellema, P., van Poppel, M. and van Tulder, M.W. (2008). Lumbar supports for prevention and treatment of low back pain. *Cochrane Database of Systematic Reviews: Reviews 2008 Issue 2*.
- van Oostrom, S.H., Driessen, M.T., de Vet, H.C., Franche, R.L., Schonstein, E., Loisel, P., van Mechelen, W. and Anema, J.R. (2009). Workplace interventions for preventing work disability. *Cochrane Database of Systematic Reviews: Reviews 2009 Issue 2*.
- van Oostrom, S.H., van Mechelen, W., Terluin, B., de Vet, H.C. and Anema, J.R. (2009). A participatory workplace intervention for employees with distress and lost time: a feasibility evaluation within a randomized controlled trial. *Journal of Occupational Rehabilitation*, 19(2), 212.
- van Oostrom, S.H., Heymans, M.W., de Vet, H.C., van Tulder, M.W., van Mechelen, W. and Anema, J.R. (2009). Economic evaluation of a workplace intervention for sick-listed employees with distress. *Occupational & Environmental Medicine*, 67, 603–610.
- van Oostrom, S.H., van Mechelen, W., Terluin, B., de Vet, H.C.W., Knol, D.L. and Anema, J.R. (2010). A workplace intervention for sick-listed employees with distress: results of a randomised controlled trial. *Occupational & Environmental Medicine*, 67, 596–602.
- van Rhenen, W., Blonk, R.W., Schaufeli, W.B. and van Dijk, F.J. (2007). Can sickness absence be reduced by stress reduction programs: on the effectiveness of two approaches. *International Archives of Occupational and Environmental Health*, 80, (6) 505.
- Vanderploeg, R.D., Schwab, K., Walker, W.C., Fraser, J.A., Sigford, B.J., Date, E.S., Scott, S.G., Curtiss, G., Salazar, A.M. and Warden, D.L.(2008). Rehabilitation of traumatic brain injury in active duty military personnel and veterans. *Archives of Physical Medicine and Rehabilitation*. 89(12), 2227.
- Vermeulen, S. , Anema, J.R., Schellart, A.J., van Mechelen, W. and van der Beek, A.J., (2010). Cost-effectiveness of a participatory return-to-work intervention for temporary agency workers and unemployed workers sick-listed due to musculoskeletal disorders: design of a randomised controlled trial. *BMC Musculoskeletal Disorders*, 11, 60.
- Vioreanu, M., Dudeney, S., Hurson, B., Kelly, E., O'Rourke, K. and Quinlan, W. (2007). Early mobilization in a removable cast compared with immobilization in a cast after operative treatment of ankle fractures: a prospective randomized study. *Foot & Ankle International/American Orthopaedic Foot and Ankle Society Swiss Foot and Ankle Society*, 28(1), 13–9.

- Vohra, R., Coughlin, P., McShane, P., Bains, M., Laughlan, K. and Gough, M. (2004). Predictors of return to work following carotid endarterectomy. *Journal of Advanced Nursing*, 48(4), 322.
- de Vries, J.S., Krips, R., Sierevelt, I.N., Blankevoort, L. and van Dijk, C.N. (2006). Interventions for treating chronic ankle instability. *Cochrane Database of Systematic Reviews*, Issue 4.
- Waddell, G., Burton, A.K., Kendall, N.A. (2008). Vocational Rehabilitation: What Works, for Whom, and When? *Report for the Vocational Rehabilitation Task Group*. London: TSO.
- Walter, P.J. (2009). Return to work after coronary artery bypass surgery. *European Heart Journal*, 9(0/95), 58.
- Wang, P.S., Simon, G.E., Avorn, J., Azocar, F., Ludman, E.J., McCulloch, J., Petukova, M.Z. and Kessler, R.C. (2007). Telephone screening, outreach, and care management for depressed workers and impact on clinical and work productivity outcomes: a randomized controlled trial. *The Journal of the American Medical Association*. 298 (12), 1401.
- Wang, P.S., Simon, G.E. and Kessler, R.C. (2008). Making the Business Case for Enhanced Depression Care: The National Institute of Mental Health-Harvard Work Outcomes Research and Cost-Effectiveness Study. *Journal of Occupational and Environmental Medicine*. 50 (4),50(4): 468–75.
- Watzke, S. Galvao, A., Gawlik, B., Huehne, M. and Brieger, P. (2006). Change in work performance in vocational rehabilitation for people with severe mental illness: distinct responder groups. *International Journal of Social Psychiatry*, 52(4):309–23.
- Westman, A., Linton, S.J., Ohrvik, J., Wahlén, P., Theorell, T. and Leppert, J. (2010). Controlled 3-year follow-up of a multidisciplinary pain rehabilitation program in primary health care. *Disability and Rehabilitation*, 32(4),307–16.
- Williams, R., Westmorland, M.G., Lin, C.A., Schmuck, G. and Creen, M. (2007). Effectiveness of workplace rehabilitation interventions in the treatment of work-related low back pain: a systematic review. *Disability and Rehabilitation*, 29(8), 607.
- Wolfenden, B. and Grace, M. (2009). Returning to work after stroke: a review. *International Journal of Rehabilitation Research*, 32(2), 93–97.
- Wright, A., Lloyd-Davies, A., Williams, S., Ellis, R. and Strike, P. (2005). Individual active treatment combined with group exercise for acute and subacute low back pain. *Spine*. 30(11), 1235–41.
- Ziebarth, N. and Karlsson, M. (2010). A Natural Experiment on Sick Pay Cuts, Sickness Absence, and Labor Costs. *Journal of Public Economics*, 94(11/12), 1108.



This rapid evidence assessment examined evidence on the effectiveness of health and work interventions to help people with common health conditions to stay in or return to work considering the latest available studies (2008–11). Studies were identified using quasi-systematic searches of bibliographic databases.

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