Workplace health: support for employees with disabilities and long-term conditions

Draft evidence review

Methods, evidence and recommendations

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National Institute for Health and Care Excellence

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1. Introduction

The National Institute for Health and Care Excellence (NICE) was asked by the Department of Health in England to produce a guideline on workplace health, with a focus on support for employees with disabilities and long-term conditions (LTC). This guideline will be for use by employers and employees (as well as others detailed in the scope) and will provide guidance on effective and cost-effective approaches to promote and protect the health of workers with chronic diseases (including cancer, HIV, diabetes, musculoskeletal conditions and arthritis) and long-term conditions. It will also cover how to effectively manage sickness absence associated with these conditions.

The scope for this guideline identifies two types of intervention which will set the focus of this guideline: targeted and organisational. Targeted interventions are employer focused and are considered in this guideline if they are the responsibility of the employer. They could include:

- non-treatment workplace programmes to help people manage their health condition, such as motivational interviewing (to strengthen belief in ability to work)

- adjustments in work activities, station, processes or place (including assistive technology or practices, changes to job design and flexible working)

Organisational interventions, which are organisation-wide interventions, could include:

- educational campaigns and workplace groups to promote positive attitudes and tackle discrimination and stigma
- showing people how to get help from 'employee support schemes'

A long-term condition is 'one that cannot currently be cured but can be managed with the use of medication or other therapies. This is in contrast to acute conditions that typically have a finite duration' (Care planning: improving the lives of people with long term conditions Royal College of General Practitioners). Long-term conditions (LTCs) may also be known as 'chronic conditions' and 'life-limiting conditions'. The World Health Organisation defines chronic diseases as diseases not passed from person to person, of a long duration and generally slow in their progression.

Disability is defined in different ways for different purposes. In employment, the definition within the Equality Act 2010 states: a person is disabled if they have a physical or mental impairment that has a 'substantial' and 'long-term' effect on their ability to do normal daily activities.

There are estimated to be 11 million people in England living with a long-term condition or disability (Disability facts and figures Office for National Statistics 2014). People

with long-term conditions have a 59% employment rate compared with 77% for those without a condition (Health at work – an independent review of sickness absence Department for Work and Pensions).

Every year 300,000 people are estimated to stop work and become reliant upon health-related state benefits. Many people are on long-term sick leave before this point. The government is estimated to spend £13 billion annually on health-related benefits because of sickness absence from work. Employers are estimated to spend £9 billion per year in sick pay and associated costs ('Health at work – an independent review of sickness absence').

There is strong evidence to show that work is generally good for the employee's physical and mental health and wellbeing (Work, health and wellbeing Black 2012; Is work good for your health and wellbeing? (Department for Work and Pensions).

To support the development of this guideline, NICE has reviewed the best available evidence on workplace health in relation to employees with disabilities and LTC. The evidence reviews will focus on the effectiveness of targeted or organisational interventions to support employees with disabilities or LTC to return to or stay in work. It will consider what impact the deliverer, setting, timing, frequency, duration and intensity of the intervention(s) have on the effectiveness and acceptability of different interventions.

2. Methods

This review was conducted according to the methods guidance set out in 'Developing NICE guidelines: the manual' (NICE 2014).

2.1. Review question

The review questions were:

- What are the most effective targeted or organisational interventions to support employees with disabilities or long term conditions (LTCs) to return to or stay in work?
    - What impact do the deliverer, setting, timing, frequency, duration and intensity of the intervention(s) have on the effectiveness and acceptability of different interventions?

2.2. Searching, screening, quality assessment and data extraction

2.2.1. *Review protocol*

The identification of evidence conforms to the methods set out in Chapter 5 of Developing Guidelines: the manual (NICE 2014).

The protocol outlines the methods for the review, including the search protocols and methods for data screening, quality assessment and synthesis (Appendix 1).

A single systematic, search of electronic databases and websites was conducted to identify relevant peer-reviewed and grey literature published from January 2000. Full details of search methods are reported in the review protocol (Appendix 1).The search combined terms for disability and long-term conditions with workplace and intervention terms. The initial search strategy was developed in MEDLINE (Ovid Interface) and tested against known relevant papers (Appendix 2). It was then translated for use with other databases and websites. Backwards and forward citation searching of key references and systematic reviews identified during full paper screening was undertaken. The reference lists of previous reviews undertaken for NICE as part of the development of NICE public health guidance 19 workplace

health: long-term sickness absence and incapacity to work were scanned for relevant trials.

Additional searches were run for specific chronic disease conditions with high prevalence in mostly black and minority ethnic groups (e.g. sickle cell disease, lupus erythematosus). This was done in response to potential equality issues identified. Furthermore, the Public Health Advisory Committee were concerned by the lack of studies identified focused on chronic conditions other than common mental disorders, or musculoskeletal conditions. To address this additional work was undertaken, including:

- Reviewing the reference lists of both included and excluded studies of potentially relevant systematic reviews
- Additional reference checking of papers about chronic conditions
- Contact with authors

All references identified were uploaded to the STAR systematic reviewing software, with screening undertaken on title and abstract against the inclusion and exclusion criteria set out in the protocol (Appendix 1). Key criteria included:

Inclusion Criteria	Exclusion criteria
OECD countries	Non-OECD countries
English language studies published in 2000 or later	Non-English language studies published pre 2000
Studies with a clear control group or suitable and clear comparator	Studies without a control group or suitable and clear comparator will be excluded.
Studies must report one or more primary outcomes - See page 10 of the protocol [appendix 1]).	Systematic reviews will not be included but used as a source of primary studies only
Employees who have an existing disability or long-term mental or physical health condition	Unemployed; Anyone receiving benefits that cover unemployed due to disability or LTC; self-employed or not contracted to work; children and young people under 16

Targeted interventions that the employer has responsibility for and/or organisational interventions	Workplace interventions to mitigate health problems or functional decline; universal screening[1]; national employment and social security policies

A random sample of 10% of titles and abstract were screened by 2 reviewers independently with differences resolved by discussion. Initial agreement at this stage was 92.1%; following discussion of differences an agreement rate of 100% was achieved. References identified as potentially relevant though abstract and screening were then retrieved as full-papers. At full paper screening a random sample of 10% of papers was independently assessed by 2 reviewers. Agreement at this stage was 95%, following discussion of differences and an agreement rate of 100% was achieved. All papers excluded at full paper screening are listed in Appendix 6 along with reasons for exclusion.

2.2.2. *Data extraction*

Data from each study included in the review were extracted into evidence tables by one reviewer with all data then checked in detail by a second reviewer. Evidence tables for each included study can be found in Appendix 3.

Identified papers were grouped and themed, following discussions between NICE and the PHAC, on what was considered to be the primary intervention action. Where a primary intervention action could not be identified the intervention was themed 'multi-component'.

2.2.3. *Quality assessment*

Each included study was quality assessed by one reviewer and then checked for accuracy by another reviewer. Any differences in quality grading were resolved by discussion. Studies with a control group were assessed using the Cochrane Effective Practice and Organisation of Care Group (EPOC) risk of bias tool; uncontrolled

[1] Universal screening was considered if it was a component of a relevant intervention

before and after studies were appraised using the Effective Public Health Practice Project (EPHPP) quality assessment tool for quantitative studies. Both tools are recommended in Developing Guidelines: the manual (NICE 2014); complete versions of these checklists are available in Appendix 4, and a summary of the QA results of all included studies is included in Appendix 5. The quality ratings used were:

++ All or most of the checklist criteria have been fulfilled, and where they have not been fulfilled the conclusions are very unlikely to alter.
+ Some of the checklist criteria have been fulfilled, and where they have not been fulfilled, or are not adequately described, the conclusions are unlikely to alter.
– Few or no checklist criteria have been fulfilled and the conclusions are likely or very likely to alter.

2.2.5 Evidence statements

Evidence statements were drafted in line with Developing NICE guidelines: the manual (NICE 2014).

3. Results

3.1. Flow of literature through the review

Database and website searching identified 15,174 references. Duplicates were removed, and a further 99 references were identified through additional methods (i.e. checking reference lists and systematic reviews) leaving a total of 11,947 references to be screened on title and abstract. 11, 738 items were excluded at the title and abstract stage. The full texts of 209 items were requested for more detailed assessment. A total of 44 studies reported in 64 papers were then included. A brief summary of the reasons for exclusion on full-text is included in Table 1 below, and a list of excluded studies along with reasons for exclusion in included in Appendix 6.

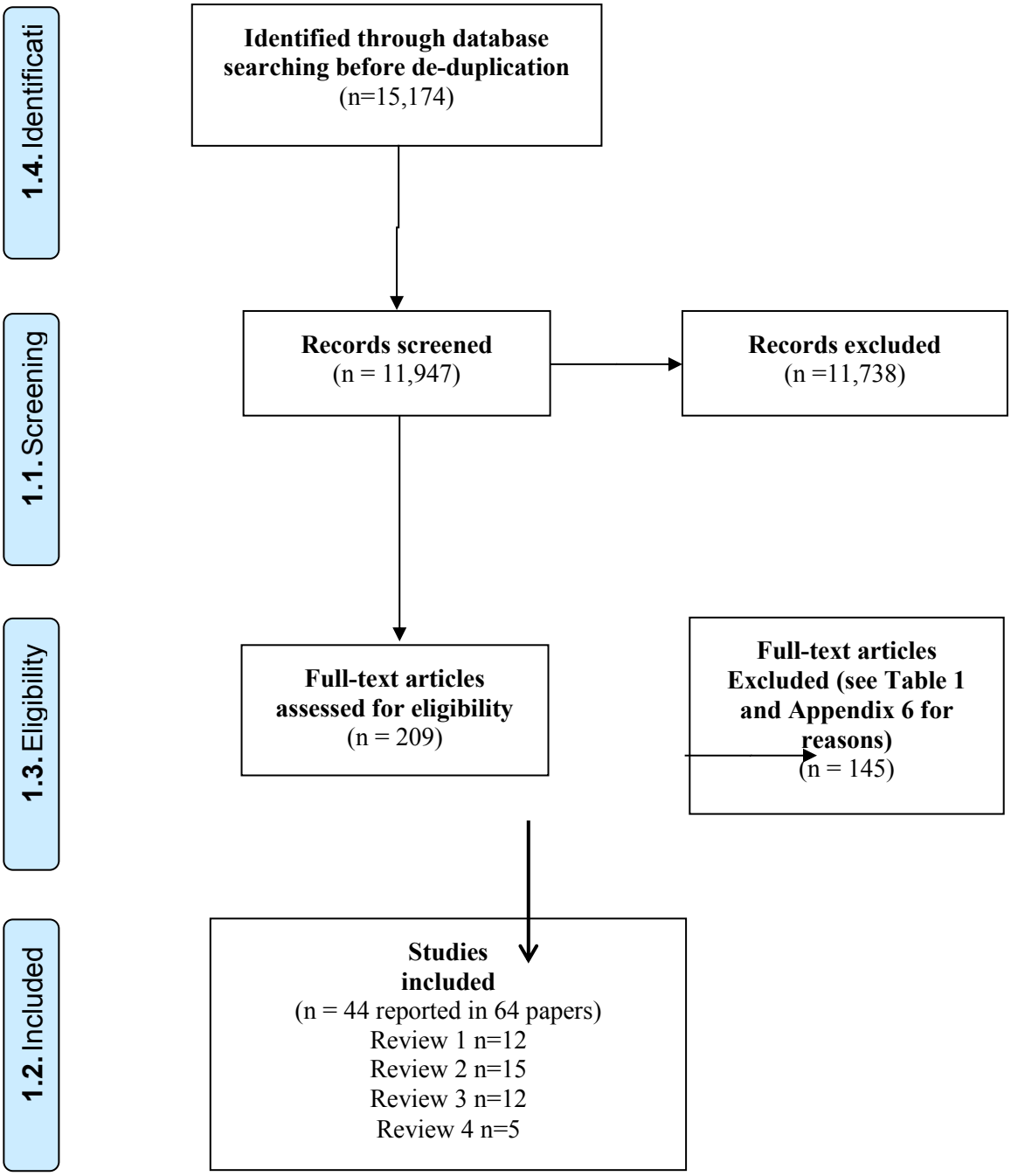
The flow of literature through the reviews is summarised in Figure 1.

Table 1: Reasons for exclusion on full text (please note some papers were excluded for more than one reason)

Reason	Number
Not about LTC or disability	11
Not workplace	34
Not all participants have LTC or disability	43
Not an employed population	12
No workplace outcomes	17
Not primary research	13
Not an intervention study	20
Duplicate	1
Economics only	1

Following advice from the PHAC a series of intervention driven reviews employing narrative synthesis of the evidence was undertaken.

Figure 1: Flow of studies through the review



4. Review One: physical activity, active leave and remote/ telephone based interventions.

This section of the report contains a review of 12 studies related to:

- physical activity interventions: defined as interventions that contain a physical activity element this included 'graded activity'[2] or Strength training - generally these programmes did not seek to improve aerobic endurance, muscle strength or any other aspect of physical fitness but sought to make the worker aware that it was safe to move and to be physically active despite pain.
- active leave interventions: defined as an intervention that 'enables employees to return to modified duties at the workplace' (Scheel et al 2002a)
- remote/ telephone based interventions: defined as interventions that can be delivered without attendance at a location or through face to face contact.

4.1.1. *Characteristics of the included studies*

Full details of the included studies are given in the evidence tables in Appendix 3a. Table 2 below shows the country in which the studies were conducted, and gives a brief summary of the interventions, populations and settings investigated in the studies.

Table 2. Summary of included studies.

Study	Participants, country and condition	Intervention	Comparator	Relevant outcomes	Quality
Staal et al 2004 **RCT**	Airport workers Netherlands Lower Back Pain (LBP)	Physical activity intervention: Graded activity	Usual guidance from Dutch occupational physicians: Back pain management strategy, advice on ergonomics, prevention and return to work (RTW) schedules and advising and communicating with other stakeholders	Days absent from work due to LBP	++

[2] Graded activity is defined as an intervention that consists of 'gradually increasing exercise programme that aims to restore occupational functioning' (Staal et al 2004)

Sunstrup et al 2014 **RCT**	Slaughterhouse workers Denmark Chronic pain and work disability	Physical activity intervention: strength training	Ergonomic training at worksite	Change in work ability index Changes in shoulder, elbow and hand pain Maximal voluntary isometric contraction strength	**++**
Viljanen et al 2003 **RCT**	Female office workers Finland Chronic neck pain	Physical activity intervention: 1) Dynamic muscle training 2) Relaxation training	Ordinary activity	Change in intensity of neck pain Neck disability Subjective work ability Cervical range of motion Dynamic muscle strength Sick leave owing to pain	**++**
Wolever et al 2012 #1 **RCT**	Employees who suffer from stress at worksites USA	Physical activity intervention: Viniyoga stress reduction programme	Initial stress level assessment , usual employee advice and information	Perceived stress Sleep quality, mood, pain levels, work productivity, mindfulness, Biological indicators such as blood pressure, breathing rate, and heart rate variability	**+**
Fleten et al 2006 **RCT**	Newly sick-listed persons Norway Musculoskeletal or mental health disorders	Remotely delivered. Minimal postal intervention	Care as usual	Return to work	**++**

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Bee et al 2010 **RCT**	Employees absent from work UK mild to moderate mental health difficulties	Remotely delivered. Multi component. Telephone CBT (T-CBT) service.	Usual care (including primary and occupational health services).	Clinical Outcomes Anxiety & Depression Work and Social Adjustment Actual and effective working	**+**
Furukawa et al 2012 **RCT**	Working men and women Japan Sub- threshold or mild depression.	Remotely delivered. Telephone based-CBT (tCBT) in addition to the pre-existing Employee Assistance Program (EAP).	EAP alone	Depression Work performance Satisfaction	**++**
Geraedts et al 2014a **RCT**	Employees The Netherlands Symptoms of depression.	Remotely delivered. Happy@Work: a brief Web-based intervention. Includes: problem-solving treatment (PST) cognitive therapy, and a guideline for employees to help them to prevent work-related stress	Care as usual (CAU: Advised to consult their (occupational) physician or a psychologist if they wanted treatment.	Work performance Depression Anxiety Burnout Absenteeism	**++**

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Lerner et al 2012 **RCT**	Public sector employees USA Depression.	Remotely delivered. Work and Health Initiative (WHI) is a telephone based intervention provided by EAP counsellors. Including: care coordination; cognitive-behavioural therapy strategies; and, work coaching and modification.	Usual care: standard EAP services.	Productivity loss Work limitations Work performance Work absences Depression	**+**
Lerner et al 2015 **RCT**	Middle-aged and older employees USA Depression and work limitations.	Remotely delivered. Work-focused intervention (WFI) counselling delivered by telephone. Including: care coordination; cognitive-behavioural therapy strategies; and, work coaching and modification.	Usual care (UC). Advised to contact a health care provider or an employer-sponsored employee assistance program (EAP).	Productivity loss Work limitations Work performance Work absences Depression	**++**
Scheel et al 2002a **RCT**	Employees Norway Low back pain	Active sick leave (ASL) 2 interventions: Passive intervention: including reminders on the sick leave form; standard agreement to initiate ASL; targeted information	No intervention offered but participants who met the inclusion criteria monitored for the same outcomes	Days off work Long term disability Quality of life Average number of recurrent sick leave episodes for back pain Patient satisfaction with management	**+**

		Proactive intervention: Passive intervention + added component of a continuing education workshop for GPs and a trained resource person to facilitate the use of ASL		of back pain by GP's	
Viikari-Juntura et al 2012 **RCT** **Finland**	Employees of 6 medium and large size private or public enterprises Finland Musculoskeletal pain	Active sick leave: Part-time sick leave Workload reduced by restricting work time and if appropriate modification of work tasks	Full time sick leave	Sustained RTW (@2 weeks and @4 weeks) Number of sickness absence days Recurrence of sick leave *From Shiri et al 2013* Pain intensity Pain interference Regional specific disability Self-rated general health Perceived health-related quality of life Depression Sleep disturbance in preceding 4 weeks Productivity loss	**+**

4.1.2. *Study findings*

Intervention types

12 randomised controlled trials (RCTs) evaluated the effectiveness of interventions to improve job related and health outcomes in working people. One study focused on stress reduction, six studies focused on pain, musculoskeletal and lower back pain and five focused on depression.

Four studies (Staal et al 2004 [++]; Sunstrup et al 2014 [++]; Viljanen et al 2003 [++]; Wolever et al 2012 #1 [+]) focused on a physical activity interventions. Six studies (Bee et al 2010 [+]; Furukawa et al 2012 [++]; Geraedts et al 2014a [++]; Lerner et al 2012 [+]; Fleten et al 2006 [++] and Lerner et al 2015 [++]) focused on remotely delivered interventions, and two studies (Scheel et al 2002a [+] and Viikari-Juntura et al 2012 [+]) focused on active sick leave interventions.

Physical activity interventions

Graded activity

One randomised control trial (RCT) Staal et al 2004 [++] was identified and included in this review that focused on graded activity. It should be noted that graded activity is identified in other studies but is part of a 'multi-component' intervention. Multi-component interventions are considered in review 4. The study was undertaken in the Netherlands and focused on employees of a Dutch Airline with lower back pain (LBP) where a physiotherapist delivered a behavioural-orientated graded activity programme. This was added to the usual guidance (usual care) from an occupational physician received by employees regarding work-related problems and return to work (RTW).

Staal et al 2004 [++] evaluated the effectiveness of usual care with an additional behaviour-orientated graded activity intervention for 67 employees with non-specific back pain or symptoms for a minimum of 4 weeks, who had been listed as fully or partially absent from work, to reduce sickness absence due to LBP. The intervention was compared with a group of 67 people with LBP who received the usual care

provided in the Netherlands in an occupational health care setting which is outlined as ‘usual guidance from Dutch occupational physician’.

People with cardiovascular contraindications for physical activity, with ongoing legal disputes with the employer, who were pregnant or with Lower Back Pain (LBP) with radiation below the knee with signs of nerve compression were not eligible for the study. The two groups were comparable on sociodemographic characteristics at baseline measurement (mean age in the intervention 38 [+/-9] and control 37 [+/-8] years; men/women in the intervention 64/3 and control 62/5). The two groups were comparable at baseline for the key workplace outcomes (median duration of absence from work in the intervention 43 [31-68] days and control 41 [25-65] days).

The intervention consisted of usual guidance (as per the control arm) plus the graded activity intervention. The graded activity intervention consisted of a medical and physical examination, and physiotherapist-delivered 1-hour supervised exercise sessions twice weekly until RTW for up to 3 months at Schiphol airport. The same physiotherapist treated the same patient. The sessions consisted of general aerobic exercise and tailored activity (usually gym-based strengthening exercises). These sessions were staggered with the initial 3 sessions utilised to establish a ‘baseline’ for specifying gradually progressive exercise, with sub-maximal exercise commencing from session 4. The mean intervention duration was 7 weeks with the mean number of session being 8.4. The physiotherapist provided verbal praise at goal achievement and improvement. The goal of the sessions was not to increase aerobic endurance or strength but to increase awareness of what can be done and pain awareness. The intervention also asked participants to set exercise goals and propose a RTW date. There was also an option to RTW work with modified days or hours prior to full RTW.

Outcome data were collected at 3 and 6 months post intervention. Longitudinal analysis of covariance was used to analyse functional status (collected via the Roland Disability Questionnaire) and pain (11-point scale – no further details) data. No statistically significant effect on pain or functional status was identified when comparing graded activity to usual care. Findings for days absent from work due to LBP were collected via electronic employee records and expressed as median total number of days absent from work due to LBP. Participants in the additional graded

activity were absent for a median of 58 days compared to 87 days in usual care at 6 months. Hazard ratios (HR) were calculated via Cox regression analysis for participants with <50 days of absence and those with ≥ 50 days of absence from work after randomisation. HR for <50 days absence post randomisation was 1.0 (95% CI, 0.6 to 1.8; p>0.2) and those ≥50 days absence post randomisation HR was 1.9 (95% CI, 1.2 to 3.2, p = 0.00 9) in favour of graded activity group. A per protocol analysis was also performed which excluded 3 non-adherers to the graded activity intervention. The HR for <50 days absence post randomisation was 1.1 (95% CI, 0.6 to 1.9; p>0.2) and those ≥50 days HR was 2.0 (95% CI, 1.2 to 3.2, p = 0.004) in favour of graded activity group. No major limitations were identified by the review team.

Evidence statement 1: Effectiveness of graded activity

There was strong evidence from 1 RCT[1] [++] from the Netherlands that a workplace based graded activity intervention in addition to usual care does not improve pain or functional status, but can significantly improve return to work in those who have been on sickness absence for ≥50 days over usual care only (HR 1.1 [95% CI 1.2 to 3.2; p=0.009]). A further analysis (per protocol) indicated a significantly improved return to work in those who have been on sick leave absence for ≥50 days over usual care (HR 1.9 [95% CI 1.2 to 3.2; p=0.004]). No significant improvement was observed for participants on sickness absence for ≤50 days.

Applicability: The evidence is only partially applicable the UK because the study was undertaken in the Netherlands, however, the intervention may be feasible in a UK-based setting.

[1] Staal et al 2004 [++]

Strength training intervention

Sundstrup et al 2014 [++] evaluated the effectiveness of a graded activity[3] intervention on work ability and pain among 33 employees who had chronic pain and work disability in a single worksite in Denmark. The intervention consisted of thirty 10-minute supervised strength training sessions for the shoulder, arm, and hand muscles, over a 10 week period. All training sessions took place in at the worksite and were supervised by a skilled instructor, who performed individual exercise adjustments when needed. The intervention was compared with 33 employees with the same symptoms who received care as usual in the form of ergonomics advice and training in the workplace. As part of usual care in this workplace, health and safety managers and representatives with existing knowledge about work-specific ergonomic risk-factors provided information necessary to identify ergonomic hazards in the workplace. Based on this information, a trained ergonomic group in each workplace conducted a job hazard analysis and in correspondence with health and safety managers and safety representatives, developed a system for hazard prevention and control. Participants in the ergonomic group received ergonomic training and education based on the practical outcomes of the worksite analysis and the hazard prevention system. Employers monitored and helped participants to continue using proper work practice during the rest of the intervention period.
Employees were eligible for the study if they: were currently working 30 hours a week or more, had a pain intensity score in the shoulder/arm/hand/wrist higher than 3 on the Visual Analogue scale (VAS)[4] lasting longer than 3 months and for more than 3 days a week, state least “some” work disability on specified scale, receiving no ergonomic or strength training in the past year.
Participants were comparable on most sociodemographic characteristics including gender, height, BMI, and average pain intensity across areas. However, those in the resistance training group were on average slightly older than the usual care group (p = 0.05).

[3] Sunstrup et al categorise this intervention as ‘graded activity’ but it does not have a staged return to work as is typical of this type of intervention, hence why it has been categorised as a ‘strength training intervention’.
[4] A Visual Analogue Scale (VAS) is a measurement instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured (Gould et al 2001) http://www.blackwellpublishing.com/specialarticles/jcn_10_706.pdf

Primary outcomes included work ability (assessed by the WAI) and pain measures in the shoulder/ elbow and hand. Over the 10 week follow-up, overall WAI scores were significantly different between groups ($p<0.05$). The usual care group scores fell over the 10 week follow-up (mean difference -2.2, 95% CI -3.5 to -0.8) and the intervention group scores stayed stable (mean difference 0.3, 95% CI -1.1 to 1.7), this between group difference was significant (mean difference 2.3, 95% CI 0.9 to 3.7, $p=0.012$). This result was mainly driven by 2 items in the WAI scale: 'work ability in relation to the demands of the job' (mean difference 0.7, 95% CI 0.3 to 1.2, $p=0.003$) and 'mental resources' (mean difference 0.3, 95% CI 0.1 to 0.6, $p=0.021$). The effect size (Cohen's d) of the change in WAI score with graded activity compared to usual care ergonomics training was 0.52 and categorised as moderate (≥0.50).

Secondary outcomes included pain measures, disability of the arm, shoulder and hand (DASH work module) and maximal voluntary isometric contraction strength (MVC) for the shoulder and wrist. Over the 10 week follow-up, average pain intensity was significantly different between groups ($p<0.0001$). The intervention group scores fell over the 10 week follow-up (mean difference -1.8, 95% CI -2.3 to -1.2) and the usual care group scores decreased only slightly (mean difference -0.3, 95% CI -0.8 to 0.3), this between group difference was significant (mean difference -1.5, 95% CI -2.0 to -0.9, $p<0.0001$). MVC scores indicated a significant improvement in shoulder rotation strength (37 (95%CI 28 to 45) $p < 0.0001$), and wrist extensor strength (42 (95%CI 29 to 54) $p< 0.0001$).

Viljanen et al [++] evaluated the impact of 'Dynamic muscle training' intervention and 'Relaxation training' intervention for 135 and 128 female employees respectively who had chronic non-specific neck pain for at least 12 weeks. The interventions were compared with 130 employees who received instructions to not change their physical activity or means of relaxation during the 12 month follow-up period (ordinary activity). Employees were female office workers in Finland. People with cancer, major trauma, rheumatic disease, neural entrapment, or major rehabilitation in the previous three months were not eligible for the study. The three groups were similar for most baseline and sociodemographic characteristics with some slight differences in physical activity bouts per week (≥3) and satisfaction with own work scores but nothing that appeared to be statistically significant.

The Dynamic muscle training intervention lasted 12 weeks (sessions were 30 minutes in duration for three times per week) and focused on group exercises using dumbbells to activate large neck and shoulder muscle groups with post exercise stretching. The first five weeks were instructor led sessions, post five weeks three exercises were taught and from the ninth week exercises were undertaken independently with feedback from the instructor. The Relaxation training lasted 12 weeks (sessions were 30 minutes in duration three times per week) and included various techniques based on progressive relaxation method, autogenic training, functional relaxation and systematic desensitisation. The training aimed to get employees to activate only those muscles needed for different daily activities – focusing on avoiding unnecessary neck muscle tension. From week 5 employees were encouraged to undertake the training independently. The training session in both interventions were undertaken by a physiotherapist in groups of up to 10. Post 12 week intervention there was reinforcement training at six months post randomisation which lasted one week

Outcome data were collected at three, six and 12 months post-intervention on: change in intensity of neck pain, neck disability, subjective workability, cervical range of motion, dynamic muscle strength, sick leave due to neck pain, proportion of participants who recovered and depression. There were no observed statistically significant differences between interventions and control groups for any of the outcome measures. No major limitations of the study were identified.

Evidence statement 2: Effectiveness of strength training/graded activity

There is strong evidence from 2 RCTs set in Denmark [++] [1] and Finland [++] [2] on the effectiveness of strength training.

1 RCT[1] observed a significant difference in WAI scores between groups ($p<0.05$). At 10 week follow-up there was an observed significant mean difference for usual care vs. intervention (mean difference 2.3, 95% CI 0.9 to 3.7, $p=0.012$; effect size 0.52 [Cohen's d]).

1 RCT[1] observed a significant difference in average pain intensity between groups ($p<0.0001$). At 10 week follow-up there was an observed significant difference for usual care vs. intervention (mean difference -1.5, 95% CI -2.0 to -0.9, $p<0.0001$). There was also significant improvement in MVC scores related to, shoulder rotation strength (37 (95%CI 28 to 45) $p < 0.0001$), and wrist extensor strength (42 (95%CI 29 to 54) $p< 0.0001$).

1 RCT[2] observed no significant difference on subjective workability, sick leave due to neck pain or any other assessed outcome between interventions and control

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in Denmark[1] and Finland[2].

1. Sunstrup et al 2014 [++]
2. Viljanen et al 2003 [++]

Worksite yoga for stress reduction

Wolever et al 2012 #1 [+] evaluated the effectiveness of a workplace stress reduction programme for 90 employees who suffered from stress at worksites in Connecticut and California, USA. This was a three-armed trial with a control group and two separate intervention groups, a yoga-based programme and a mindfulness programme. For the purposes of this review, only the results from the yoga intervention will be discussed. The mindfulness intervention (Wolever et al 2012 #2 [+]) results are reported in section *3.3.2.*

The yoga intervention was run by a trained instructor from the American Viniyoga Institute (AVI) and consisted of weekly one hour sessions over a 12 week period. Participants were progressively introduced to tools to manage stress (i.e. postures known as 'asanas', breathing techniques, guided relaxation, mental techniques, education on home practice). The sessions took place in the workplace, but some were given instructional handouts and DVDs to enable home practices and yoga work breaks. The intervention was compared with 53 employees who received the initial stress-level assessment but no stress management intervention.

The control group were provided with a list of resources available to all employees, including fitness programmes, employee assistance programmes (EAP), behavioural health services for depression, chair massage, and wellness coach opportunities. Employees were eligible for the study if they had a score of ≥16 on the perceived stress scale questionnaire given in the initial assessment. There were no significant baseline differences between groups with regards to both demographics and baseline outcome measures.

The primary outcome measure was perceived stress, which was assessed using a self-report 10-item perceived stress scale. Secondary outcomes included sleep quality, mood, pain levels, work productivity, mindfulness, and biological indicators such as blood pressure, breathing rate, and heart rate variability. Follow-up was within 2 weeks of the end of the 12 week intervention programme.

In the initial ANCOVA analysis (taking into account the mindfulness intervention), there was a significant group × time interaction for the following measures: perceived stress ($F(2, 233) = 8.89$, $p<0.01$, $\eta 2 = 0.07$), sleep quality ($F(2, 233) = 3.03$,

$p<0.05$, $\eta 2 = 0.03$), current pain ($F (2, 233) = 3.56$, $p<0.05$, $\eta 2 =0.03$), breathing rate ($F (2, 233) = 3.02$, $p<0.05$, $\eta 2 =0.03$), heart rate variability ($F (2, 233) = 15.86$, $p<0.001$, $\eta 2 =0.12$). There was no interaction for workplace productivity or depressive symptoms. For those interactions that were significant, the authors performed a post-hoc univariate comparison of yoga intervention vs control. When compared to the control group, perceived stress was found to decrease significantly more over time for those in the intervention ($F (1, 144) = 21.31$, $P<0.01$, $\eta 2 =0.13$). This was also the case for sleep difficulty ($F (1, 144) = 5.17$, $p<0.05$, $\eta 2 = 0.04$). In contrast, heart rate variability rose in the intervention group compared to the control ($F (1, 144) = 4.25$, $p<0.05$, $\eta 2 = 0.03$).

There were limitations identified during the review which downgraded this study from a [++] to a [+]. These included: lack of power, the study was undertaken during a time of restructure and job eliminations, and inconsistent methods reported.

Evidence statement 3: Effectiveness of worksite yoga-based stress reduction programme

There is moderate evidence from 1 RCT [+] [1] set in the USA that a yoga-based stress-reduction programme may have a beneficial effect on stress but no effect on work productivity.

The study found that perceived stress of those receiving the intervention had decreased significantly more than the control group at 12 week follow-up ($F (1, 144) = 21.31$, $P<0.01$, $\eta^2 =0.13$). This was also the case for sleep difficulty ($F (1, 144) = 5.17$, $p<0.05$, $\eta^2 = 0.04$). In contrast, heart rate variability rose in the intervention group compared to the control ($F (1, 144) = 4.25$, $p<0.05$, $\eta 2 = 0.03$).

There was no interaction for workplace productivity or depressive symptoms

Applicability: This study is only partially applicable to the UK because the study was undertaken in USA. However the intervention may be feasible in a UK setting.

1. Wolever et al 2012 #1 [+]

Remotely delivered interventions

Six randomised controlled trials (RCTs) compared the effectiveness of remotely delivered interventions to improve job related and health outcomes in working people with chronic conditions. Five studies focus on employees with symptoms of depression, and include cognitive behavioural therapy (CBT) or CBT-based interventions, alone or with other components. One study focused on newly sick listed employees with musculoskeletal and mental disorders. Four studies evaluated the effects of interventions delivered by telephone, one was conducted in the UK (Bee et al 2010 [+]), two in the USA (Lerner et al 2012 [+], Lerner et al 2015 [++]), and one in Japan (Furukawa et al 2012 [++]. A fifth study conducted in The Netherlands evaluated a web-based intervention called Happy@Work (Geraedts et al 2014a [++]), and a sixth study undertaken in Norway evaluated the effectiveness of a minimal postal intervention (Fleten et al [++]).

Bee et al 2010 [+], evaluated a multi-component telephone cognitive behavioural therapy service (T-CBT) for 26 employees of a large UK based communications company absent from work with mild to moderate mental health difficulties for 8 to 90 days (authorised by a general practitioner certificate). The intervention was compared with 27 other employees absent from work with mild to moderate mental health difficulties who had access to usual care which included primary and occupational health services (*the study provides no further details*).

The mean age across the sample was 45 (SD 8.9) years with 51% of the sample male and 96% of the sample Caucasian. The authors did not report whether groups were comparable at baseline in terms of other sociodemographic characteristics. Employees with severe or complex disorders, degenerative cognitive disorders, substance misuse issues or who were actively self-harming were excluded from this study.

The T-CBT intervention was delivered over 12 weeks by one of two registered graduate mental health workers. Outcome data was collected at baseline and at 3 months via a postal questionnaire. Participants worked with therapists through regular phone calls to identify and challenge negative thoughts, develop self-care skills and complete workbook exercises emphasizing behavioural activation.

Therapists received 12 hours of didactic instruction and role-play and weekly supervision from a senior CBT therapist. All patients had access to usual care, including primary and occupational health services.

All data was collected via self-report validated questionnaires. Twenty three individuals (88%) had ≥1 T-CBT session and *n* 19 (73%) attended all appointments. Mean (SD) session number was 4.5 (3.2) and mean (SD) session length was 28.32 (18.24) minutes. Twenty-one patients (40%) failed to return 3-month outcome data. Non-respondents were more likely to be male (adjusted OR =5.4; 95% CI =1.4–21.6) and more severely ill (adjusted OR=1.1, 95% CI=1.02–1.2).

The primary outcome measure was changes in symptom severity (via the Clinical Outcomes in Routine Evaluation outcome measure [CORE-OM]) for which there was no significant effect for T-CBT over usual care (Adjusted mean difference [AMD] 4.73, 95%CI−0.32 to 9.78; effect size 0.63, p=0.065)

Secondary outcome measures collected were 'actual and effective working hours' (hours/week; quantified by the World Health Organization Health and Work Performance Questionnaire) where a statistically significant effect was observed in the direction of T-CBT for 'effective work hours/week (AMD 17.20, 95%CI 6.72 to 27.67; effect size 0.75; p=0.002) and hours worked/week (AMD 17.58; 95%CI 5.60 to 29.55, effect size 0.88; p=0.006); anxiety and depression (via Hospital Anxiety & Depression Scale [HADS]) for which there was no significant effect (AMD 5.60; 95%CI −1.08 to12.28; P=.097); and work and social adjustment (via Work and Social Adjustment Scale [WSAS]) for which there was no statistically significant effect (AMD 6.66; 95%CI −0.02 to13.36, effect size 0.77; p=.051). Self-perceived job performance was assessed (data collection tool not described) with no significant effect observed in T-CBT over usual care (AMD 1.28 95%CI1.12to3.69, effect size 0.13; p=0.286).

The reviewers identified the lack of evidence regarding the blinding of participants, providers and assessors or any measures to reduce the potential impact of the identified lack of blinding in this study as a potential study limitation. The 40% loss to follow-up and wide confidence intervals around effectiveness estimates were

identified as indicating as a possible bias to findings. As a result of these factors, the study has been downgraded from a '++' to a '+'.

Lerner et al 2012 [+], was a pilot study which evaluated the Work and Health Initiative (WHI) an employee assistance programme (EAP) delivered by phone to 59 employees (≥15 hours/week) that fulfilled the criteria for current major depressive disorders (MDD) and/or dysthymia (five out of nine criteria on the Patient Health Questionnaire depression scale [PHQ-9]). The WHI was compared with 27 other employees who fulfilled the criteria for current major depressive disorders (MDD) and/or dysthymia from the same employer who received usual care in the form of standard EAP services (*details not specified*). Participants who had recently suffered from a bereavement, who were planning to retire within two years, receiving disability benefits, suffering active alcoholism or drug-abuse (assessed via CAGE), who were pregnant or six months postpartum; who were suffering from schizophrenia or bipolar disorder; who were non-English speaking and/or reading; and/or diagnosed with one or more of 12 medical conditions that have symptoms that potentially interfere with working were excluded from the study

The two groups were comparable on all demographic and clinical outcomes at baseline. Mean age was 45.6 years (SD=9.4); males comprised 21.5% (n=17) of the sample; 98.7% were Caucasian; the average PHQ-9 depression symptom severity was moderate at 12.8 (SD=5.2). Baseline measures for at-workplace performance and work absences were similar ($p>0.05$). Total samples ability to perform tasks related to time management was impaired with an average of 44.9% (SD=19.7%) of their time in the prior two-week period. Ability to perform mental and interpersonal job tasks was impaired an average of 37.7% (SD=15.3%) of the time in the past two weeks. At-work productivity was reduced by an average of 10.2% (SD=4.1%) in the two-week period prior to baseline. On average, employees missed 1.5 (SD=1.6) workdays due to health problems in the two weeks prior to baseline for an average productivity loss of 15.0% (SD= 14.6%);

The WHI intervention consisted of 3 components: 1) Work Coaching and Modification interventions which target specific job performance difficulties related to depression, guiding the employee to change modifiable aspects of work methods

and/or work conditions. 2) Care Coordination which involves outreach by the counsellor to the employee and their primary care physician (PCP) or other prescribing professional to promote adherence to already prescribed antidepressants and the use of evidence-based depression treatment. Counsellors also provided psycho-education about the impact of depression. 3) Cognitive-Behavioural Therapy (CBT). Strategies included using an adapted version of a 'coping skills workbook' (*not referenced in the study*) with the aim of helping employees change behaviours and cognitions that accompany depression and may interfere with functioning.

Data was collected at baseline and at 4 months follow-up. Changes in at-work performance (measured via a Work Limitation Questionnaire [WLQ] validated self-report survey tool over four scales) indicated statistically significant effects for time management (effect size -0.73; p=0.005), performance of physical tasks (effect size -0.54; p=0.027), mental-interpersonal tasks (effect size -0.59; p=0.017) and output tasks (effect size -0.70; p=0.006) [5]for WHI over usual care. Changes in WLQ at-work Productivity Loss Scores[6] indicated a statistically significant effect for WHI over usual care (effect size -0.78; p=0.002). The WLQ Work Absence Module measured self-reported time missed from work in the past two weeks due to health or medical care indicated statistically significant effects for WHI over usual care (effect size -0.87; p=0.001). The Absence-related productivity loss is the ratio of time missed in the past two weeks to time usually spent working and it identified a statistically significant effects for WHI over usual care (effect size -0.90; p=0.001). A secondary outcome was the change in depression symptom severity, measured via PHQ-9 which statistically significant effect for WHI over usual care (effect size -1.09; p=0.001).

The reviewers identified the lack of information regarding the blinding of participant, providers and assessors or any measures to reduce the potential impact of the identified lack of blinding in this study as a potential study limitation. The authors did not fully report a power calculation but outline that the study may have been too

[5] A higher value on each variable signifies a worse outcome; a negative change score indicated an improvement from baseline. Effect sizes of ≥0.8 are assumed to be large, effect sizes of 0.5-0.8 are moderate, and effect sizes of 0.2-0.5 are assumed to be small.

[6] Calculated via the weighted sum of the four scale scores and indicates the percentage reduction in at-work productivity relative to a healthy benchmark group (not specified)

small to detect impact of the intervention. These factors have downgraded the study from a '++' to a '+'

Lerner et al 2015 [++], evaluated a work-focused intervention (WFI) delivered by telephone to 217 employees from 19 employers and five related organisations with depression (as measured by PHQ-9) and at-work limitations of ≥5% (measured by WLQ). The intervention was compared with 214 employees with depression taken from the same employers and organisations who were assigned to usual care where each participant was advised to contact a health care provider (for example, primary care physician, psychiatrist, or behavioural health specialist) and, when applicable, an employer-sponsored employee assistance program (EAP). No direct care was provided. All study participants were shown web links to depression information and care resources. During the study, participants were not restricted from using other services. Participants were excluded from the study if psychosis, bipolar disorder, current alcohol abuse or dependence and severe physical limitations were identified at initial screening.

The intervention and control were comparable on all baseline characteristics except marital status (usual care [UC] 58% vs. intervention [I] 46%, p=0.01) and the mean number of baseline comorbid general medical conditions (UC 3.2 vs. I 2.7, p<0.01). Mean age was 54.7(SD+/-6.1), 72% were female, mean at-work productivity loss was 10.3% (SD+/-4.4%), mean productivity loss due to absence was 14.6% (SD+/-18.8%) and mean days missed in the past 2 weeks was 1.2 (SD+/-2.2)

WFI is a telephone-based counselling intervention with three integrated modalities. 1) Care coordination to addresses barriers to functional improvement related to a misalignment of goals and expectations among the individual with depression, their regular provider, and the counsellor. 2) Cognitive-behavioural therapy strategy development to address psychological barriers to functional improvement. 3) Work coaching and modification to address barriers to functioning resulting from imbalances between the characteristics of the worker and those of the job and work environment, which results in the development of a customized plan that guides the participant to change specific work behaviours, work processes, or environmental conditions, to begin using compensatory strategies—or both. The WFI intervention is

delivered by masters-level counsellors with EAP experience via eight 50-minute telephone sessions every two weeks for a total of four months total. WFI stresses the acquisition of self-care strategies through "homework". Study personnel provided the counsellors with 2.5 days of in-person WFI training and fidelity to the intervention was supported by weekly group supervision by telephone and individualized support.

Data was collected at baseline and at 4 months via validated self-report tools. Analysis was undertaken via mixed effects models. Changes in productivity loss scores[7] measured via WLQ (effect size -0.72; $p<0.001$)[8]; time at-work limitations - measured via changes in WLQ work performance scales - by time management, (effect size -0.67; $p<0.001$) [confidence intervals not reported], by physical tasks (effect size -0.37; $p<0.001$), by mental and interpersonal tasks (effect size -0.63; $p<0.001$) and by output tasks (effect size -0.61; $p<0.001$); Absences due to health or medical care – measured by responses to WLQ time loss module – for days missed (effect size -0.31; $p <0.001$), for % productivity loss due to absences (effect size -0.30; $p<0.01$) and by depression symptom severity (effect size -0.60; $p<0.001$) all indicated a significant effect for WFI over usual care. No significant limitations were identified in this study

An additional post hoc sub-group analysis (Adler et al 2015) was undertaken on 167 participants screened positive for dysthymia only for the effect of WFI over usual care. Results were similar to Lerner et al 2015 with statistical significant effect for WFI over usual care in at-work productivity (%) (effect size -0.91; $p<0.001$), Time at-work limitations by Time management (-0.68; $p<0.001$), by physical tasks (-0.54; $p=0.027$), by mental and interpersonal tasks (effect size -0.83; $p<0.001$), by output tasks (effect size -0.86; $p<0.001$) and by absences due to health or medical care for depression symptom severity (effect size -0.89; $p<0.001$). The authors also flag that the study (Lerner et al 2015) was not sufficiently powered for the sub-group analysis (Adler et al 2015).

[7] Calculated via the weighted sum of the four scale scores and indicates the percentage reduction in at-work productivity relative to a healthy benchmark group (not specified)

[8] A higher value on each variable signifies a worse outcome; a negative change score indicated an improvement from baseline. Effect sizes of ≥0.8 are assumed to be large, effect sizes of 0.5-0.8 are moderate, and effect sizes of 0.2-0.5 are assumed to be small.

Workplace health: support for employees with disabilities and long-term conditions

Furukawa et al 2012 [++] evaluated the impact of a multi-component workplace telephone-based CBT intervention (in addition to an employee assistance programme – [EAP]) for 58 employees with subthreshold or mild depression on workplace productivity, presenteeism and depression. The intervention was compared with 60 employees who were offered the EAP alone. Employees were based in the offices of a large manufacturing company in Japan, with 78% males and an average age of 39 years.

Employees were not eligible for study inclusion if they had experienced a major depressive episode in the past month, had a lifetime history of bipolar disorder, had any substance dependence in the past 12 months or any other current mental health disorder if it required treatment not offered in the study, were receiving treatment from a mental health professional, had been on sick leave for 6 or more days in the past month for a physical or mental health condition. Employees were also excluded if they were expecting to be on maternity leave or nursing leave within 6 months after screening.

The two groups were comparable on all sociodemographic characteristics and outcome measures at baseline including age, job category and rank, psychiatric history, depression scores and work performance scores.

The telephone-based CBT intervention consisted of a structured 8-session programme accompanied by manuals for both patient and therapist. The participant and the therapist also shared an ‘‘Activity Pocketbook’’ containing homework worksheets that the participant could easily carry and record self-monitoring results, activity results and automatic thoughts. Weekly sessions were designed for completion in 30–45 minutes or according to the therapist/participants’ needs. The first session included education about CBT and the rationale of the program. Sessions 2–4 focused on increasing pleasant activities. Sessions 5–7 focused on identifying, distancing from and challenging negative automatic thoughts. In Session 8 the participant and the therapist reviewed the cognitive and behavioural skills covered in the program and created a personal self-care plan. The intervention was given alongside the EAP, which included a web-based stress diagnostics and reduction programme, telephone consultation, and an email consultation. Those in the control group received the EAP alone.

Presenteeism was measured using the World Health Organisation Health and Work Performance questionnaire and hours worked in the preceding 4 weeks were recorded at 4-month follow-up. There was no significant difference between the intervention and control for absolute presenteeism (effect size 0.15; 95%CI -0.21 to 0.52; p = 0.44) and relative presenteeism scores (effect size 0.02; 95%CI -0.34 to 0.39); p=0.50 or the hours worked in the preceding month (effect size 0.18; 95%CI -0.18 to 0.54; p=0.59). Depression and psychological distress were measured using the Beck Depression Inventory-II (BDI-2) and the K6 (6-item self-report questionnaire) respectively. At 4-month follow-up, the intervention group had significantly lower depression (effect size 0.69, 95%CI: 0.32 to 1.05 p = 0.001) and psychological distress (effect size estimate 0.71, 95% CI: 0.34 to 1.07; p <0.001) scores.

No major limitations of the study were identified. However, according to the study power calculation, 108 participants were required in each study group to show statistical significance. Furthermore, the original follow-up period was planned to be 15-months however this was adjusted to 4-months due to low participation rate.

Geraedts et al 2014a [++] evaluated the impact of a web-based guided self-help course for 116 employees (mean age 43, 39% male) with depressive symptoms on anxiety, burnout, workplace performance and depression. The intervention was compared to 115 employees (mean age 43.8, 48% male) who received a 'care as usual' (CAU) control. Participants were not eligible to take part in the study if they had unstable (<1 month) medication use for depressive symptoms or if they were in a legal labour dispute with the employer.

The two groups were comparable on all sociodemographic characteristics at baseline including age, marital status, education, working hours, and working days.

The web-based guided self-help course, entitled "Happy@Work" consists of two components: problem-solving treatment (PST) cognitive therapy, and a guideline for employees to help them to prevent work-related stress. It primarily focuses on depressive symptoms but also incorporates psychoeducation and assignments related to dealing with stress and burnout symptoms. It consists of 6 weekly lessons with an option of 1 week extra time in case of delay. Themes of the lessons are

introduction of problem solving (lesson 1), problem-solving methods (lesson 2), changing cognitions (lesson 3), dealing with work-related problems (lesson 4), social support (lesson 5), and relapse prevention (lesson 6). Participants submitted weekly assignments via the website and subsequently received feedback from a trained coach, within 3 working days. The support includes feedback on the assignments and motivational and empathic strategies to keep participants engaged in the course. Employees in the 'care as usual' group did not receive treatment or support from the coaches but were advised to consult their occupational physician or psychologist if they wanted treatment. Control group participants were sent an optional copy of the self-help book version of the intervention after having completed a post-treatment assessment. Anxiety was measured using the anxiety subscale of the Hospital Anxiety and Depression scale (HADS) and exhaustion with the Maslach Burnout Inventory-General scale (MBI). At 8-weeks follow-up, the intervention group had significantly lower anxiety scores (Cohen's d=0.16[9], 95% CI –0.09 to 0.42, p=0.04) and exhaustion scores (Cohen's d=0.17, 95% CI –0.09 to 0.43, p = 0.02) compared to the control group – the observed effect sizes (Cohen's d was < 0.2 indicating an assumed small effect). Course completers also improved more on anxiety symptoms compared to the control group (d=0.19, 95% CI –0.16 to 0.53, p=0.04), but not on the exhaustion dimension of the MBI (d=0.17, 95% CI–0.18 to 0.52, p = 0.14). There was no significant difference between the groups for work performance (Cohen's d = 0.00; 95%CI -0.26 to 0.26), as measured by the general work performance scale of the World Health Organisation Health and Work Performance Questionnaire (HPQ) or depressive symptoms as measured by the Center for Epidemiologic Studies Depression scale (CES) (Cohen's d=0.16, 95% CI –0.10 to 0.41, p=0.29). There were also no significant differences between groups for the cynicism (Cohen's d=0.30, 95%CI 0.05 to 0.57) and professional efficacy (Cohen's d = 0.10, 95%CI –0.16 to 0.36) dimensions of the MBI. A follow-up paper (Geraedts et al 2014b) reported the results at 12-months follow-up. It outlined that all participants improved between baseline and 12 month follow up for depression related outcomes. However, the overall estimated mean difference between the groups over time was not significant. There were no significant differences between the

[9] Effect sizes of ≥0.8 are assumed to be large, effect sizes of 0.5-0.8 are moderate, and effect sizes of 0.2-0.5 are assumed to be small

groups over time on any of the remaining outcomes. No major limitations were identified by the review team.

Fleten et al 2006 [++] evaluated the effectiveness of an informational intervention delivered via post on sick leave of 495 employees sick-listed with MSD or mental health disorders in Norway. The intervention was described as a 'minimal postal intervention' which involved a package posted 14 days after the start of current sick leave containing information on the next steps available to the employee. This included information on returning to an adjusted job whilst receiving sickness benefits, cooperation with employer and National Insurance Organisation (NIO) on modified work measures, getting formal approval by NIO to receive sickness benefits for more than 12 weeks. There was also a questionnaire in the pack that related to sick leave and consent to arrange contact with the NIO. During this period, the local NIO undertook normal follow-up activities and were unaware of the group status (with the exception of 61 employees who provided NIO officers with a copy of the information). The intervention was compared to 495 employees, who we assume received care as usual as this is standard for employees on sick leave in Norway (authors do not report details of the control group conditions). Those on a full-time disability pension were excluded from the study. The intervention and control groups were comparable across all sociodemographic characteristics including age, gender diagnosis and length of sick leave.

The primary outcome was length of sick leave, which was collected from the National Sickness Benefit Register. Overall, there was no significant differences between intervention and control groups with regards to sick leave over the 1 year follow-up period (unadjusted HR intervention vs control: 1.09, 95% CI 0.95 to 1.25, p=0.24). However, subgroup analysis by diagnostic category found that the only between group differences were for employees with rheumatic disorders and arthritis (unadjusted HR 1.62, 95% CI 1.02 to 2.57, p=0.04) and mental health disorders (unadjusted HR 1.42 (95%CI 1.03 to 1.96) p=0.032) where there was a greater chance that employees from the intervention group had returned to work compared to the control group over the year follow-up.

For employees on sick leave for 12 weeks or longer, there was a greater chance that employees from the intervention group returned to work compared to the control

group over the year follow-up (unadjusted HR intervention vs control: 1.39, 95% CI 1.04 to 1.85, p=0.024; adjusted HR 1.42, 95% CI 1.06 to 1.92, p = 0.013). However within this group, for those with low back pain the intervention was found to be less effective than control for returning to work (unadjusted HR intervention vs control: 0.49, 95% CI 0.25 to 0.98, p=0.04; adjusted HR 0.25, 95% CI 0.10 to 0.60, p=0.135). For other diagnostic groups, the intervention was found to be more effective compared to control for employees with other musculoskeletal conditions (unadjusted HR intervention vs control: 2.00, 95% CI 1.30 to 3.08, p=0.001; adjusted HR 2.03, 95% CI 1.30 to 3.19, p=0.001) and mental health disorders (unadjusted HR intervention vs control: 2.54, 95% CI 1.32 to 4.87, p=0.004; adjusted HR 3.96, 95% CI 1.46 to 6.00, p=0.047).

The odds ratios for receiving social services benefits due to sickness one year after the start of sick leave (if sick listed subject was exposed to intervention after 14 days of sick leave) was: 0.69 (95% CI 0.51-0.93) for all diagnostic groups, 0.34 (95% CI 0.14-0.81) for employees with low back pain, 0.62 (95% CI 0.39-0.97) for employees with other musculoskeletal disorders, and 0.20 (95% CI 0.06-0.71) for employees with mental health disorders. For those with any diagnosis but educated for longer than 12 years, the odds ratio was 0.44 (95% CI 0.27-0.73) for any benefits due to sickness and 0.48 (95% CI 0.25-0.91) for designated sickness benefits.

Evidence statement 4: Effectiveness of telephone delivered Employment Assistance Programmes (EAP)

There was moderate evidence from 2 RCT's[1, 2] [+[1] ++[2]] from the USA that telephone delivered EAP can significantly improve changes in a number of work related outcomes over usual care in employees with current major depressive disorders and/or dysthymia at 4 month follow up. Outcomes included: at-work performance (effect size -0.73; p=0.005)[1]; significant time at-work limitations - by performance of physical tasks (effect size -0.54; p=0.027[1]; effect size -0.37; p<0.001[2]), by mental-interpersonal tasks (effect size -0.59; p=0.017[1]; effect size -0.63; p<0.001[2]) by time management, (effect size -0.67; p<0.001)[2] and by output tasks (effect size -0.70; p=0.006[1]; effect size -0.61; p<0.001[2]); Productivity Loss Scores (effect size -0.78; p=0.002[1] effect size -0.72; p<0.001[2]), self-reported time missed from work in the past two weeks due to health or medical care (effect size -0.87; p=0.001[1]; effect size -0.31; p <0.001[2]), absence-related productivity (effect size -0.90; p=0.001[1]; effect size -0.30; p<0.01[2])

Both studies demonstrated statistically significant changes in depression symptom severity (effect size -1.09; p=0.001[1]; effect size -0.60; p<0.001[2]) for telephone delivered EAP over usual care.

Applicability: The evidence is only partially applicable the UK because the study was undertaken in the USA, however, the intervention may be feasible in a UK-based setting.

[1] Lerner et al 2012 [+]

[2] Lerner et al 2015 [++]

Evidence statement 5: Effectiveness of multi-component telephone cognitive behavioural therapy (T-CBT)

There was moderate evidence from 1 RCT[1] [+] from the UK that a multi-component telephone cognitive behavioural therapy (T-CBT) service intervention can significantly improve 'effective work hours/week' (AMD 17.20, 95%CI 6.72 to 27.67, effect size 0.75; p=0.002) and hours worked/week (AMD 17.58; 95%CI 5.60 to 29.55, effect size 0.88; p=0.006) at 3 months follow –up in employed individuals absent from work for 8 to 90 days with mild to moderate mental health conditions over usual care. No significant effects were observed for symptom severity (AMD 4.73, 95%CI−0.32 to 9.78; effect size 0.63, p=0.065), anxiety and depression (AMD 5.60; 95%CI −1.08 to12.28; p=.097), work and social adjustment (AMD 6.66; 95%CI −0.02 to13.36, effect size 0.77; p=.051), and self-perceived job performance (AMD 1.28 95%CI1.12to3.69, effect size 0.13; p=0.286).

There was strong evidence from 1 RCT[2] from Japan that a multi-component T-CBT intervention in addition to an employee assistance programme (EAP) had no significant effect on absolute (effect size 0.15; 95%CI -0.21 to 0.52; mixed model p = 0.44) or relative (effect size 0.02; 95%CI -0.34 to 0.39; p=0.5) presenteeism scores or hours worked in the preceding month (effect size 0.18; 95%CI -0.18 to 0.54, p=0.59) at 4 months follow up in employed individuals with sub-threshold or mild depression compared to an EAP alone (control). The T-CBT did significantly lower depression (effect size 0.69, 95%CI: 0.32 to 1.05; p = 0.001) and psychological distress (effect size estimate 0.71, 95% CI: 0.34 to 1.07; p <0.001) scores.

Applicability: The evidence is partially applicable to the UK as one study was undertaken in the UK and the other in Japan. However the intervention may be feasible in the UK setting

[1] Bee et al 2010 [+]

[2] Furukawa et al 2012 [++]

Evidence statement 6: Effectiveness of minimal postal interventions

There was strong evidence from 1 RCT set in Norway [++] [1] on the effectiveness of a 'minimal postal intervention' on reducing sick leave for certain groups.

Over the 12 month follow-up period, there was no significant main effect of the intervention over time (unadjusted HR intervention vs control: 1.09, 95% CI 0.95 to 1.25, p=0.24)). However, further investigation into reason for sick leave showed that the intervention was effective for certain groups of employees. For employees with Rheumatic disorders and arthritis (unadjusted HR 1.62, 95% CI 1.02 to 2.57, p=0.04) and mental health disorders (unadjusted HR 1.42 (95%CI 1.03 to 1.96) p=0.032), there was a greater chance that employees receiving the intervention had RTW work compared to those receiving usual care.

For employees on sick leave for 12 weeks or longer, there was a greater chance of RTW in the 12 month follow-up for employees receiving the intervention compared to those with usual care (unadjusted HR intervention vs control: 1.39, 95% CI 1.04 to 1.85, p=0.024; adjusted HR 1.42, 95% CI 1.06 to 1.92, p = 0.013). Furthermore, the intervention was found to be more effective compared to control for employees with other musculoskeletal conditions (unadjusted HR intervention vs control: 2.00, 95% CI 1.30 to 3.08, p=0.001; adjusted HR 2.03, 95% CI 1.30 to 3.19, p=0.001) and mental health disorders (unadjusted HR intervention vs control: 2.54, 95% CI 1.32 to 4.87, p=0.004; adjusted HR 3.96, 95% CI 1.46 to 6.00, p=0.047). However, this was not the case for employees with low back pain on sick leave for 12 weeks or longer, where chance of RTW was lower over the 12 month follow-up for those receiving the intervention (unadjusted HR intervention vs control: 0.49, 95% CI 0.25 to 0.98, p=0.04; adjusted HR 0.25, 95% CI 0.10 to 0.60, p=0.135).

Applicability: The evidence is only partially applicable in the UK because the study was undertaken in Norway.

Fleten et al 2006 [++]

Evidence statement 7: Effectiveness of web-based guided self-help intervention

There was strong evidence from 1 RCT[1] [++] from the Netherlands that a web-based guided self-help course had no significant effect on work performance (Cohen's d = 0.00; 95%CI -0.26 to 0.26), cynicism (Cohen's d=0.30, 95%CI 0.05 to 0.57) and professional efficacy indicators (Cohen's d = 0.10, 95%CI –0.16 to 0.36) at 8 weeks follow-up in employed individuals with depressive symptoms compared to usual care.

The intervention did significantly reduce anxiety scores (d=0.16; 95% CI-0.09 to 0.42; p=0.04) and exhaustion scores (d=0.17, 95%CI –0.09 to 0.43, p=0.02).

A linked study presented results at12 months' follow-up with no statistically significant improvements observed in any of the outcomes assessed at baseline.

Applicability: The evidence is only partially applicable the UK because the study was undertaken in the Netherlands, however, the intervention may be feasible in a UK-based setting.

[1] Geraedts et al 2014a [++]

Active leave interventions

Viikari-Juntura et al 2012 [+] evaluated the effect of an active sick leave intervention for 31 employees, mostly female (97%) with an average age of 44, on enhancing return-to-work and reducing sickness absence over a 12-month period. The intervention was compared with 31 employees, of comparable characteristics, who received a full-time sick leave control option. Participants were excluded from the study if they had any acute infections, symptoms due to accidental injury, suspected occupational injury or disease, active inflammatory arthritis, malignant tumour diagnosed or treated during the preceding year, coexisting mental health disorders, were pregnant, or if they had a very severe pain intensity or pain that interfered with their sleep.

The two groups were comparable on sociodemographic characteristics including level of education, pain intensity, and pain interference with work. However

intervention and control groups differed in job tenure (12.1 years [I] 15.8 years [C]), lifting heavy loads (19% [I] 10% [C]), BMI (25.4 [I] 27.2 [C]), smokers (32% [I] 23 % [C]), pain interference with sleep (4.8/10 [I] 3.6/10 [C]), symptoms lasting longer than 12 weeks (23% [I] 37% [C]), back pain (19% [I] 35% [C]), lower limb pain (0% [I], 16% [C]), sickness absence in previous 30 days (2.6 days [I] 4.8 days [C]) or 90 days (7.9 days [I] 11.3 [C]). These differences were adjusted for in the analysis and are not considered to bias reported findings.

Further findings from this study are reported in a linked paper (Shiri et al 2013), where additional sociodemographic characteristics that differed between groups included: the number of elapsed days since symptom onset (42 [I] 48 [C]), pain interference with work (7.5/10 [I] 6.6/10 [C]), and depression rates (14% [I] 23% [C]).

The active sick leave intervention involved reducing working time by half (achieved in 70% of subjects) or reducing working days to 3-4 hours (achieved in 30% of subjects) and work tasks were modified if required. After a consent procedure with the employer, the occupational health physician (from the place of work or the Finnish Institute of Occupational Health) made recommendations on the duration of partial work disability, whether certain physical loads should be reduced, and on any other work modifications required. A 'fit note' was produced for employees to give to their employer after this consultation.

Outcome measurements over the 12-month follow-up period included sustained return to work (for longer than a) 2 weeks; b) 4 weeks), number of sickness absence days taken, and recurrence of sick leave after initial sick leave period. Additional work-related outcomes reported in Shiri et al 2013 included pain interference at work (scale 0-10) and productivity loss calculated with a quantity and a quality of work score (scale 0-10) (calculation: [1 – (quality/10) x (quantity/10)] x 100%). There was also a measure of self-rated general health and health-related quality of life (measured by the validated questionnaire EQ-5D). Further non work-related outcomes are reported in the evidence table in appendix 3a.

At 12-month follow-up, there was no significant difference between intervention and control group for sustained return-to-work measures (≥ 2 weeks: median was 9 days for both groups; ≥ 4 weeks: 12 days [I] 20 days [C]). Age-adjusted hazard ratios (HR)

for return to work (RTW) for ≥4 weeks was 1.60 (95% CI 0.98–2.63). The effect of the intervention differed for one large enterprise (N=24, age-adjusted HR 1.05, 95% CI 0.43–2.55). For the other five enterprises, the HR were close to 2 (combined HR adjusted for age 2.25, 95% CI 1.10–4.59). Overall HR, controlling for age, pain interference with sleep, and previous sickness absence, was 1.76 (95% CI 1.21–2.56). Further adjustment for pain interference with work increased the HR to 1.84 (95% CI 1.20–2.82).

Throughout the 12-month follow-up period, the total number of sickness absence days was approximately 20% lower in the intervention group than the control group (p values for difference not reported). Time to first recurrent sick leave was similar in the intervention group (median 29 days) compared to the control group (median 27 days), however the average number of sick leave spells per person year was higher in the control group compared to the intervention (median 6.5 [I] (95%CI 5.1 to 7.9) median 8.6 [C] (95% CI 6.4 to 10.9) p values not reported).

General pain intensity scores decreased in both groups over the first 8 weeks and then stabilised thereafter. There was no significant difference between groups for pain interference with work (p=0.15) or productivity loss (p=0.52) at 12 months. For general health measures over the course of the 12 months, there was a non-significant trend for self-rated general health to be higher in the intervention group (p= 0.07). Perceived health-related quality of life was found to be higher in the control group compared to the intervention group (p=0.02).

However for a subgroup of employees with a productivity loss score of ≤30%, the active sick leave intervention significantly reduced productivity loss (p=0.02) and pain interference with work (p=0.02) compared to the control. When participants were grouped by pain intensity level (low <7 and high >7), those in the low pain group at baseline reported pain-related sleep interference less frequently during the intervention, compared to the control (adjusted OR 0.1, 95% CI 0.0 to 0.3). Those who had experienced their symptoms for longer than 6 weeks had higher general health scores (P=0.05) and quality of life (p=0.03) in the intervention group compared to the control.

There were some limitations identified by the review team including: the study was under powered making the subgroup analysis less reliable; there was an identified possible selection bias risk introduced by the recruitment method via Finnish Institute of Occupational Health vs resident occupational health physician with very few participants recruited at the Institute declining to participate; the contamination risk was also unclear due to no reporting on communication of study amongst colleagues. These factors have downgraded the study from a '++' to a '+'.

Scheel et al 2002a [+] evaluated the effect of two informational interventions (passive and proactive) for employees with low back pain in 43 municipalities in Norway (passive n=2045, mean age = 39.2, 46.4% male; proactive n=2232, mean age = 40.7, 51.7% male), on enhancing the uptake of active sick leave and reducing sickness absence and long term disability over a 12-month period. The interventions were compared to employees in 22 different municipalities (*n*=1902, mean age = 40.2, 52.1% male) where no intervention was offered. This was a cluster randomised controlled trial, with randomisation and intervention allocation occurring at the municipality level rather than the individual.

Participants were excluded from the study if they were pregnant, self-employed, or already on active sick leave. To be eligible for the study, participants were required to have been on sick-leave for longer than 16 days.

The three groups were comparable on all sociodemographic characteristics at baseline including: percentage with sciatica, mean job satisfaction score, physically demanding work, physically straining work, previous back pain, and positivity to active sick leave. The proportion of females was 5-6% higher in the passive intervention group.

The passive intervention included reminders about active sick leave on the standard active sick leave form (which is completed by the GP) and an agreement to initiate active sick leave. There was also targeted information (format of information not reported) and a desktop summary for GPs of clinical guidelines for low back pain that emphasised the importance of staying active. The proactive intervention included all the features of the passive intervention but with an added component of a continuing education workshop for GPs and a trained resource person to facilitate the use of

active sick leave. Details of this training and where the resource person was based were not reported. Days off work were recorded in the 12-month period following enrolment in the study, along with quality of life measurements at enrolment and after 3 months of sick leave. If participants were absent for longer than 50 weeks, this was categorised and recorded in the study as 'long term disability'. The average number of recurrent episodes of sick leave was also measured over the 12-month period.

Over the 12-month follow-up, there were no significant differences between the groups for first episode of sickness (Control, median 56 days, mean ±SD 113.7 ± 2.7; Passive, median 55 days, mean ±SD 110.6±2.5; Proactive, median 57 days, mean ±SD 112.7±2.4) or total number sick-leave days (Control, median 71 days, mean ±SD 128.5 ± 2.8; Passive, median 68 days, mean ±SD 124.8±2.7; Proactive, median 70 days, mean ±SD 127.7±2.6). The proportion of recurrent episodes of sick leave for back pain was similar across the groups (Passive 11.6%, Proactive 11.8%, Control 11.2%). No p-values were reported.

The proportion of employees with a long-term disability (measured by proxy - one year of absence which is linked to administrative proceedings to transfer employee to other measures of rehabilitation or disability pension) that returned to work within 50 weeks was similar in the 3 groups (Control 89.1%, Passive 90%, Proactive 89%). There were no significant differences between: proactive vs control group: differences -0.1, CI -2.5 to 2.3, p =0.93; passive vs active group: differences -1.0, CI -3.4 to 1.4, p = 0.86; proactive vs (control and passive group combined): differences -0.6, CI -2.7 to 1.6, p = 0.83. There was a low response rate to the quality of life questionnaire at 3 months, but the results available show no differences between the groups (no p-values reported).

An analyses not pre-specified in the study protocol was undertaken and results presented. Out of the employees who took up active sick leave, those in the proactive group started the process an average of 24.2 days earlier than the control group (p = 0.04) and an average of 9.6 days earlier than the passive group (p=0.90). The median length of sick-leave in the proactive group (56 days) was significantly shorter than control group (86 days) (p <0.0005) but not the passive group (67.5

days, p = 0.13). A non-randomized comparison was undertaken for those on sick leave longer than 12 weeks, regardless of study group. Employees on active sick leave (n=663) took 11 days fewer off than those on full time sick leave (n=1995) (95% CI 1.6 to 20.4 days, p-value not reported). Employees on active sick leave returned to work before 50 weeks more often (85.2%) than employees on full-time sick leave (71.9%, p<0.0001).

Some limitations identified by the review team including: possible self-selection bias in the return to work data (subgroup analysis) as those on active sick leave may have been more motivated or less afflicted than those on full time sick leave. Similarly, there was no reporting on job type variation within the clusters which may have contributed to self-selection bias (i.e. people in more senior roles, for example, may have felt greater pressure to take up active sick leave and return to work). There were also baseline outcome measures missing from the report. These factors have downgraded the study from a '++' to a '+'.

Evidence statement 8: Effectiveness of two informational interventions (passive and proactive) to enhance uptake of active sick leave and reduce sickness absence and long-term disability.

There was moderate evidence from 1 cRCT[1] [+] from Norway that both passive and active informational interventions did not significantly reduce sickness absence (no p values reported) in terms of first episode of sickness (Control, median 56, mean ±SD 113.7 ± 2.7; Passive, median 55, mean ±SD 110.6±2.5; Proactive, median 57, mean ±SD 112.7±2.4); All sick-leave (Control, median 71, mean ±SD 128.5 ± 2.8; Passive, median 68, mean ±SD 124.8±2.7; Proactive, median 70, mean ±SD 127.7±2.) or long term disability (proactive vs control: differences -0.1, CI -2.5 to 2.3 p=0.9301; proactive vs. control and passive group combined differences -0.6, CI -2.7 to 1.6, p = 0.8268) compared to a usual procedure control

However for the subgroup of employees who took active sick leave, those who were offered the proactive intervention started the active sick leave significantly earlier (mean: 24.2 days: p=0.04) and had significantly less time off (median: 56 (I) vs. 86 (C) p<0.0005) than those who took active sick leave in the control group. Employees who took active sick leave returned to work before 50 weeks more often than those who did not take active sick leave (p<0.0001). For those on sick-leave longer than 12 weeks, patients on active sick leave took 11 days fewer off than non-active sick leave patients (95% CI 1.6 to 20.4 days).

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in Norway, however, the intervention may be feasible in a UK-based setting.

[1]Scheel et al 2002a **[+]**

Evidence statement 9: Effectiveness of an active sick leave intervention to enhance return to work and reduce sickness absence, productivity loss and pain interference with work.

There was moderate evidence from 1 RCT[1] [+] from Finland that an active sick leave intervention did not significantly enhance sustained return to work (no p value reported), but it did reduce the total number of sickness absence days in the 12 months follow-up period compared to the full-time sick leave control (no p value reported).

The intervention had no effect for one large enterprise (n=24, age-adjusted HR 1.05, 95% CI 0.43–2.55), however for the other five enterprises, the intervention was found to be effective at reducing sustained RTW timeframes (combined HR adjusted for age 2.25, 95% CI 1.10–4.59). When controlling for age, pain interference with sleep, and previous sickness absence, the overall HR was 1.76 (95% CI 1.21–2.56). Further adjustment for pain interference with work increased the HR to 1.84 (95% CI 1.20–2.82).

Further results reported in a linked study (Shiri et al 2013) (of the same population and intervention) show that the active sick leave intervention did not reduce productivity loss or pain interference with work compared to a full-time sick leave control.

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in Finland, however, the intervention may be feasible in a UK-based setting.

[1]Viikari-Juntura et al 2012 [+]

4.2 Review Two: hospital based, occupational therapy, relapse prevention, self-care/self-management and talking therapy based interventions

This section of the report contains a review of 15 studies focused on:

- Hospital based interventions: defined as an intervention that occur in or with contact with a hospital facility but with a clear input from the workplace. In order to be included the employer contribution had to be clear for example Myhre et al 2014 included "*case workers contacting employers regarding the programme and to inquire about possible temporary modifications at work*" and "*Planned meeting with the employer*"
- 'Occupational therapy': defined as intervention(s) that seeks to 'assist people to remain in work by enhancing functional ability. They seek to maximise the person-environment-occupational fit across the lifespan' (Macedo et al 2009) and can be comprised of a number of interventions including the provision of education, ergonomics reviews and exercise
- 'Relapse prevention': defined as interventions that explicitly seek to assist employees in work deal with 'stressors' for example stressful work situations, in order to prevent sick leave and increase full return to work. Relapse prevention can be comprised of different interventions delivered singularly or in combination. Examples include problem solving strategies and graded activity that seeks to prevent recurrent sickness absence.
- Self-care/self-management: aims to empower employees to affect changes in their health and work-related activities based on self-care/self-management strategies (this could be through increasing self-efficacy or changing attitudes).
- Talking therapies: defined as 'a group of psychological therapies that involve a person talking to a therapist about their problems' (NHS Choices 2016).

Characteristics of the included studies

Full details of the included studies are given in the evidence tables in Appendix 3b. Table 3 below shows in which country the studies were conducted, and gives a brief summary of the interventions, populations and outcomes investigated in the studies.

Table 3. Summary of included studies.

Workplace health: support for employees with disabilities and long-term conditions

Study	Participants, country and condition	Intervention	Comparator	Relevant outcomes	Quality
Tamminga et al 2013 **RCT**	Female cancer patients. The Netherlands	Hospital-based: work support intervention	Usual care	Return to work Quality of life Work ability Work functioning	+
Myhre et al 2104 **RCT**	Patients with neck pain and lower back pain. Norway	Hospital-based: work focussed rehabilitation intervention	Usual Care	Return to work	+
Phillips et al 2012 **Cohort**	Employees with MSD UK	Hospital-based: Tiered self-referral physiotherapy programme	n/a	sickness absence self-reported work performance pain measures, health related quality of life, fear avoidance belief	+
Arends et al 2010 **Cluster RCT**	Workers who returned to work after sickness absence due to common mental disorder. The Netherlands	Relapse prevention: SHARP-at work intervention – based on Management of mental health problems of workers by occupational physicians of the Netherlands Society of Occupational Medicine	Usual care	Recurrent sickness absence days Recurrent sickness absence incidence due to all causes Time to first episode of recurrent sickness absence	+
Noordik et al 2013 **Cluster RCT**	Workers who were on sick leave due to common mental disorder. The Netherlands	Relapse prevention: Exposure-based occupation therapy return-to-work intervention	Usual care	Time-to-full RTW lasting without recurrent sick leave Time to partial RTW	+

				Number of recurrences of sick leave Symptoms of distress, anxiety, depression and somatization	
Lexis et al 2011 **RCT**	Employees at risk of sickness absence and with mild to severe depressive The Netherlands	Talking therapies: Psychological treatment based on principles of problem solving therapy (PST) and cognitive behavioural therapy (CBT	Usual care	Sickness absence duration (in calendar days) – Long-term sickness absence Depressive complaints Self-rated health Work characteristics	**+**
Lander et al 2009 **Controlled before and after**	Employees on sick leave with self –reported emotional distress Denmark	Talking therapies: Psycho-educative intervention on return to work	Usual care	Time to return to work	**-**
Lagerveld et al 2012 **Quasi-experimental controlled trial**	Employees on sick leave with common mental disorders. The Netherlands	Talking therapies: Work-focussed cognitive behavioural therapy (W-CBT)	Regular CBT	Full return to work Partial return to work Return to work steps Stress, depression, anxiety	**+**
McClusky et al 2006 **nRCT**	Employees with MSD UK	Talking therapies: Multi component intervention comprised of a psychological assessment and the potential for modified return to work and onward referral	Standard care – seeing the occupational nurse on return to work	Return to work Work retention	**-**
Hees et al 2012	Employees who are sick-listed	Occupational therapy:	Usual Care	Return to work	**++**

RCT	because of work-related major depression. The Netherlands	Adjuvant occupational therapy		Absenteeism Depression Work functioning Health related functioning Self-efficacy	
Macedo et al 2009 **RCT**	Workers with a confirmed diagnosis of rheumatoid arthritis. UK	Occupational therapy: Comprehensive occupational therapy	Usual care	Occupational performance Satisfaction with performance Disability score Work productivity Presenteeism and absenteeism Coping RA disease activity	**++**
Taimela et al 2008 **Longitudinal cohort study with 2 embedded RCTs**	Employees at high risk of sick leave with MSK related conditions. Finland	Occupational therapy: Occupational therapy with additional individual feedback	Usual care	Sickness absence	**+**
Eklund et al 2011 **Quasi-experimental controlled trial**	Women with stress-related disorders. Sweden	Self-care/ management: Redesigning Daily Occupations (ReDO) program with self-care	Usual care	Return to work Degree of sick leave Perceived stress Self-esteem	**-**
Detaille et al 2013 **RCT**	Workers with a diagnosed chronic disease (e.g. rheumatoid arthritis or diabetes mellitus), encountering	Self-care/ management: Self-Management Program Course	Usual care	Self-efficacy at work Attitude towards self-management	**+**

	problems at work because of the condition. The Netherlands			Job satisfaction Mental and physical health	
Wolever et al 2012 #2 **RCT**	Employees who suffer from stress at worksites USA	Self-care/ management: Mindfulness intervention	Initial stress level assessment	Perceived stress Sleep quality, mood, pain levels, work productivity, mindfulness, Biological indicators such as blood pressure, breathing rate, and heart rate variability	**+**

4.3.2. *Study findings*

Interventions types

15 studies evaluated a range of interventions to improve work and health related outcomes: Two RCTs (Myhre et al 2014 [+], Tamminga et al 2013 [+]) and one cohort study (Phillips et al 2012 [+]) evaluated hospital based interventions. Two cluster RCTs evaluated interventions to prevent relapse (Arends et al 2010 [+], Noordik et al 2013 [+]); one RCT (Lexis et al 2011 [+]), one controlled before and after (Lander et al 2009 [-]), a quasi-experimental trial (Lagerveld et al 2012 [+]) and a nRCT (McClusky et al 2006 [-]) evaluated talking therapy based interventions; three studies evaluated occupational therapy interventions (Hees et al 2012 [++], Macedo et al 2009 [++], Taimela et al 2008 [+]); and, three studies evaluated interventions directed at self-care/management (Eklund et al 2011 [-], Detaille et al 2013 [+], Wolever et al 2012 #2 [+]. Three of the studies were conducted in the UK (Macedo et al 2009; Phillips et al 2012, McClusky et al 2006).

Hospital based interventions

Two RCTs evaluated the effectiveness of hospital-based interventions with workplace focussed components compared to usual care (Tamminga et al 2013 [+], Myhre et al 2014 [+]). Neither study found significant differences on workplace outcomes between the intervention and control groups. One cohort study (Phillips et

al 2012 [+]) evaluated the effectiveness of a hospital based tiered occupational health intervention which identified significant intervention effects on workplace outcomes at 3 months.

Tamminga et al 2013 [+] evaluated the effect of a hospital-based work support intervention in the Netherlands for 61 employed mostly female (99%) cancer patients aged between 18 and 60 on return to work (RTW), quality of life, work ability and work functioning over 12 months. The intervention was compared with 61 employed female cancer patients who received usual oncological care.

The two groups were comparable on all sociodemographic characteristics at baseline including gender (99% [I] 100% [C] females), age (47.5+/- 8.2 [I] 47.6+/- 7.8 [C]) and cancer diagnosis (P=0.82). Breast (62%) and female reproductive cancer (34%) were the most frequently diagnosed.

The multi-disciplinary intervention was provided by an oncology nurse or medical social worker and had three central elements: 1) patient education and support regarding return to work integrated into usual psycho-oncology care in four 15 minute sessions; 2) improving communication between the treating physician and the occupational physician; and 3) drawing-up a concrete and gradual return-to-work plan in collaboration with the cancer patient, the occupational physician, and the employer. The control group received usual care (not further described by the study authors). This study assessed intervention effectiveness at 1 year follow-up on participant RTW, quality of life, work ability, and work functioning. Whilst all participants' outcomes improved there was no statistically significant difference between the intervention and control groups on any outcome measure.

Limitations of the study which reduced its quality score from a [++] to [+] included a lack of power to detect a significant improvement in return to work (power calculations required 109 patients in each arm but only 65 and 68 achieved), lack of blinding, and potential contamination between the interventions and control group.

Workplace health: support for employees with disabilities and long-term conditions

Myhre et al 2014 [+] evaluated a Norwegian multi-centred RCT that assessed the effectiveness of a work-focussed rehabilitation intervention on RTW for patients with neck and lower back pain, compared to a usual care control group. All participants had been on sick leave for 4 weeks to 12 months. Participant characteristics at baseline appear broadly similar but no statistical analysis of differences was undertaken.

The intervention was evaluated at two outpatient clinics. All participants in the intervention and control groups received a standard clinical examination from a physician. Imaging was evaluated, and patients were informed about the findings and that the origin of pain is often difficult to visualize via imaging. Patients were reassured that daily activities, physical exercise, or work would not hurt or damage their necks or backs. Emphasis was placed on removing fear-avoidance beliefs, restoring activity level, and enhancing self-care and coping. In addition to this, the intervention group patients received individual appointments with the caseworker during the first days of treatment. Work histories, family lives, and obstacles to return to work were discussed. With patient consent the case-workers contacted participants' employers to inform them of the program and inquire about possible temporary modifications at work and return to work schedule was put together by the patient with the caseworker and the multidisciplinary team. Patients and the caseworkers also discussed issues in a meeting with the employer, and caseworkers offered the patients assistance at this meeting, if requested. There were differences in usual care at the two clinics with one providing a comprehensive multi-disciplinary approach and the other a brief multidisciplinary intervention.
There was no statistically significant difference in any work-related outcomes between the intervention and control groups at 12 months follow-up. Fewer patients in the intervention group had RTW, 142 (70%) compared with 152 (75%) in the control group (HR adjusted for age, sex and educational level = 0.94 (CI 0.75-1.17). The median time to RTW was also greater in the intervention arm (161 days) compared to the control (158 days ($p = 0.45$)). Median total sick leave days were also higher in the intervention group (117 days) compared the control group (107 days).

Limitations of the study which reduced its quality score from a [++] to [+] included differences in the levels of usual care in the two clinics and the potential for contamination between the intervention and control arms.

Phillips et al [+] evaluated the effectiveness of a tiered self-referral physiotherapy programme for 486 employees with MSDs in the UK.

The intervention was described as a three tiered occupational health physiotherapy pilot project comprising of: 1. Telephone advice and triage from a physiotherapist to provide rapid advice and signposting to services; 2. Face-to-face physiotherapy assessment and treatment if necessary provided at either the hospital, workplace or other setting; 3. Workplace assessment and rehabilitation package if appropriate. This was a cohort study with no comparator group. The mean age of the group was 43.1 (SD 10.45) and 63% were female. Within the cohort, 72.3% of the participants were working their usual hours and performing their standard work duties despite their MSD symptoms, 14.5% were working usual hours but stated that help was needed at work, 9.2% were working their usual hours but not performing their usual duties, 2.3% were performing their usual duties but not their usual hours, and 1.7% did not work during treatment.

Outcome measurements included days sickness absence (authors do not state whether this is self-report or from a register), self-reported work performance (assessment tool not stated, scale not specified), pain measures, health related quality of life, fear avoidance belief (including the work and physical activity subscales).

Mean days sickness absence had significantly decreased from 4.6 (SD 12.6) at baseline to 2.82 (SD 11.4) at end of treatment and 1.45 (SD 9.7) at 3 month follow-up (statistical difference from baseline $p<0.05$). Self-reported work performance significantly increased from 75.9 (SD 19.6) at baseline to 82.1 (SD 16.2) at end of treatment and 87.8 (SD 13.2) at 3 month follow-up ($P<0.001$). Pain intensity scores and psychological distress significantly decreased (both $p<0.001$) as did the subscales for fear and avoidance of work and physical activity (both $p<0.001$) from baseline. All the health related quality of life measures significantly increased (all $p<0.001$).

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [+]. These included: lack of comparator group or randomisation, risk of selection bias, low level of employer and service user engagement, lack of reporting on methodological details.

Evidence statement 10: Effectiveness of workplace focused specialist hospital care based interventions

There is moderate evidence from 1 RCT set in The Netherlands [+][1], 1 multi-center RCT set in Norway [+][2] and 1 cohort study set in the UK [+][3] which provide mixed findings regarding multi-component interventions with a hospital component combined with a workplace focus.

There is moderate evidence from 1 RCT set in The Netherlands [+][1] and 1 multi-center RCT set in Norway ([+])[2] which suggest that multi-disciplinary interventions with a focus on the workplace in hospital specialist care does not statistically significantly improve workplace outcomes including return to work when compared with usual care.

There is moderate evidence from 1 cohort study set in the UK that a three tiered occupational health physiotherapy intervention significantly decreased mean days sickness absence by 3.15 days ($p<0.05$), mean self-reported work performance scores increased by 11.9 ($p<0.05$), pain intensity scores, psychological distress, subscales for fear and avoidance of work and physical activity significantly decreased ($p<0.001$), and all the health related quality of life measures significantly increased (all $p<0.001$) at 3 month follow-up.

Applicability: One study is of direct applicability as it is UK based. The remaining two studies are only partially applicable to the UK because the studies were undertaken in the Netherlands and Norway.

1. Tamminga et al 2013 [+]

2. Myhre et al 2014 [+]

3. Phillips et al 2012 [+]

Self-care/ management interventions

Three studies evaluated the effectiveness of interventions focussed on self-care or self- management of chronic conditions (Detaille et al 2013 [+]) and stress (Eklund et al 2011 [-]; Wolever et al 2012 #2 [+]). The results of the studies were equivocal.

Detaille et al 2013 [+] evaluated a Self-Management Program for 44 workers with a chronic disease who were encountering problems at work because of their disease over 8 months. This intervention was compared with 35other workers with a chronic condition who received usual care (details not reported). All participants were recruited from the Amhem and Nijmegen regions in the Netherlands with chronic conditions including musculoskeletal (32%) and respiratory system (24%) conditions and had to be encountering problems at work due to their condition to be included in the study.

The two groups were comparable on all sociodemographic characteristics at baseline with no significant difference found between the groups on demographic or baseline outcome measures.

The intervention consisted of six weekly session lasting two and half hours per session, with each week focusing on a specific topic: 1) Introduction and the importance of physical exercise 2) Coping with pain, fatigue and stress at work 3) Importance of healthy nutrition and problems encountered at work 4) Communication techniques at the workplace 5) working with occupational health professionals 6) Plans for the future.

At eight months follow-up, changes in ‘self-efficacy at work and ‘attitude towards self-management at work (importance and enjoyment)’ (measured via a self-developed focus group informed tool) indicated no significant difference between control and intervention groups. Secondary outcomes ‘Job satisfaction’ and ‘intention to change job’ (measured utilising the two scales from the Perception and Evaluation of work questionnaire and Mental and physical health were measured utilising scales from the SF-12) indicated no significant difference between control and intervention. An

adjusted multivariate analysis was undertaken (comparing estimated marginal means and adjusting for age, gender, education and baseline scores) and indicated a significant improvement in the direction of the intervention for 'attitudes towards self-management at work' (p=0.03) but no other significant intervention effects were identified for primary outcomes.

Limitations of the study which reduced its quality score from [++] to [+] included: the small sample size and lack of 'power' for all outcomes; effect sizes for all primary outcomes not being calculated or not presented; and, unclear methods of randomisation, allocation concealment, and blinding. Furthermore there may be a general lack of applicability of the intervention given the requirement for Stanford University Masters qualifications for lay trainers.

Eklund et al 2011 [-] evaluated the effectiveness of a 16-week rehabilitation programme for 42 female employees with stress-related disorders. The intervention was compared to a control group of 42 female employees with the same stress-related disorders, who received care as usual in the form of regular follow-ups with an officer from the Social Insurance Office and the employer, as well as receiving any relevant medical treatment. Participants were eligible to take part if they were on sick leave (for at least 2 months) for a stress-related diagnosis (as measured by ICD-10).

The two groups were comparable on all sociodemographic characteristics, including mean age ([I] = 45 (±19.0); [C] = 46(±9)), proportional diagnosis of depression ([I] 45%; [C] 54%), stress/exhaustion ([I] 48%; [C] 41%) and physical main diagnosis ([I] 7%; [C] 5%). Degree of sick leave was estimated as the percentage of the employee's regular working hours taken up by sick leave. The mean (SD) degree of sick leave was 92% (±18) for the intervention group, compared to 83% (±26) for the control (p = 0.086). The mean (SD) sick leave duration before baseline was 13 (±20) months in the intervention and 10 (±10) in the control group (p = 0.414). The only significant difference between groups was that more of the control group had previously been involved in work rehabilitation compared to the intervention group (36% vs 12%, p = 0.010).

Workplace health: support for employees with disabilities and long-term conditions

This work rehabilitation intervention included a focus on self-care and consisted of the 16 week 'redesigning Daily Occupations' (ReDO) programme, which involved 3 parts. Part 1 involved 10 group sessions where problems were identified and home tasks were set. Part 2 involved a further 10 group sessions with a greater focus on the work situation. Part 3 involved 3 group sessions on problem solving in work practice. Authors do not report who runs the sessions, but they take place in health-care centres in a South Sweden district.

At 12-month follow-up, return to work (RTW) had significantly increased in both groups ($F = 12.29$; $p<0.001$). When controlling for previous sick leave and baseline self-esteem, progression of RTW over the time points was significantly greater in the intervention group compared to the control ($F = 4.55$, $p = 0.005$). Degree of sick leave significantly decreased over time for both groups ($F = 29.55$, $p<0001$), with the decrease being significantly greater in the intervention group ($F = 9.34$, $p<001$). In terms of secondary outcomes, perceived stress significantly decreased over time for both groups ($F = 4.15$, $p<0.01$) but there was no significant differences between the intervention and control ($F = 3.11$, $p = 0.083$). Self-esteem significantly increased over time for both groups ($F = 6.99$, $p<0.001$).

Limitations of the study that reduced its quality score from [++] to [-] included: a lack of randomisation; half the control group reported receiving some kind of focussed work rehabilitation making the comparison with intervention group less reliable; a small sample size with unreliable power calculation; and, non-conformity with eligibility criteria (participants had to be on sick leave to be eligible for the study, however 43% of the control group and 24% of the intervention group were working at baseline before the intervention began).

Wolever et al 2012 #2 [+] evaluated the effectiveness of a mindfulness-based workplace stress reduction programme for 96employees who suffered from stress at worksites in Connecticut and California, USA. (A yoga-based stress reduction intervention was also evaluated in this three-armed trial and is included in section *3.2 Review 1* of this report).

The mindfulness intervention was delivered by an experienced mindfulness meditation teacher (authors give no further details) and was run in weekly one hour sessions over a 12-week period. Some of the participants received face-to-face sessions with the teacher in classrooms, whilst others received the programme via an online platform in a 'virtual classroom'. The mindfulness practices targeted work-related stress, work-life balance and self-care and were designed to be delivered at work. Handouts were given for home and office use.

The intervention was compared with 53 employees who received the initial stress-level assessment but no stress management intervention. The control group were provided with a list of resources available to all employees, including fitness programmes, employee assistance programmes, behavioural health services for depression, chair massage, and wellness coach opportunities. Employees were eligible for the study if they had a score of ≥16 on the perceived stress scale questionnaire given in the initial assessment.

There were no significant baseline differences between groups with regards to both demographics and baseline outcome measures.

The primary outcome measure was perceived stress, which was assessed using a self-report 10-item perceived stress scale. Secondary outcomes included sleep quality, mood, pain levels, work productivity, mindfulness, and biological indicators such as blood pressure, breathing rate, and heart rate variability. Follow-up was within 2 weeks of the end of the 12 week intervention programme.

In the initial ANCOVA analysis (taking into account both yoga and mindfulness intervention), there was a significant group × time interaction for the following measures: perceived stress ($F(2, 233) = 8.89$, $p<0.01$, $\eta^2 = 0.07$), sleep quality ($F(2, 233) = 3.03$, $p<0.05$, $\eta^2 = 0.03$), current pain ($F(2, 233) = 3.56$, $p<0.05$, $\eta^2 = 0.03$), breathing rate ($F(2, 233) = 3.02$, $p<0.05$, $\eta^2 = 0.03$), heart rate variability ($F(2, 233) = 15.86$, $p<0.001$, $\eta^2 = 0.12$). There was no interaction for workplace productivity or depressive symptoms. For those interactions that were significant, the authors performed a post-hoc univariate comparison of mindfulness intervention

vs control. When compared to the control group, perceived stress was found to decrease significantly more over time for those in the intervention ($F (1, 144) = 21.31$, $P<0.01$, $\eta^2 = 0.13$). This was also the case for sleep difficulty ($F (1, 144) = 5.17$, $p<0.05$, $\eta^2 = 0.04$) and measures of mindfulness (CAMS-R) ($F (1, 144) = 5.75$, $p<0.05$, $\eta^2 = 0.04$). In contrast, heart rate variability rose in the intervention group compared to the control ($F (1, 144) = 4.257$, $p<0.05$, $\eta^2 = 0.18$).

There were limitations identified during the review which downgraded this study from a [++] to a [+]. These included: lack of power, the study was undertaken during a time of restructure and job eliminations, and inconsistent methods reported.

Evidence statement 11: Effectiveness of self-care or self-management interventions

There was moderate to weak evidence from one RCT[1] [+] from The Netherlands and one RCT[2] [-] from Sweden that a self-management programme for workers with chronic conditions[1] and a work rehabilitation programme with a focus on self-care for females with stress related disorders[2] did not significantly improve self-esteem at work[1] at 8 months or perceived self-efficacy at 12 months[2] when compared to usual care.

1 RCT [+] from the Netherlands showed that the intervention did not significantly improve job satisfaction and intention to change job or mental and physical health at 8 months compared to a usual care [1]. However an adjusted analysis (age, gender, education and baseline score) did indicate a significant (p=0.03) improvement in 'attitude towards self-management' at 8 months.

1 RCT [-]from a Swedish quasi-randomised controlled trial[2] showed that at 12 months follow-up a work rehabilitation programme with a focus on self-care for female employees with stress-related disorders improved: progression of return to work ($F = 4.55$, $p = 0.005$); and, sick leave ($F = 9.34$, $p<001$) over usual care. There were no significant differences between groups on perceived stress.

Applicability: The evidence is only partially applicable the UK because the studies were undertaken in the Netherlands and Sweden, however, the interventions may be feasible in a UK-based setting.

1 Detaille et al 2013 [+]

2 Eklund et al 2011 [-]

Evidence statement 12: Effectiveness of mindfulness

There is moderate evidence from 1 RCT [+] [1] set in the USA that a mindfulness-based stress-reduction programme may have a beneficial effect on stress but no effect on work productivity.

The study found that perceived stress of those receiving the intervention had decreased significantly more than the control group at 12 week follow-up ($F (2, 233) = 8.89$, $p<0.01$, $\eta 2 = 0.07$). This was also the case for sleep difficulty ($F (1, 137) = 5.94$, $p<0.05$, $\eta 2= 0.04$) and measures of current pain ($F (1, 137) = 6.51$, $p<0.01$, $\eta 2 = 0.05$). In contrast, heart rate variability rose in the intervention group compared to the control ($F (1, 137) = 29.77$, $p<0.001$, $\eta 2 = 0.18$).

Applicability: This study is only partially applicable to the UK because the study was undertaken in USA. However the intervention may be feasible in a UK setting.

1. Wolever et al 2012 #2

Talking therapy interventions

Four studies, two conducted in the Netherlands, evaluated the effect of talking therapies on work and mental health related outcomes for employees with common mental disorders (Lexis et al 2011 [+][1], Lagerveld et al 2012 [+][2]). One study conducted in Denmark evaluated the effectiveness of a two part intervention focused on individual consultations with psychologists and advice and support from social workers on return-to-work on employees with stress related disorders currently on sick leave (Lander et al 2009 [-][3]). One study conducted in the UK evaluated the effectiveness of a multi-component occupational health-led intervention based primarily on an initial cognitive behavioural therapy (CBT) based psychological assessment and optional work modification and physiotherapist/GP referral in employees with MSD (McClusky et al 2006 [+]) [4]. The Dutch interventions[1, 2] involved individual CBT sessions. There were statistically significant benefits to some work related outcomes at 12 months for intervention participants in both groups. Whilst, participants in one study[1] also experienced statistically significant improvements across all mental health measures at 6 and 12 months follow-up, participants in the other study reported improvements in health outcomes that were not statistically significant[2]. The Danish study[3] did not observed any statistical difference in return to work outcome over usual care. The UK study[4] observed at 12 months a statistically significant reduction in time taken to return to work but the finding should be treated with caution due to methodological irregularities and contradictions in the methodological narrative

Lexis et al (2011) [+] conducted an RCT which compared an early intervention with CBT combined with problem solving therapy (PST) in 69 employees to usual care for 70 employees with mild to severe depressive complaints at high risk of sickness absence. The early intervention was provided to employees who were still at work and screening positive for mild to severe depression on the Hospital Anxiety and Depression Scale (HAD-D), with the aim of preventing future long-term sickness absence and major depression. The intervention was delivered by psychologists who provided seven, 45 minute sessions, each based on the major steps of PST with CBT principles applied throughout. The seventh session consisted of an evaluation session, where the psychologist and employee decided whether they were ready to move onto the next stage of the intervention known as the ‘specific stage’. This element could last

for a maximum of 5 sessions, and the employee could decide what area to focus on. The intervention was compared to care as usual (CAU) provided by occupational health services. CAU included consultation with an occupational physician, and referral to other services if required.

At baseline, participants were comparable on: age (mean age [I] 48.41 [C]47.07); gender (43% male); proportion with presence of long-term illness ([I], 59.1%; [C], 51.5%); depressive complaints in the HAD-D score ([I], mean(SD) 10.45(2.67); [C], 9.97(2.34)); and, risk of sickness absence measured by a screening questionnaire - Balansmeter ([I], mean (SD) 40.79(27.85); [C] (35.34(25.47)). Participants in the intervention group had higher depression scores as measured by the Becks Depression Inventory, than the control group ([I], mean (SD) 17.03 (9.56); [C], 14.84(8.11)) and higher self-rated heath scores as measured by the Brief symptom Inventory (BSI), ([I], mean (SD) 40.79(27.85); [C], 35.34 (25.47)). It appears that no statistical analysis of differences was undertaken as p-values on these differences were not reported.

Participants in the intervention group had a statistically significantly ([I] mean 27.48 days vs [C] mean 50.83 days) shorter duration of sickness absence at 12 months follow up when compared to the control group (β-0.62, 95% CI-1.12 to -0.11, p=0.017). Whilst duration of sickness absence at 18 months was still shorter in the intervention group, the difference was no longer statistically significant. At 12 and 18 months, the intervention group had fewer participants with spells of sickness absence >28 calendar days, however this was not statistically significant. Whilst the direction of effect favoured the control group for all other work-related outcomes at 12 and 18 months (at least one time on sick leave, frequency, and time to onset of sick leave), the differences were not statistically significant. At 12 month follow up the intervention group had statistically significantly greater improvements in depression scores as measured by the Becks Depression Inventory-II (-5.40, 95%CI -9.12 to -1.68, p=0.005) and the Hospital Anxiety and Depression D Scale (-2.62, 95% CI-4.41 to -0.83, p=0.005).They also experienced statistically significant improvements in psychological distress scores as measured by the Brief Symptom Inventory (BSI) (-15.69, 95% CI -25.11 to -6.26, p =0.001).

Limitations of the study which reduced its quality score from a [++] to [+] included the study not being blinded and only 55% of the intervention participants completing the study.

Lagerveld et al 2012 [+] undertook a quasi-experimental trial to evaluate the effectiveness and cost effectiveness of work-focussed CBT (W-CBT) on return to work for 89 employees on sick leave with common mental disorders, compared with standard CBT in 79 employees on sick leave. Intervention participants received up to 12 sessions of standard CBT with an added module focussing on work and return to work. A specific return to work-plan was devised with work-related homework exercises. Regular CBT exercises were also framed in the work context. The control group received up to 12 sessions of standard CBT.

At baseline participants were comparable on age (W-CBT, mean (SD) 40.2 (9.6); CBT, 41.3 (10.4)) and gender (W-CBT, 54% female; CBT, 67% female). Participants in both groups were also comparable on disorder and treatment characteristics: adjustment disorder (CBT, 62%; W-CBT, 72%); anxiety (CBT, 15%; W-CBT, 12%), depression (CBT, 18%, W-CBT, 16%); other mental disorders (CBT, 5%; W-CBT, 0%).

The intervention group had a statically significant greater chance of full return to work (HR 1.56, $p < 0.05$, SE 0.19) and partial return to work (HR 1.59, $p < 0.05$, SE 0.20) at 12 months follow up. On average, full return to work occurred 65 days earlier and partial return to work occurred 12 days earlier for W-CBT participants. The intervention group used significantly more steps (each step representing an increase in working hours) to full return to work (2.94 vs 4.26; $F (1, 147) = 16.72$, $p<.01$), indicating a more gradual RTW process. The intervention group experienced relapses more often after full return to work but this difference was not statistically significant. Participants in both groups had improved levels of stress, emotional exhaustion, and depression and anxiety at 3, 6, and 12 months follow-up but the difference between the two groups was not statistically significant.

Limitations of the study which reduced its quality score from a [++] to a [+] included non-randomisation, 52% loss to follow-up for some mental health outcomes, and a lack of data on how many control group participants requested that they had a work focus to some of their CBT sessions.

Lander et al 2009 [-] evaluated the effectiveness of a two part intervention focused on individual consultations with psychologists and advice and support from social workers for 72 employees on sick leave with self-reported emotional distress in Denmark

The intervention is described as psycho-educative and had two components: 1) individual consultations with psychologists focused on activating and supporting the employees' efforts to adopt a problem-solving approach to problems 2) Advice and support for employees and their families from a social worker. The number of sessions varied and depended on the rate of employees return to work

The intervention was compared to 89 employees, who received care as usual in Denmark. Those with severe mental health disorders, long-term sick (>4 weeks during the previous 6 months) and/or engaged in drug or alcohol abuse were excluded from the study. The intervention and control outcome characteristics are outlined by the author as comparable but figures are not reported. Participants in the control were matched to intervention participants by self-reported sick leave, gender, age and labour union membership, but there is a lack of information regarding baseline differences in conditions.

The primary outcome was time to return to work measured from day of referral to full return to work.

There were no significant differences between intervention and control groups for time to return to work in the 68 week follow-up period (HR = 0.84, 95% CI = 0.60 to 1.19)

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [-]. These included: A lack of allocation concealment, a lack of clarity regarding baseline outcome data and characteristics between control and intervention arms and a lack of clarity regarding missing data.

Workplace health: support for employees with disabilities and long-term conditions

McCluskey et al 2006 [-] evaluated the effectiveness of a multicomponent occupational health-led intervention for 304 employees with MSDs across 2 manufacturing sites of a large pharmaceutical company in the UK.

The intervention was delivered by occupational health nurses who identified and contacted employees at the start of absence. The nurses were trained to deliver the intervention using a case-management approach over a 4 week period. The intervention began with a psychosocial assessment broadly based on cognitive behavioural principles, and an educational booklet targeting unhelpful beliefs was also offered to the employee. If deemed essential, work practices were modified for a maximum of 2 weeks in order to facilitate early return to work; if the employee had not resumed work after 2 weeks they were referred to a physio or GP. Finally, the occupational health nurse liaised with other relevant parties, including: GPs to discuss 'unnecessary sickness certification', team leaders to discuss RTW and work retention plans as well as any issues identified during the assessment regarding job demands and work modification needs.

The intervention was compared to 214 employees who received standard care, which involved seeing the occupational health nurse only on return to work. Modified work was a possible component of standard care, but without clear criteria for implementation or temporal restriction. To be eligible for the study, employees were required to have an MSD as shown in the initial assessment. Those with a serious underlying pathology were not eligible to take part in the study. The intervention and control groups were comparable on job type (mostly manual workers), and had similar absence rates (~12%). Although the authors do not report on exact figures, they state that there were no significant differences in age and gender of workers.

Primary outcome measures were RTW and work retention. For the analysis, the intervention group was split by experimental site (named E1 and E2) because it was later found that the experimental protocol was not being followed at E2. The following results are reported as displayed in the published paper, however it is noted that some typographical errors may have occurred with regards to the 95% CI figures. At 12 month follow-up, those in the intervention group at E1 were found to take less time to return to work compared to the control group (mean difference -4.3 days (95% CI 1.1 to 7.4), p=0.009). There was no significant difference for those

receiving the intervention at site E2. In terms of work retention, no significant differences were found between intervention site and control. These results should be treated with caution due to the identified irregularities and contradictions in the methodological narrative.

There were a number of limitations identified during the review which resulted in this study being downgraded from a [++] to a [-]. These included: lack of blinding and randomisation, failure to follow protocol at one of the intervention sites, low uptake of the intervention, and risk of selection bias.

Evidence statement 13: Effectiveness of talking therapy based interventions

There was moderate evidence from 1 RCT[1] [+] and 1 quasi-experimental trial[2] [+] from the Netherlands that cognitive behavioural therapy (CBT) combined with problem solving therapy (PST) for those with severe and moderate depression and work-focused CBT for those with common mental disorders have statistically significant effects on work related outcomes at 12 months over usual care. There was weak evidence from one controlled before and after study set in Denmark [-] [3] on the effectiveness of a 'Psycho-educative intervention' on time return to work

1 RCT[1] demonstrated that CBT combined with PST demonstrated a statistically significantly 46% shorter duration of sickness absence at 12 months follow up when compared to care as usual (-0.62, 95%CI -1.12 to -0.11, p=0.017) – this effect did not remain significant at 18 months; whilst 1 quasi-experimental trial[2] demonstrated that participants in work-focused CBT intervention had a statistically significant greater chance of both full return to work (HR 1.56, $p < 0.05$, SE 0.19) and partial return to work (HR 1.59, $p < 0.05$, SE 0.20) at 12 months follow up compared to care as usual. The intervention group used significantly more steps to full return to work (2.94 vs 4.26; $F(1, 147) = 16.72$, $p<.01$), indicating a more gradual RTW process.

Two studies[1, 2] also demonstrated improvements to mental health outcomes over care as usual although these were only statically significant in one study[1]. At 12 month follow up the CBT combined with PST intervention group had significant improvements across two depression scores (Becks Depression Inventory-II: -5.40, 95%CI -9.12 to -1.68, p=0.005; Hospital Anxiety and Depression D Scale: -2.62, 95% CI-4.41 to -0.83, p=0.005) and psychological distress scores (-15.69, 95% CI -25.11 to -6.26, p =0.001).

The controlled before and after study demonstrated over the 68 week follow-up period, no observed significant effect of the intervention over care as usual (HR = 0.84, 95% CI = 0.60 to 1.19).

Applicability: The evidence is only partially applicable the UK because the studies were undertaken in the Netherlands and Denmark. However, the interventions may be feasible in a UK-based setting.

1 Lexis et al 2011 [+] [1]

2 Lagerfeld et al 2012 [+] [2]

3 Lander et al 2009 [-] [3]

Evidence statement 14: Talking therapies nursed-based intervention plus optional work modification and onward referral to specialist

There is weak evidence from 1 nRCT set in the UK [-] [1] which suggests that a multi-component intervention comprised of a psychosocial assessment and the potential for modified return to work and onward referral if required, significantly reduced time to return to work compared to the control group (mean difference -4.3 days (95% CI 1.1 to 7.4), p=0.009) at 12 month follow-up.

Applicability: The evidence is directly applicable to the UK.

1. McCluskey et al 2006 [-] [1]

Occupational therapy based interventions

Three studies conducted in the Netherlands, the UK and Finland evaluated the effect of occupational therapy based interventions on work and mental health related outcomes for employees with depression (Hees et al 2012 [++])[1], rheumatoid arthritis (RA) (Macedo et al 2009 [++])[2] and musculoskeletal conditions (MSK) Taimela et al 2008 [+])[3]. All interventions involved occupational therapy to varying degrees as an addition to usual care: one as an adjuvant therapy[1] and the two others as a more comprehensive intervention[2, 3]. The three interventions varied in their specific content with all three having a consultation-based element and one having an additional individualised intervention[2]. Participants in one study[2] experienced statistically significant improvements in some workplace outcomes at 6 month follow-up, with the remaining 2 studies[2, 3] demonstrating intervention effect in some workplace outcomes but not at a statistically significant level. Two of the studies[1, 2] evaluated intervention effects on health outcomes with one study[2] reporting statistically significant intervention effect across all outcomes and one study[2] reporting statistically significant intervention effect across some outcomes.

Hees et al 2012 [++] evaluated the effectiveness of an adjuvant occupational therapy intervention in 78 employees who were sick-listed because of work related major depression The intervention was compared with 39 other employees sick-listed for the same reason, who received treatment as usual (TAU) from a psychiatric resident at the out-patient hospital. Employees were eligible for the study if they were aged 18-65, diagnosed with major depressive disorder (according to DSM-IV) for a duration of at least 8 weeks, absent from work for at least 25% of their contracted hours due to depression. There also had to be a relationship between the depressive disorder and work. Participants were referred by occupational physicians.

The intervention and control appeared comparable on all baseline characteristics, however no formal statistical comparison was reported. Relevant baseline characteristics included mean age (TAU, 41.5±9.6; [I], 43.8±9.0); mean contracted hours per week; (TAU 32.7; [I], 35±5); mean hours absenteeism (TAU, 27.1±8.8; [I], 27.6±10); median duration of absenteeism in the previous 6 months (TAU, 3.8

months (IQR 2.0-6.5); [I], 5 months (IQR 2.8-5)); proportion who experienced more than 1 depressive episode (TAU, 54%; [I], 53%). The authors state that the groups were comparable at baseline apart from, contracted hours, WLQ output scale, and HRSD scores. However these differences were adjusted for in the analyses. The authors describe the participants as a 'highly impaired population'.

The occupational therapy intervention consisted of 18 sessions (length not reported) comprising of 9 individual, 8 group and 1 meeting with the employer. In the individual sessions, the therapist tried to relate current work stressors to the employee's recurrent ineffective coping-pattern as well as monitoring the employee's progress with the work-reintegration plan. In the group sessions, the 'Quality of Work' (QW) model was used, where 5 factors that affect work performance are discussed: 'Work Load', 'Autonomy', 'Relationships at Work' 'Job Perspective', and 'Work-Home Interference'. In every group session (approximately 8 participants), the QW model is discussed, and employees are taught how to evaluate both the positive and negative factors in their own work situation. Each group member decides what dimension within the model is most important to change in his/her own work situation. Group sessions are also used to prepare for the meeting with the employer (through role-playing) and to develop a prevention plan. In the employer meeting, the occupational therapist educates the employer regarding the content of the occupational intervention and the consequences of depression for work performance. The employee has the opportunity to openly discuss work-related difficulties with the employer. Those in the intervention group also received TAU which consisted of supervised clinical management by psychiatric residents in an outpatient university clinic.

Work participation was the primary outcome and was measured in terms of absenteeism (average number of hours of absenteeism over previous 6 month period) and time until partial or full return to work (RTW). Secondary outcomes included depression severity (measured by the Hamilton Rating Scale for Depression, HRSD), a self-report questionnaire Inventory of Depressive Symptoms – (IDS-SR). At work functioning was measured with weekly self-report records of work efficiency on a scale of 1-10 (higher ratings for higher productivity), as well as 3 sub-scales of the Work Limitations Questionnaire (WLQ), including: output, time, mental-

interpersonal. Health related functioning was measured with 3 sub-scales of the Medical Outcomes Study-Short Form (MOS-SF 36), including: mental health, role limitations due to emotional problems, and role limitations due to physical problems. Intermediate outcomes included 'coping with work-related situations', measured with an adapted version of the Utrecht Coping List (UCL); and 'work-related self-efficacy', which was measured with a validated 11-item questionnaire on 'Expectations regarding work resumption'.

Over the 18 month follow-up period, absenteeism decreased within groups but there was no statistically significant difference between groups over time (B -3.1, 95% CI -16.2 to 10.4), p=0.64). There were also no significant group differences in time until partial RTW (HR=0.72; 95%CI 0.44-1.11; p=0.14) or time until full RTW (HR=0.93; 95%CI 0.57-1.53; p=0.79) after 18 month follow-up. Depression scores were significantly improved in the intervention group when compared to TAU (-1.5: 95% -2.8 to -0.3, p=0.03) as were depression symptom remission scores (OR = 1.8, 95% CI 1.0 to 3.3; p=0.05). 'Sustainable remission' for longer than 6 months was also more common in the intervention group (92%) compared to the TAU group (69%) (p=0.04, *effect size and CI not reported*). There were no significant group differences after 18 months in self-reported depression scores on the IDS scale (B -1.6, 95% CI -3.7 to 0.5), p=0.13). Both groups significantly decreased their work limitations, but there were no significant differences between the groups on the WLQ scales. The intervention group significantly improved their score on the mental health subscale of the HRQ scale (B (95% CI), 3.2 (-0.2 to 6.3), p=0.04) when compared to the TAU group. However there were no between group differences on either the emotional or physical role subscales of the HRQ. There were no significant between group differences for active coping or self-efficacy outcomes.

No major limitations of the study were identified.

Macedo et al 2009 [++] evaluated the effect of a targeted and comprehensive occupational therapy intervention, in 16 employees with Rheumatoid Arthritis (RA), on occupational performance and improvements on physical function, work productivity, coping and disease activity. The intervention was compared to 16 other employees that received usual care, which consisted of routine reviews by the

rheumatologist. Employees were eligible for the study if they had a confirmed diagnosis of RA, were involved in full-time/ part-time work or were self-employed, were fluent in English, lived locally, and had medium or high work disability risk on the RA Work Instability Scale (RA WIS). Participants were excluded if they were involved in other research studies, had other major comorbidities (e.g., cancer), were pending major surgery, and/ or had received an occupational therapy intervention within the past 18 months.

The occupational therapy and usual care groups did not differ with regard to age, sex, disease duration, function, work performance, coping, or disease activity. There were more full-time workers in the occupational therapy group (94% versus 6%).

The intervention consisted of 6 months of comprehensive occupational therapy, which included an individualized assessment of the employee's medical history, a work assessment, a functional assessment, and a psychosocial assessment. There was also an individualized treatment plan of 6–8 sessions and usual rheumatology care. Those in the usual care group had routine reviews by the rheumatologist where the focus of treatment was on early, aggressive medical management with a goal of achievement of remission (DAS28 score 2.6). The usual care group had no occupational therapist (OT) involvement. In both groups, medical management and rheumatology clinic visit schedules were not changed from normal practice.

Occupational performance and satisfaction, as measured by the Canadian Occupational Performance Measure (COPM) was significantly greater in the intervention group at 6-month follow-up (change scores for performance: intervention 3.10 ±2.01; control -0.28 ±1.44; change scores for satisfaction: intervention 4.08 (+/- 2.41), control 0.25(+/-2.16) (t-test for both p=0.001)). The intervention group also showed significant improvement in the remaining secondary measures compared to the control: disability index scores (p=0.02); work instability scores (p=0.04); arthritis helplessness (p= 0.02); health outcomes (p=0.02); and RA disease activity, pain scores (p=0.007). There was no difference in: the mean change in work days missed per month; arthritis impact measurement scores; or fatigue scores.

No major limitations of the study were identified. However, according to the study power calculation, 17 participants were required per group to show statistical significance and the study had only 16 per group.

Taimela et al 2008 [+] evaluated the effectiveness of an occupational health intervention for 209 employees at high risk of sick leave due to MSK related conditions. The intervention was compared to a usual care occupational health control group (n=209). Employees were eligible for the study if they were in permanent employment, aged 18-60 and had a high risk of sickness absence Employees who had been granted a disability pension (part-/full- time) were excluded. The baseline screening questionnaire was given to all participants before randomisation, and included questions on lifestyle, anthropometrics, sleep disturbances, work-related stress and fatigue, depression, pain, disability due to musculoskeletal (MSK) problems, and a prediction of future working ability. The intervention and control appeared comparable on all other baseline characteristics; however no formal statistical comparison was reported.

The intervention consisted of an initial 90 minute consultation with an occupational nurse where the employee received feedback on the screening questionnaire. Occupational health sessions ensued as needed and the nurse kept a file on the employee until the end of 1-year follow-up. The file included information such as consultation content, and any referrals made to other services or interventions (see Appendix 4 for more details) Employees in the care as usual group were free to consult their occupational nurse or physician, but they did not receive any personalised feedback on the screening questionnaire.

The overall effectiveness of this study remains unclear as the authors do not present effect sizes or significance values. After 12 months follow-up mean sickness absence in the intervention group was 11 days lower than the control group (19.3 ± 44 vs 29.9 ± 53.3; 95% CI 1 to 20). In the control group, 23% of employees had not taken any sick leave compared to 31% in the intervention. In terms of intervention uptake, 129 out of 209 employees saw the therapist; furthermore, 106 received health advice, 64 had a referral to consultation or hospital outpatient clinic, 6 referred to a group intervention at the occupational health service clinic. Of the 142

employees that visited the occupational health service, 72 had not received earlier treatment for that condition. Data from post-hoc subgroup analyses should be treated with caution given the uncertainty surrounding the primary findings. These data show that the intervention had a greater effect on employees who did not feel able to continue at their present job due to health reasons (-74 days; 95% CI -105 to -43) than for those who were uncertain about their future working ability (-4.3 days; 95% CI -18.3 to 9.7) or those who believed in their own working ability (-4.5 days; 95% CI -18.5 to 9.5). (ANCOVA $p<0.005$). Secondly, the intervention had a greater effect on employees with high level of physical impairment (-17.5 days; 95% CI -28.5 to -6.5) than for those with low level of impairment (2.5 days; 95% CI -13.5 to 18.5) with the cut-off limit C5. (ANCOVA $p<0.005$).

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [+]. Furthermore a lack of effect sizes or significance values makes it difficult to interpret the findings. The sample was mainly males, with just 6% females included, this should be taken into account in judgements about applicability.

Evidence statement 15: Effectiveness of occupational therapy based interventions

There was strong evidence from 3 RCT (2 [++] [1, 2], 1 [+] [3]) from the Netherlands, the UK and Finland that occupational therapy-based interventions may have a beneficial impact on some work-related and health-related outcomes.

1 RCT [1] [++] found no significant differences in workplace outcomes related to absenteeism, or full or partial RTW. Depression scores were significantly improved in the intervention group when compared to TAU (-1.5: -2.8 to -0.3, p=0.03) as were remission scores (OR = 1.8, 95% CI 1.0 to 3.3; p=0.05); and scores on the mental health subscale of the HRQ scale (B 3.2, 95% CI -0.2 to 6.3, p=0.04) when compared to the TAU group

1 RCT[2] [++] found occupational performance change scores (intervention 3.10 ±2.01; control -0.28 ±1.44, p=0.001) and satisfaction scores (intervention 4.08 +/-2.41, control 0.25(+/-2.16, p=0.001)) to be significantly greater in the intervention group at 6-month follow-up. There was no difference in: the mean change in work days missed per month. The intervention group also showed significant improvement in health related outcomes when compared to the control group: disability index scores (p=0.02); work instability scores (p=0.04); arthritis helplessness (p= 0.02); health outcomes (p=0.02); and RA disease activity, pain scores (p=0.007). There was no difference in arthritis impact measurement scores; or fatigue scores.

1 RCT[3] [+] found that after 12 months follow-up mean sickness absence in the intervention group was 11 days lower than the control group (19.3 days ± 44 days vs. 29.9 days ± 53.3 days; 95% CI 1 to 20). Whilst the direction of effect for all other outcomes favoured the intervention, it is unclear due to lack of effect sizes and significance values whether other between group differences are statistically significant.

Applicability: The evidence is only partially applicable to the UK because only one of the studies was undertaken in the UK. However, the interventions may be feasible in a UK-based setting.

1 Hees et al 2012 [++]

2 Macedo et al 2009 [++]

3 Taimela et al 2008 [+]

Relapse prevention interventions

Two cluster-RCTs evaluated the effectiveness of interventions focussed on relapse prevention compared to usual care in the Netherlands (Noordik et al 2013 [+], Arends et al 2014 [+]). The results of the studies were equivocal, reporting statistically significant improvements to outcomes for the control group in one and the intervention group in the second.

Noordik et al 2013 [+] evaluated the effectiveness of an 'exposure-based return to work' (RTW-E) intervention on time to full return to work (RTW) among 75 workers who were on sick leave due to common mental disorders (CMD) in the Netherlands. The intervention was integrated into usual care and consisted of gradual exposure therapy with participants being exposed to more demanding work situations structured by a hierarchy of tasks evoking increasing levels of stress, anxiety or anger. Participants were given "homework" aimed at preparing and executing (and evaluating) and exposure –based RTW plan. The intervention was compared with 85 workers also sick listed for CMD who received care as usual (CAU) which comprised guideline-directed intervention focused on problem solving activities and graded activity. Employees were eligible for the study if they were on sick leave due to CMD for ≥ 2 weeks and ≤8 weeks. The intervention and comparator were delivered by occupational physicians (n = 35).

The intervention and control appeared comparable on all baseline characteristics, no statistical comparison was reported, but the authors state that there was no statistical difference between both groups at baseline. Relevant baseline characteristics included mean age (CAU, 45.9; RTW-E 44.9); Male % (CAU, 33.3; RTW-E 24.3) and duration of sick leave before inclusion (CAU 34.1 days; RTW-E 36 days).

Time to full RTW was the primary outcome and was calculated as the number of calendar days from the first day of sick leave to the first day of full RTW. Full RTW was defined as the total number of contracted working hours per week lasting ≥28 calendar days without a recurrence of sick leave and was calculated via workers diaries and occupational physician (OP) medical records. Secondary outcomes included time to partial RTW, the number of recurrences of sick leave, symptoms of distress, anxiety,

depression and somatization (measured via 4DSQ). This study sought to measure process outcomes including compliance with the RTW-E programme (via presence [dichotomously yes/no ≥ 6 forms] and quality of completed homework assignment forms [3 point Likert scale – 0 = not in accordance with purpose of form; 2 = in accordance with form]), the frequency of consultations between a worker and OP and the reported communications between worker and his/her supervisor. Participants were followed up at 3, 6, 9 and 12 months

Over the 12 month follow–up period, the median time to full RTW differed significantly between RTW-E and CAU (p=0.02). Workers receiving RTW-E had a statistically significantly longer (p=0.02) period of time to RTW compared to workers receiving CAU (209 days, 95% CI 62-256 vs. 153 days, 95% CI 128-178). The hazard ratio (HR) of RTW-E compared to CAU was 0.55 (95% CI 0.33 – 0.89, *no p-value stated*) indicating a lower likelihood of reaching full RTW in those in the RTW-E arm. The median time to partial RTW did not differ significantly between RTW-E (78 days, 95% CI 60-95 days) and CAU (70 days, 95% CI 60-80). The HR for this difference was 0.89 (95% CI 0.62-1.29, *no p-value stated*). The mean number of recurrences of sick leave within 12 month follow up did not differ between RTW-E and CAU (p=0.96 – *no effect size or confidence interval reported*) indicating a lack of intervention impact on employee relapse. In terms of impact on health related outcomes there was a significant between group difference for Anxiety (p=0.004) for CAU over RTW. However, after adjusting for differences in the presence of mixed anxiety-depressive disorders and age, the mean anxiety change score did not differ significantly between groups (p=0.27). There were no significant difference between groups for distress (p=0.14), depressive symptoms (p=0.13) or somatization (p=0.55). Process evaluation data revealed no significant differences (p=0.07) in the mean number of consultations with OP between the RTW-E (3.9 consultations, SD 2.2) and CAU (3.4 consultations, SD 1.9). The frequency of communication with the supervisor during the first 3 months of sick leave (p = 0.74) and the satisfaction with the treatment of the OP after 9 months (p=0.99) did not differ between RTW-E and CAU.

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [+]. These included: the absence of allocation concealment of the OP's and attrition of workers through study may been a source of

selection bias. The sample attrition may have been a source of bias in the estimated median time to full RTW and the secondary outcome measures.

Arends et al 2014 [+] evaluated the effect of the 'Stimulating Healthy Participation and Relapse Prevention at work (SHARP-at work) intervention, in 80 employees who returned to work (RTW) after sickness absence due to common mental disorders (CMD) and sought to prevent recurrent sickness absence in workers in the Netherlands. SHARP-at work commenced 2 weeks post employee RTW. It involved 2 to 5, 30 minute OP consultations within 3 months post RTW and is comprises a 5 step problem solving process to empower employees to define their own problems and design solutions. The intervention was compared to 78 other employees that received care as usual (CAU) according to the Dutch context and in line with the Dutch guideline on 'Management of mental health problems of workers by occupational physicians (OP's)'. This guideline does not contain a structured approach for preventing recurrent sickness absence. Employees were eligible for the study if they were aged 18-63, employed in a paid job, had a diagnosis of a CMD given by their OP (based on ICD-10) at the start of the sickness absence period, an episode of sickness absence of at least 2 weeks and a planned RTW within 2 weeks (i.e. the intervention could begin directly when a worker started RTW). Participant exclusion criteria included having a sickness absence episode >12 months, a prior sickness absence episode due to a CMD in the past 3 months or a severe mental disorders, such as psychotic disorder or bipolar disorder and somatic complaints/disorders that would affect RTW.

The SHARP-at work and CAU care groups appeared to be different for gender, educational level and sickness absence days at baseline, and broadly comparable for other characteristics. However, no statistical test for difference was undertaken so overall comparability was unclear. The comparability of outcome measures at baseline were also unclear as the authors noted that differences in the number of recurrent sickness absence days between groups were not analysed due to skewed distributions – more than 50% of the study population had no recurrent sickness absence days.

Outcomes were measured via administrative occupational health survey data. The primary outcome measure was recurrent sickness absence days (≥30% decrease in working hours per week due to sickness absence) but due to the skewed study population distribution for this outcome it was not analysed. The differences in incidence of recurrent sickness absence between groups were examined at follow-up utilising multi-level longitudinal regression analysis. Time to recurrent sickness absence was compared across groups (using Kaplan-Meier survival analysis). Secondary outcomes included depression and anxiety (measured via Hospital Anxiety and Depression Scale), symptoms of distress, depression, anxiety and somatisation (measured via the four-dimensional symptom questionnaire [4-DSQ]), work functioning (via work role functioning questionnaire) and coping behaviour (14 item Utrecht Coping List [UCL])

The SHARP-at work group demonstrated a lower incidence of recurrent sickness absence at all follow-up points and some difference in median at the 75th percentile but no statistically significant difference was detected. A multilevel logistical regression for SHARPE-at work compared to CAU produced an adjusted Odds Ratio (OR) 0.40 (95% CI 0.20 to 0.81, *no p-value stated*) indicating a lower chance of recurrent sickness absence in SHARP-at work participants. Analyses were undertaken of the interaction between group and time at each of the 3 follow-up time points with the author stating no statistical significance detected between groups.

The SHARP-at work group demonstrated a significantly longer median number of days to recurrent sickness absence than CAU group (365 days; IQR[10] 174-365 vs. 253 days; IQR 117-365. Logrank test; p=0.003). When adjusted for confounders time to recurrent sickness absence was significantly longer in SHARP-at work group compared to the CAU group (adjusted HR:0.53, 95% CI 0.33 to 0.86). Of the secondary outcomes assed no significant differences between SHARPE-at work and CAU were identified for mental health complaints at follow-up or group x time interactions for mental complaints, work functioning and coping behaviour. However there were significant changes at 3 months for coping behaviour UCL – distraction[11]

[10] IQR – interquartile range

[11] UCL questionnaire assessed coping behaviour across 3 scales: (1) active problem focused coping, (2) emotional coping and (3) looking for distraction and decreasing tension

(mean difference: 0.78 95%CI 0.07-1.49; p<0.05), at 6 months for depression as measured by 4DSQ (mean difference: 1.08 95%CI 0.30-1.86; p<0.05) and anxiety as measured by HADS-Anxiety (1.06 95%CI 0.08-2.04; p<0.05). There were no identified significant changes across any of the secondary outcomes at 12 months.

There were some limitations identified during the review which reduced the quality score from [++] to [+] including: participants recruited to the study did not reach the predefined sample size calculation; differences in participant baseline characteristics and outcomes is a potential source of residual confounding; participants included in the study had CMD diagnosis by OP's not trained to make these diagnosis; and, participant differences for recurrent sickness absence was not outlined.

Evidence statement 16: effectiveness of interventions focused on relapse prevention

There is inconsistent evidence from 2 RCT's set in The Netherlands [+] [1, 2] on the effectiveness of relapse prevention focused intervention on workplace outcomes.

The RCTs report significant effects in different directions for workplace outcomes:

1 RCT[1] found that those receiving the intervention (RTW-E) had a longer time to RTW compared to workers receiving care as usual (CAU) (209 days, 95% CI 62-256 vs. 153 days, 95% CI 128-178. p = 0.02). Those receiving RTW-E had a lower likelihood of reaching full RTW compared to CAU (HR: 0.55 95% CI 0.33 – 0.89, *no p-value stated*) over the 12 month follow –up period. The mean number of recurrences of sick leave within the 12 month follow up did not differ between RTW-E and CAU (p=0.96 – no effect size or confidence interval reported) indicating a lack of intervention impact on employee relapse.

1 RCT[2] demonstrated a statistically significant reduced chance of recurrent sickness absence (OR: 0.40; 95% CI 0.20 to 0.81), a statistically significant longer time to recurrent sickness absence (adjusted HR: 0.53, 95% CI 0.33 to 0.86 *no p-value stated*) and a statistically significant difference in the median days to recurrent sickness absence (SHARP-at work 365 days: IQR 174-365 vs. CAU 253 days: IQR 117-365. Logrank test; p=0.003) in the SHARP-at work intervention over care as usual.

In terms of impact on health related outcomes there was no significant mean between group differences across both RCT's [1, 2] for most outcomes assessed. There was however a statistically significant difference between groups for distraction at 3 months (mean difference: 0.78 95%CI 0.07-1.49; $p<0.05$)[2], for depression (4DSQ) at 6 months (mean difference: 1.08 95%CI 0.30-1.86; $p<0.05$)[2] and anxiety (HADS-A) at 6 months (1.06 95%CI 0.08-2.04; $p<0.05$)[2] for the intervention over CAU

Applicability: The evidence is only partially applicable to the UK because the studies were was undertaken in The Netherlands.

1. Noordik et al 2013 [+]

Workplace health: support for employees with disabilities and long-term conditions

2. Arends et al 2014 [+]

4.3 Review Three: workplace ergonomics, and education, advice and support driven interventions

This section of the report contains a review of 12 studies focused on:

- Workplace Ergonomics interventions: defined as interventions that seek to reduce stress and injury and associated disorders related to overuse, bad posture and repeated tasks through designing tasks, work spaces, controls, displays, tools, lighting and equipment to fit employee's physical capabilities and limitations (The National Institute for Occupational Safety and Health 2013)
- Education, advice and support: are defined as interventions that seek to increase knowledge, which could be via leaflets and flyers, provide advice, which could be via provider led counselling and provide support which could be via follow-up meetings face-to-face or by phone, with the aim of impacting health and/or workplace outcomes.

4.3.1 Characteristics of the included studies

Full details of the included studies are given in the evidence tables in Appendix 3c. Tables 4 and 5 below shows in which country the studies were conducted, and gives a brief summary of the interventions, populations and outcomes investigated in the studies.

Table 4: Summary of included studies - Ergonomics:

Study	Participants, country and condition	Intervention	Comparator	Relevant outcomes	Quality
Baldwin et al 2012 **RCT**	Employed persons with diagnosis of RA or OA confirmed by a physician; competitive full-time or part-time employment, aged 18-61; no other significant medical or psychiatric histories. USA	Workplace ergonomics intervention: workplace assessments, work plan and a follow-up call	Written educational materials	Employment satisfaction Impact on arthritis on work performance, Role score, Pain, Physical functioning Psychological wellbeing	+

Anema et al 2007** **RCT**	Occupational therapists practice and workplace; nonspecific LBP; 8 full or partial sick leave due to nonspecific LBP lasting 2 to 6 weeks; age between 18 and 65 years The Netherlands	Two interventions assessed separately against usual care and concurrently against usual care: 1) <8weeks workplace intervention (ergonomics: assessment and modifications, case management) + usual care 2) 8 weeks: graded activity : bi weekly 1 hr exercise sessions based on operant-conditioning principles +usual care	Usual care as per Dutch occupational guideline on LBP	Sick leave duration due to LBP Pain intensity Functional status	**++**
Esmaeilzadeh et al 2014 **RCT**	Employees of the Istanbul Faculty of Medicine with work-related upper extremity musculoskeletal disorders (WUEMSDs) Turkey	3-part ergonomic intervention: 1) comprehensive ergonomic training 2) Ergonomics training brochure 3) A work station evaluation	Care as usual	Absenteeism Ergonomic exposure Musculoskeletal symptoms Medical care seeking Need for medication Functional status Health related quality of life	**+**
Larsson et al 2008 (#1*) **Prospective single group pre –post-test studies**	Public sector workplace; Women with Musculoskeletal symptoms Sweden	Ergonomic education intervention	Usual Care	Health related factors Work ability Coping strategies Coping abilities for pain	**-**

Shiri et al 2011 **RCT**	Helsinki metropolitan area; Finnish Institute of Occupational Health; upper-extremity symptoms Finland	Best current practice treatment as per Finnish occupational health service + Workplace ergonomic improvements	Usual care	Pain intensity Sickness absence Productivity loss	**+**

***** Larsson et al 2008 study featured two interventions reported separately – the ergonomics interventions is reported in this review

** Anema et al 2003 assessed two interventions separately against usual care and in combination

Table 5. Summary of included studies: Education, advice and support.

Study	Participants, country and condition	Intervention	Comparator	Relevant outcomes	Quality
Allaire et al 2005 **RCT**	Employed persons with rheumatoid arthritis, knee osteoarthritis, systemic lupus erythematosus, ankylosing spondylitis, or psoriatic arthritis who were at risk for job loss. USA	Vocational rehabilitation (VR) job retention intervention	Written materials delivered by mail	Time to job loss: permanent Time to job loss: temporary Overall satisfaction with intervention, including helpfulness of intervention, and whether participants would pay for this intervention themselves	**++**
Bevis et al 2014 **BA**	Major employer with type 2 diabetes USA	12-month wellness program for employees with type 2 diabetes or pre-diabetes – *only data from participants with confirmed diagnosis of type 2 diabetes presented*	n/a – *Before and after study*	Blood and BMI measures Presenteeism	**-**
Coole et al 2013	Employed, and expressed concern about	8 individually targeted and tailored	Group rehabilitation only:	Perceived workability	**-**

RCT	ability to work due to LBP Clinic, home or workplace. UK	vocational sessions	multidisciplinary rehab focused on self-management of back pain	Mood Disability Fear avoidance related to work Self-efficacy Pain	
Van Oostrom 2010 **RCT**	Employees on sick leave for 2-8 weeks and meeting distress criteria, measured by the 4DSQ questionnaire. The Netherlands	Participatory workplace intervention – 7 steps lasting approx. 6 weeks	Care as usual	Lasting RTW Stress-related symptoms	**+**
Karjalainen et al 2004 **RCT**	Employees (25-60 year old) with current daily low back pain (with or without sciatica) which had made working difficult for more than 4 weeks but less than 3 months Finland	Physician/ physiotherapist led intervention (with or without an added worksite visit)	Care as usual - No examination or work visit but all participants (in all groups) given a leaflet on low back pain. Employees were free to seek their own treatment	Back-pain related sick leave Self-rated pain intensity (scale 0-10) Frequency and bothersome-ness of pain Interference of pain with daily life Oswestry disability index (ODI) Health related quality of life (HRQL)	**++**
Karlson et al 2010 **RCT**	Employees on sick-leave at least half-time for 2-6 months from a previously healthy state Southern Counties of Sweden	Work-place orientated intervention: Screening, questionnaires and interview with employees and employers	Usual Care	Sickness absence: Sick leave post CDM Degree of sick leave	**+**
Bernaards et al 2007	Computer workers from seven Dutch companies; neck	2 intervention groups:	Care as usual – in line with Dutch guidelines	Degree of recovery Pain intensity	**++**

RCT	and upper limb symptoms The Netherlands	1) Work style (WS) group - six group meetings in a six month period that take place at the workplace – general information, awareness raising and discussions on behaviour change 2) work style group and physical activity (WSPA)		Disability Number of days with neck and upper limb symptoms Number of months without neck and upper limb symptoms	

* Larsson et al 2008 study featured two interventions (numbered #1 and #2) reported separately – the ergonomics interventions is reported in this review (Larsson et al 2008a)

4.3.2 Study findings

Intervention types

This review identified 12 studies that evaluated a range of interventions to improve job related and health related outcomes. Five studies were included that focused on 'ergonomics': Four RCT's (Baldwin et al 2012 [+]; Esmaeilzadeh et al 2014 [+]; and Shiri et al 2011 [+]; Anema et al 2003 [++][12]) and one prospective single group pre – post-test (Larsson et al 2008 #1 [-]).

Seven studies were included that focused on 'education, advice and support': Six RCTs (Allaire et al 2005 [++], Coole et al 2013 [-]; Van Oostrom et al 2010 [+]; Karjalainen et al 2004 [++]; Karlson et al 2010 [+]; Bernaards et al 2007 [++]) and one before and after study (Bevis et al 2014 [-]).

Ergonomics

Ergonomics assessment and subsequent work plan

[12] Anema et al (2003) was a stepped intervention which included graded activity with a workplace assessment, work plan and workplace modification. The study analysed the workplace assessment intervention by itself and also ran an analysis of the combined effect with graded activity.

Workplace health: support for employees with disabilities and long-term conditions

Three RCTs evaluated the effectiveness of interventions that focus on delivery of an ergonomics assessment and subsequent work plan compared with usual care (Esmaeilzadeh et al 2014 [+]; Shiri et al 2011 [+]), and a resource manual and telephone contact with an occupational therapist (Baldwin et al 2012 [+]) on work related and health outcomes. The studies provided inconsistent findings for workplace and health outcomes.

Esmaeilzadeh et al 2014 [+] evaluated the effectiveness of an ergonomic intervention on absenteeism and other health-related measures for 35 computer workers with work-related upper extremity musculoskeletal disorders (WUEMSS) in the Istanbul Faculty of Medicine, Turkey. The intervention consisted of 3 parts: 1. comprehensive training including 2 × 90 minute theoretical and practical sessions (groups of 20); 2. an ergonomics brochure with information on office ergonomics and preventative measures; 3. a work station evaluation with teaching on how to make adjustments and monthly follow-ups to re-evaluate the work-station. The intervention was compared with 34 employees with the same symptoms who had care as usual and who received the intervention once the study was complete. Employees were eligible for the study if they were: aged 18-60; were in full time employment for at least 1 year; diagnosed with WUEMSS as defined by the National Institute for Occupational Safety and Health case definition criteria and had symptoms within the past 12 months; minimum of 3 hours computer work daily or more than 40 hours weekly. Parts 1 and 3 of the intervention were delivered by the investigators who were trained in ergonomics. The intervention and control groups were comparable across all sociodemographic characteristics and baseline outcome measurements.

At baseline and at the end of the 6 month follow-up, employees were asked to carry out a series of self-report measures on ergonomic exposure and intensity and duration of musculoskeletal symptoms. They were also asked about the number of days needed in the previous 3 months for medical care, medication, and absenteeism according to the following categories: never, 1-7 days-8-14 days, 15-28 days, more than one month. Functional status was measured by self-report questionnaire ‘upper extremity function scale’ and health related quality of life was measured using 2 scales of the SF-36 (mental and physical components).

By the end of the 6 month follow-up, there were no significant differences between groups for absenteeism (p = 0.48), medical care seeking (p = 0.123), and medication (p = 0.098). However, the intervention group's MSD symptoms were significantly different to the control in both duration scores ([I] change mean -0.1, SD 0.4; [C] 0.1, SD 0.5, p<0.001) and intensity scores ([I] change mean -0.3, SD 0.5; [C] 0.1, SD 0.4, p<0.001). The groups differed significantly in functional status (p = 0.001) with the intervention group scores decreasing slightly (change mean -0.0, SD 0.5) and the control group scores increasing slightly (change mean 0.3, SD 1.1). There were also significant group differences in health-related quality of life, in both the physical component ([I] change mean 0.1, SD 0.2; [C] -0.0, SD 0.2 p<0.001) and the mental health component ([I] change mean 0.1, SD 0.3; [C] -0.0, SD 0.1, p=0.035).
There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [+]. These included: all outcome measures were self-reported, small sample size, research was conducted in place of work of the researchers so they were testing their colleagues, short follow-up period, missing outcome data not accounted for in the per protocol analysis, knowledge of allocated interventions was not concealed.

Shiri et al 2011 [+] evaluated the effectiveness of a workplace-focussed ergonomic intervention in 89 employees with upper extremity MSD symptoms in the Helsinki metropolitan area on sickness absence, pain intensity, interference with work, and productivity loss. The intervention combined best current practice as per the Finnish occupational health service with an employer/physician telephone discussion and a physiotherapist worksite visit. During the worksite visit, the occupational physiotherapist conducted an ergonomic assessment and discussed suggestions with the employer and the employee in order to increase the employee's possibility of continuing to work. The intervention was compared to 84 employees who received care as usual from the Finnish occupational health service. Employees were eligible for the study if they were aged 18-60, seeking medical advice due to upper-extremity symptoms, with symptoms lasting less than 30 days prior to medical consultation, and if immediate sick leave was not required. There were no significant differences between the control and intervention group with respect to age, gender, smoking, BMI and job strain.

Pain intensity was measured via an interview at baseline and by an internet questionnaire at 2, 8, 12, and 52 week follow-up. Sickness absence data from the occupational health services and employment data from the administration of each workplace were collected and reviewed 12 months after recruitment. In a linked paper with findings from the same study, Martimo et al 2010 report other outcomes such as self-assessed productivity loss (due to upper extremity MSD symptoms) at 8 weeks and 12 weeks (further details are outlined in appendix 3c) . Proportion, magnitude and change in productivity loss are also reported from baseline to 12 week follow-up. Covariates included physical load factors measured by interview at baseline and job strain measured by job content questionnaire at baseline.

During 12 month follow-up, there were no significant differences between groups for the percentage of employees taking sick leave taken due to *upper extremity MSD symptoms only.* There was also no difference when combined with sick leave data for other MSD symptoms. Within the 4-12 month follow-up period however, the percentage of employees taking sick leave *due to any MSD* (diagnosed by a nurse) was significantly lower in the intervention group ([I] 1.1% vs [C] 8.3%; p=0.02) as was the total number of days ([I] mean (SD) 0.03 (0.3) vs [C] 0.32 (1.2); p=0.02). A separate subgroup analysis looking at age indicated that the percentage of employees taking sick leave *due to any MSD* was significantly lower in the intervention group for older participants only (aged 47-64) (percentage of employees [I] 32.1% vs [C] 20.2%; p=0.07). Any subgroup analysis should be interpreted with caution due to the study being substantially underpowered (205 subjects needed in each group).

At 8 week follow-up, the proportion and magnitude of productivity loss were lower in the intervention group compared to the control, but this difference was not significant (p values 0.17 and 0.42 respectively). At 12 weeks follow-up however, the proportion of productivity loss was lower in the intervention group (25%) compared to control (51.3 %) (p= 0.001) as well as magnitude of productivity loss ([I] mean (SD) 6.8 (17.4) vs [C] 18.4 (25.7); p=0.001).

There were some limitations identified during the review which reduced the quality score from a [++] to a [+] including: study was substantially underpowered to detect

true effect of intervention, lack of participant and physician blinding, differences at baseline in outcome measures, indicators of contamination in the control group.

Baldwin et al, 2012 [+] evaluated a workplace ergonomic intervention to improve arthritis related workplace difficulties in 48 people with rheumatoid arthritis (RA) or osteoarthritis (OA) who were in full- or part-time employment. The intervention was compared with a group of 41 people with RA or OA who received a resource manual and telephone contact with the occupation therapist. People with significant medical or psychiatric histories were not eligible for the study. The two groups were comparable on sociodemographic characteristics at baseline measurement. However, significantly more participants in the control group reported less arthritis-related physical symptoms and pain ($p < 0.03$) at baseline. However this difference was adjusted for in the analyses, and is not a source of bias in the reported findings.

The intervention consisted of two 2.5 hour workplace sessions with an occupational therapist (OP) with a background in arthritis care and ergonomics. The first assessment included an interview to determine specific job tasks and difficulties, plus observation and photographing of tasks by the OP. The impact of arthritis on job performance/functioning was assessed, and an ergonomic assessment of the work environment completed. An individual intervention plan was then developed. This was reviewed at the second session in which the employee's supervisor was invited to participate. The plan provided a summary of the job assessment, photographs of areas of concern and recommendations to manage impairments (e.g. methods to establish routines and workflow, including body mechanics and exercises, workstation and equipment modifications, person specific recommendations such as orthoses, lifestyle changes).The opportunity for a follow-up call one month later to modify the plan was available where required. Intervention participants also received: a resource manual supplied with guidance on self-management of arthritis and ergonomic interventions in the work setting (the same resource manual as the control group); education and information about arthritis, local resources, work-related resources and regulations; and job-related risks, job-specific guides and modifications.

Outcome data were collected at 12 and 24 months post intervention on: job satisfaction, the impact of arthritis on work performance, and psychological

wellbeing. At 12 months there were no significant differences between the groups on any outcomes. However at 12 months the intervention group reported improvements in job satisfaction ($p<0.01$); at 24 months the intervention group reported less arthritis-related impact on their vocational functioning ($p < 0.03$); at 12 and 24 months the intervention group reported improvements in physical symptoms ($p<0.04$; $p<0.01$), pain ($p<0.01$); and declines in control of job satisfaction ($p<0.01$).

No major limitations of the study were identified, and it was down-graded on quality to + rather than ++ due to not reporting outcome data collected at 3 and 6 months.

Evidence statement 17: Effectiveness of ergonomic interventions that focus on delivery of an ergonomics assessment and subsequent work plan

There is inconsistent evidence from 3 RCTs set in Turkey [+] [1], USA [+] [2] and Finland [+] [3] on the effectiveness of ergonomic interventions that focus on delivery of an ergonomics assessment and subsequent work plan on workplace and health outcomes.

In terms of sick leave, 2 RCTs[1], [3] did not find any significant effect of the intervention on absenteeism[1], [3] or proportion of employees taking sick leave[3].

In terms of work-related performance measures, 1 RCT[2] did not find any significant effect of the intervention on work performance or job satisfaction. However 1 RCT[3] found that, after 12 weeks follow-up, 25% of those receiving the intervention reported productivity loss compared to 51.3% receiving care as usual. The magnitude of this productivity loss was also lower for those receiving the intervention ([I] mean (SD) 6.8 (17.4) vs [CAU] 18.4 (25.7); p=0.001). For the same RCT[3] over the 12 month follow-up, fewer employees took sick leave due to any MSD (diagnosed by a nurse) compared to the control group ([I] 1.1% vs [C] 8.3%; p=0.02) and for a smaller amount of time ([I] mean days (SD) 0.03 (0.3) vs [C] 0.32 (1.2); p=0.02).

For further measures that could relate to work performance, 1 RCT[1] found that the functional status of those receiving the intervention actually decreased slightly (change mean -0.0, SD 0.5; median -0.2 (IQR -0.7-2.0)), compared to those receiving usual care where functional status increased slightly (change mean 0.3, SD 1.1; between group difference p=0.001). Despite reduced functional status, ergonomic outcomes were found to be significantly improved for the intervention group compared to the control, including postural abnormality (change mean [I] -0.5, SD 0.5; [C] 0.2, SD 0.6; p<0.001) and improper location scores (change mean [I] -0.4, SD, 0.6; [C] 0.2, SD 0.9; p<0.002).

In terms of symptom severity, 1 RCT[1] found that after 6 months follow-up, those receiving the intervention experienced an improvement in both the duration and intensity of their MSD symptoms compared to those who received CAU (duration scores: [I] change mean -0.1, SD 0.4; [C] 0.1, SD 0.5, p<0.001; and intensity scores: [I] change mean -0.3, SD 0.5; [C] 0.1, SD 0.4, p<0.001). Another RCT[2] found that

those receiving the intervention reported significantly less arthritis-related impact on their vocational functioning ($p<0.03$) at 24 month follow-up.

Applicability: The evidence is only partially applicable to the UK because the studies were undertaken in Turkey, USA and Finland.

1. Esmaeilzadeh et al 2014 [+]

2. Baldwin et al 2012 [+]

3. Shiri et al 2011 [+]

Ergonomics assessment, subsequent work plan and work place modifications:

One RCT (Anema et al 2007 [++]) evaluated the effectiveness of an intervention focussed on ergonomics assessment, subsequent work plan and work place modification on workplace outcomes. The study had a unique study design (outlined in the narrative below) which included a stepped intervention approach which exposed some participants to a graded activity intervention. This has been examined in this review where the study analysis considers the additional effect of the additional graded activity intervention to the ergonomic intervention vs. ergonomic intervention[13]. This study also had three relevant linked publications the findings of which are also considered in the narrative summary. The study indicated an observed significant change in sick leave duration. No significant effect was observed for functional status or pain over usual care. The addition of graded activity did not produce any observed difference in effect over usual care for sick leave duration, functional status or pain

Anema et al 2007 [++] evaluated the effectiveness of a workplace (n=96) and graded activity (n=55)[14] intervention in employees on full or partial sick leave for non-specific back pain on sick leave duration (return to work), pain intensity and functional status due to lower back pain. The interventions were delivered concurrently and coordinated by an occupational therapist and delivered by an 'ergonomist'[15]. The workplace intervention was delivered up to 8 weeks and consisted of ergonomic assessment, workplace modifications and case management in addition to usual care. If participants had not returned to work at 8 weeks they were randomised again into a graded activity intervention or usual care. The graded activity intervention consisted of bi-weekly 1hr exercise session based on operant conditioning principles in addition to usual care. Employees were eligible for the study if they were aged 18-65 years on full or partial sick leave for non-specific lower back pain nonspecific lasting 2 to 6 weeks; seeking medical advice due to upper-extremity symptoms. There were no statistically significant differences outlined for

[14]Graded activity related findings are reported in review 2

[15] Ergonomist was used to describe a group of professionals that work in occupational health services including occupational health nurses

baseline outcome measures between both interventions and control. The baseline demographics differed between ergonomics intervention and control for age and gender ($p<0.05$) with no differences identified for graded activity

The intervention was compared against 157 employees with non-specific lower back pain usual care as per the Dutch occupational guidelines on lower back pain which comprised worker visits to occupational physician's office at two weeks, physical examination and a subsequent intervention which could include occupational physician delivered education and/or advice.

There are three linked papers: two with findings from the same study a) Steenstra et al 2006 which reports more specifically on the graded activity intervention at 12, 26 and 52 weeks outlining findings on functional status, pain and return to work outcomes; and b) Steenstra et al 2009 which presents findings from a post-hoc sub-group analysis to detect possible moderators of treatment focused on the ergonomics intervention. Steenstra et al 2009 also presents findings of an analysis of the effect of ergonomics and graded activity against usual care. One study Anema et al 2003 undertook a process evaluation with 35 participants. All ergonomic relevant findings will be reported in this narrative.

The primary outcomes were sick leave duration (return to work) due to lower back pain, pain intensity and functional status measured at 12, 26 and 52 weeks follow-up.

A univariate analysis outlined a significantly lower median number of days until return work from the ergonomics vs. usual care ([I] 77 days [median; IRQ, 56–126 days] vs. Usual care 104 days [median; IRQ, 56–166 days]; log-rank test; $p=0.02$). A subsequent regression analysis produced an adjusted hazard ratio (adjusted for graded activity, workers functional status and job control) 1.7 (95% CI 1.2 – 2.3; $p=0.003$). There were no observed statistical differences found between intervention and usual care for functional status or pain at 12 months.

For the combined effect of ergonomics intervention with graded activity, a univariate analysis identified no observed statistical difference over usual care (143 days [median; IQR, 108–250 days] vs. usual care 126 days [median IQR, 83–171 days], log-rank test; $p=0.49$). A regression analysis also did not identify any observed statistical difference over usual care (HR [adjusted] 0.7 (95% CI, 0.3–1.2, $p>0.05$).

There were no observed statistical differences found between ergonomics with graded activity and usual care for functional status or pain at 12 months.

A sub-group analysis (Steenstra et al 2009) observed a greater effect of the ergonomics intervention over usual care in workers aged ≥44 (HR: 2.5 95%CI 1.6-4.1; p=0.02) vs workers aged <44 HR: 1.2 95%CI 0.8-1.8), those who had taken sick leave in the previous year (HR 2.8 95%CI 1.7-4.9, *no p-value*)

The process evaluation (Anema et al 2003) identified a significant association between solutions work design and organisation with planned short – term intervention (p<0.02). Implementation was significantly lower in the industrial sector with significantly fewer solutions planned compared to the health and service sectors (p<0.001). A significant relationship between ergonomists satisfaction about the effectiveness of the intervention and compliance to the protocol was observed (p<0.05). Ergonomists flagged technical and organisational difficulties, workers disabilities, high physical workload and workers financial situation as barriers to implementation. Ergonomists identified making an inventory of problems and solutions with workers and employers; and the commitment to prioritisation of ergonomic solutions of the worker and of the supervisors as key motivating elements in the process of the intervention

There were some limitations identified during the review for example the lack of blinding, the stepped intervention approach and randomisation but none that were sufficient to downgraded the quality of the study [++].

Evidence statement 18: Effectiveness of ergonomic interventions that focus on delivery of an ergonomics assessment, subsequent work plan and workplace modifications

There is strong evidence from 1 RCT set in The Netherlands [++] [1] on the effectiveness of ergonomic interventions that focus on delivery of an ergonomics assessment, subsequent work plan and workplace modifications on workplace outcomes.

1 RCT[1] observed a significant effect of the ergonomic intervention on median number of days until return to work ([I] 77 days [median; IRQ, 56–126 days] vs. usual care (104 days [median; IRQ, 56–166 days]; log-rank test; p=0.02) and adjusted hazard ratio (adjusted for graded activity, workers functional status and job control) 1.7 (95% CI 1.2 – 2.3; p=0.003).

There were no observed statistical differences found between intervention and usual care for functional status or pain at 12 months.

1 RCT[1] observed no statistical difference between ergonomics intervention with the addition of graded activity over usual care for median days until return to work, and functional status or pain at 12 months

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in The Netherlands.

1. Anema et al 2007 [++]

Ergonomics intervention that focus on education only

One prospective single group pre –post-test (Larsson et al 2008 #1 [-]) evaluated the effect of group-based ergonomic and psychosocial education on workplace and health outcomes. There was an observed statistical difference for some workplace outcomes which should be treated with caution due to lack of observed change in the median score presented at follow-up. There were also observed statistical differences for health outcomes.

There were statistically significant benefits to some work related outcomes at 12 months for intervention participants in both groups. Whilst, participants in one study[1] also experienced statistically significant improvements across all mental health measures at 6 and 12 months follow-up, participants in the other study reported improvements in health outcomes that were not statistically significant[2].

Larsson et al 2008 #1 [-] evaluated the effectiveness of an education-focussed ergonomics intervention on work ability among 21 women who were experiencing musculoskeletal symptoms in Sweden. The 2 week intervention aimed to promote health and work ability by improving the following: self-management skills, coping with pain at work, ergonomic knowledge, and preventative knowledge about work environment factors in order to make adjustments. The intervention was delivered in groups of 5 by a physical therapist at the occupational health service. The group met at 2 monthly 3 hour sessions and received education about ergonomic and psychosocial work issues and the practice of 'stretch-and-flex' breaks, physical activity and relaxation. There was no control group in this study[16]. Employees were eligible for the study if they were female, employed by the public sector, experiencing MSD symptoms and working at least part-time at the time of baseline measurement.

All outcome measures were collected by self-report questionnaires at baseline, 10 weeks, and 9 month follow-up intervals. Work ability was assessed by 10 questions covering 7 items of the Work Ability Index (WAI). Health related factors such as general health, severity of symptoms, and mental strain were measured using a self-

[16] This study did contain a 'comparator' but this was a different intervention (comprehensive self-efficacy intervention – which is reported in in 'education, advice and support'. This study does not undertake a comparative analysis, providing only within group difference.

report questionnaire. Coping strategies in working life were measured on 3 scales taken from the Copenhagen Strategies Questionnaire. Coping abilities for pain were assessed by a single item from each of the 8 subscales in the Coping Strategies Questionnaire.

For the WAI outcomes, belief in work ability decreased from baseline (median 7, range 1-7) to at 10 weeks follow-up (median 4, range 1-5), but then increased again by 9 month follow up (median 7, range 1-7), this change over time was significant (p=0.046). For the rest of the subscales, there was no change over time for work ability relative to the following: lifetime best, physical demands, mental demands, diagnosed diseases, work impairment, sickness absence, and psychological wellbeing.

From baseline to the 9 month follow-up, there was no change in any of the general health measures, including symptom severity (p=0.924), state of health (p=0.782), and mental strain (p=0.169). There was also no change in any of the coping in relation to work scales (problem-focussed coping, p=0.714; selective coping, p=0.109; resigning coping, p=0.542). For the coping abilities for pain scales however, there were significant improvements over the 9 months follow-up for the positive distraction subscale (baseline median score (range): 2.5 (0-4.5); 9 months 3.5 (2.5-4.5); p=0.002) and the ignoring pain subscale (baseline median score (range): 3.5 (0-5); 9 months 4.2 (1.5-5.5); p=0.048). Physical strain in work also demonstrated significant improvement over 9 months follow-up (baseline median score (range) 12 (6-15), to 10 weeks 12 (6-16), to 9 months 12 (6-16) p=0.044). Self-efficacy in relation to pain also improved in the short-term after 10 weeks (baseline median score (range): 3 (2-6); 10 weeks 4 (3-6); p=0.040) however scores decreased after 10 weeks and the improvement was not significant at 9 month follow-up (p=0.071).

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [-]. These included: single group with no control, small sample size, self-selecting sample, no blinding, and a 25% drop-out rate with no adjustment for missing data. This study also only focused on women which may affect its wider applicability.

Evidence statement 19: Effectiveness of ergonomic interventions that focus on an educational element only.

There was weak evidence from one prospective single group pre –post-test set in Sweden [-] [1] on the effectiveness of ergonomic interventions that focus on an educational element only.

After receiving the intervention, participants' belief in their work ability decreased after 10 weeks and then increased again by 9 months follow up (p=0.046). However this finding should be interpreted with caution given the uncertainty around the data reported. There were no changes to any other work ability measures over the 9 month follow-up period.

There was no change in self-reported general health over the 9 month follow-up period, nor was there any change in self-reported coping strategies in relation to work. However, participants did experience some improvement in coping abilities in relation to pain, in terms of increased positive distraction (p=0.002) and ignoring the pain (p=0.048). Self-efficacy in relation to pain also improved in the short-term after 10 weeks (p=0.040) however the improvement was not sustainable at 9 month follow-up (p=0.071).

Participants 'Physical strain at work' median values (range) did not appear to change from baseline (12 [6-15]), at 10 weeks (12 [6-16]) and 9 months (12 [6-16]) but the analysis observed a statistical difference between baseline and at 9 month follow-up (p=0.044). However this finding should be interpreted with caution given the uncertainty around the data reported

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in Sweden.

1. Larsson et al 2008 #1 [-]

Education, advice and support

Seven studies were included that focused on 'education, advice and support': Two RCTs evaluated 'vocational rehabilitation' (Allaire et al 2005 [++], Coole et al 2013 [-]); one before and after study evaluated a 12 month wellness programme (Bevis et al 2014 [-]); One RCT evaluated a participatory workplace intervention (Van Oostrom et al 2010 [+]); One RCT evaluated a physician/ physiotherapist led intervention with or without an added worksite visit (Karjalainen et al 2004 [++]); One RCT evaluated a workplace –orientated intervention focused on screening, questionnaires and interviews with employers and employees (Karlson et al 2010 +-]) and one RCT evaluated work style group based session providing general information, raising awareness and undertaking discussion to change behaviour (Bernaards et al 2007 [++]).

Allaire et al 2005 [++] conducted an RCT in the USA to evaluate a multicomponent vocational rehabilitation (VR) job retention intervention in people with rheumatoid arthritis, knee osteoarthritis, systemic lupus erythematosus, ankylosing spondylitis, or psoriatic arthritis who were at risk for job loss. The intervention was compared with a group which received written educational materials. People with plans to retire or move from the area within the following 2 years were not eligible for the study. There were 122 participants in the intervention group and 120 in the comparison group. The two groups were comparable on sociodemographic characteristics and functional limitation scores at baseline measurement (mean age 49.49 years, 81% female, 93% were white, mean functional limitation score of participants was 0.54 (SD = 0.43) which is in the mild limitation range for persons with rheumatoid arthritis (range was 0-1.70.).

The intervention had three components: (a) identification of work barriers and solutions, (b) vocational counselling and guidance, and (c) education and self-advocacy. It was delivered by one of two rehabilitation counsellors who conducted the intervention in meetings which lasted approximately 1.5 hours. (Additional time was available if desired). Barriers in the workplace, in commuting, and in the individual's home were identified and prioritized. The counsellor then suggested

potential solutions and discussed their feasibility with participants, and an action plan was drawn up. Where the participant desired, a job evaluation of barriers was conducted in the workplace and, counsellors could contact an employer on a participant's behalf. Counsellor and participants also evaluated the individual's long' term job person match in light of the impact of his or her rheumatic disease. Where problems were foreseen, possible job alternatives, requirements, and relevant resources were identified so the individual could begin the process of changing job or career. In the education and self-advocacy component, the counsellors provided participants with information about their disability, related employment legal rights and responsibilities, such as the employee's responsibility to request accommodation when needed and guidance regarding disclosure issues. They also conducted a skill training exercise with participants to increase their ability to request a job accommodation in an appropriate manner. Finally, counsellors gave participants copies of pamphlets and flyers about how to manage health related employment problems and available resources and discussed the information with them. This information was also provided to the comparison group.

Outcome data was collected 48 months post-intervention on: Time to job loss (permanent or temporary); and overall satisfaction with intervention (including helpfulness of intervention, and whether participants would pay for this intervention themselves). There were 73 permanent or temporary job loss events in the full sample over 48 months of follow-up: Intervention group n =25, control group n =48. In Poisson regression analysis the experimental group had a 49% (CI 17-69%) reduction in the number of permanent and temporary job losses when compared to the control group. This difference was significant (p=0.007).

The intervention group were significantly more satisfied with the intervention and found it to be more helpful than the comparison group ($p<0.001$). 81% of the intervention group said that they would have been willing to pay for the intervention in comparison to 52% of the control group (no analysis of significance was presented on this outcome). No major limitations of the study were identified.

Evidence statement 20: Vocational support

There was strong evidence from 1 RCT [++]1 from the USA that a multicomponent vocational rehabilitation (VR) job retention intervention can significantly reduce job loss events in the intervention group when compared to a comparison group receiving educational leaflets only (p=0.007) after 48 months; and that participants will be highly satisfied with the intervention.

Applicability: The evidence is only partially applicable in the UK because the study was conducted in USA, however the intervention may be feasible in a UK-based setting.

1 Allaire et al 2005 [++]

Coole et al 2013 [-], conducted a pilot RCT with 59 employees, to examine the feasibility and effectiveness of an individual work support intervention, alongside group rehabilitation for employees with lower back pain (LBP), compared to group rehabilitation alone. This UK study included a population who, expressed concern about their ability to work due to LBP, and had been offered group treatment by the referring rehabilitation team.

Participants in both the intervention and control group received a multi-disciplinary group rehabilitation intervention. It was delivered in 10 weekly 2-3 hour sessions, and covered self-management of back pain comprising education and physical conditioning using a cognitive behavioural approach. The intervention group also received individually targeted and tailored vocational support sessions from an occupational therapist with a background in back-pain management. Consultations took place in an agreed location (either the workplace, clinic or home). A maximum of eight consultations of up to 90 minutes, over a 16 week period could include: identifying barriers to pain management in the workplace; assessment of work tasks and environment; tailored work focused interventions; and, communication with employers and healthcare practitioners.

The authors acknowledge that the study was underpowered to support statistical analysis and within group results were presented with, no attempt made to analyse the level and significance of between group differences. The authors reported that the intervention group had ‘better’ outcome scores than the control group for: perceived workability, as measured by the Work Ability Index question 1; reduced fear and work avoidance, as measured by the Fear-Avoidance Beliefs Questionnaire; and, reduced pain (VAS Pain scores). The control group were reported to have ‘better’ outcome scores than the intervention group for: perceived workability (Graded Reduced Work Ability Scale); disability (Roland and Morris Disability Questionnaire); perceived self-efficacy; and, both anxiety and depression (Hospital Anxiety and Depression Scale). These findings should be interpreted with caution given the limitations of the study, and viewed only as a general direction of effect.

There were major limitations to this study including high loss to follow up. Of 59 participants randomly allocated, only 19 in each group were available for analysis at 6 months follow up. No details of participants who were lost to follow up were

reported, or accounted for in the analyses, baseline characteristics of the participants were not clearly reported, and there appear to be group differences in age, gender and education. Only 8 intervention group participants received workplace visits.

Evidence statement 21: Rehabilitation focused intervention

There was weak evidence from 1 pilot RCT [-] from the UK that an individual work support intervention, alongside group rehabilitation for employees with (LBP), compared to group rehabilitation alone did not significantly improve measures of perceived work ability, anxiety and depression, pain or self-efficacy.

Applicability: The evidence is applicable in the UK given its UK-based setting.

1. Coole et al 2013 [-]

Educational support interventions

Two studies evaluated the effectiveness of educational support interventions. One did so against usual care in The Netherlands in employees with neck and upper limb symptoms (Bernaards et al 2007 [++]) and the other had no control due to study design but considered employees with type 2 diabetes (Bevis et al 2014 [-])

Bernaards et al 2007 [++] evaluated the effectiveness of an advice-based intervention for 152 computer workers with neck and upper limb symptoms in 7 Dutch companies. The intervention involved 6 group meetings held at the workplace over a 6 month period, which were supervised by a specially trained counsellor. Four of the meetings were an hour in length and were held in larger groups (10 people); these meetings provided general information, raised awareness about work style, and gave the opportunity to discuss and find solutions to general barriers to behaviour change. The final 2 meetings were smaller in group size and offered tailored advice based on stages of change regarding work style as well as further discussing barriers.

The intervention was compared to 158 employees with the same symptoms who received usual care as set out in the Dutch Guidelines for occupational health management of workers with complaints in arm, shoulder and neck. Employees were eligible for the study if they had frequent or long-term neck and upper limb symptoms in previous 6 months and/or last 2 weeks, worked at the computer at least 3 days a week for at least 3 hours a day. The intervention and control groups were comparable on all sociodemographic characteristics.

Primary outcome measures included self-rated reports on degree of recovery (7 point scale), pain intensity scales, disability (change in ability to work, interference of pain on daily activities in past 4 weeks), number of days with neck and upper limb symptoms, and number of months without symptoms. Secondary outcomes included self-reported body posture and workplace ergonomics, phase of behavioural change, health care use. All outcome measures were taken at 6 months and 12 month follow-up.

There was no significant difference between the intervention and control groups for degree of recovery at both 6 months (Odds Ratio I vs C: 1.99 (95%CI 0.93-4.29)) and 12 months (OR 1.73 (95%CI 0.75-3.99)). There was also no significant difference between groups for disability at work at both 6 months (OR 0.70 (95%CI

0.33; 1.50)) and 12 months (OR 0.64 (95%CI 0.28; 1.47)). There were observed significant difference between groups for current pain (OR -0.645 (CI95% -1.24 to -0.05) p<0.05), average pain (OR -0.607 (95%CI -1.17 to -0.04) p<0.05), worst pain (OR -0.807 (CI95% -1.50 to -0.12) p<0.05) at 12 months but not at 6 months. There were no observed statistical differences between intervention and control for number of days with pain symptoms at 6 or 12 months.

In terms of secondary outcomes there was no observed statistical increase in self-reported physical activity although total physical activity increase in both groups. The use of health care system decreased significantly (p<0.01) in the intervention (18%) vs. control (38%). Individuals actions to reduce neck and upper limb symptoms after 6 months was reported as significantly different (*significance not reported*) via 'ergonomic changes' (25.6% control vs 72.2% intervention) and 'body posture and workplace adjustments' (24.1% control vs 57.9% intervention), increases in physical activity at work (12% control vs. 23.3% intervention), leisure time physical activity (22.6% control vs. 34.6%) and searching for information on work stress /work demands (5.3% control vs. 9.8% intervention). No major limitations of the study were identified.

Bevis et al, 2014 [-] evaluated a 12 month workplace wellness programme intervention for employees with type 2 diabetes or pre-diabetes. For the purposes of this review, only data on the participants with a confirmed diagnosis of type 2 (T2) diabetes was considered. The two groups received substantially different interventions and authors presented the data separately.

This was a before and after study, where there was no separate control group for comparison. People who had a diagnosis of type 1 diabetes, who had either a medical condition or hypercritical lab result which make them unsuitable intervention participants (as decided by the clinical judgement of the University of Florida, Division of Endocrinology) were excluded from the study. Women who were pregnant or lactating at the time of the study were also not eligible for the study.

For the included group of individuals with a diagnosis of T2 diabetes (n=151), 56% were male, the average age was 53, and the mean BMI was 34.

Workplace health: support for employees with disabilities and long-term conditions

The intervention consisted of an initial welcome meeting followed by a 12-month programme. In the initial welcome meeting, participants were made aware of existing employer-supported health programs in the workplace, including: on-campus network of walking trails and biking paths; an on-campus fitness centre; a program for healthy daily eating at the employee cafeterias; two weight loss programmes; and a variety of smoking cessation programmes. In addition, free glucometer test strips were made available.

The 12-month programme was divided into quarters. During the first quarter, four 2-hour educational sessions were given by a certified diabetes nurse educator, where attendance of at least two sessions was required for retention in the program. These were (1) about diabetes: introduction; (2) about diabetes: lifestyle changes for good health; (3) diabetes: nutrition; and (4) diabetes: a healthy daily management program.

Outcomes were measured post-intervention, these included: HbA1c, cholesterol, BMI and presenteeism. Post-intervention, participants registered significant improvements in HbA1CC ($p \leq 0.0001$), BMI (<0.005), and presenteeism ($P<0.0001$). There were major limitations to this study given that it was a single-group pre- post-test study without a different control group.

Evidence statement 23: Group based sessions providing general information, raising awareness and undertaking discussion

There was moderate to weak evidence of effectiveness from 1 RCT[1] [++] in The Netherlands and 1 before and after[2] [-] study from the USA for interventions providing group based sessions for employees with neck and upper limb symptoms[1] and type 2 diabetes[2]

One RCT[1] observed no statistical improvements for intervention over control for degree of recovery, disability at work and number of days with pain symptoms at 6 and 12 months. There were observed statistical improvements for current pain (OR -0.645 (CI95% -1.24 to -0.05) p<0.05), average pain (OR -0.607 (95%CI -1.17 to -0.04) p<0.05), worst pain (OR -0.807 (CI95% -1.50 to -0.12) p<0.05) at 12 months but not at 6 months.

One before and after[2] study observed that a 'wellness programme' significantly improved percentage glycated hemoglobin (HbA1c, %) at 6 (p<0.0001) and 12 months (p<0.0001); BMI at 12 months (p<0.005, CI -1.02 to 0.22) and presenteeism at 12 months (p<0.0001)

One RCT[1] observed a statistically significant decrease in the 'use of the health care system' (p<0.01), an increase in 'individuals actions to reduce neck and upper limb symptoms' after 6 months via 'ergonomic changes' and 'body posture and workplace adjustments', increases in physical activity at work, leisure time physical activity and searching for information on work stress /work demands (*significance not reported*).

Applicability: The evidence is only partially applicable the UK because the studies were undertaken in The Netherlands[1] and USA[2], however, the intervention may be feasible in a UK-based setting.

1. Bernaards et al 2007 [++]

2. Bevis et al 2014 [-]

Participatory workplace intervention

Two studies evaluated participatory workplace interventions against care as usual in Sweden (Karlson et al 2010 [+]) and The Netherlands (Van Oostrom et al 2010 [+]) in sick listed employees with distress.

Karlson et al 2010 [+] evaluated the effectiveness of a 'workplace orientated intervention' for participatory workplace intervention for 74 employees on sick leave for work-related burnout for 2-6 months sick-listed employees with distress and on sick leave for 2-8 weeks in Sweden

The intervention intended to reduce job-person mismatch through patient-supervisor communication and consisted of questionnaires and interviews focused on work situation, reasons for and events leading up to employee sick leave with employees and employers, a 1-day employee examination, employer and employee dialogue meeting, half day seminar for employers and employee – all facilitated by a combination of researchers, senior physicians, psychologists and social workers.

The intervention was compared to 74 employees, who received treatment as usual in Sweden. Employees on sick-leave related to private life stress, post-traumatic stress or sick-leave from conflicts or bullying at work currently engaged in legal conflict with their employer were excluded from the study. The intervention and control groups were selected from a social insurance register via a screening process, with the control group made up of those who were uninterested in receiving the intervention. Subsequently baseline characteristics of the control group were not taken but control and intervention groups were matched on previous sick leave, age and gender but no statistical measure of difference was present.

The primary outcome was sickness absence measured via sick leave post dialogue meeting (week 0) up to 80 weeks and the degree of sick leave as a percentage of ordinary working time.

Return to work increased in both groups at 18 months follow-up. The return to work patterns were more stable in the intervention group (linear contrast: X^2 (1) = 26.07,

p<0.0001)) vs. control (quadratic contrast: χ^2 (1) = 7.48, p = 0.006) which increased and then decreased.

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [+]. These included: a lack of concealment in allocation to study arms, a lack of clarity regarding similarities between intervention and control participants baseline characteristics, an absence of baseline outcome measures for the control group and a high risk of selection bias as the intervention group 'agreed to participate' (indicating a strong inclination to engage and return to work) whereas the control were not interested.

Van Oostrom et al 2010 [+] evaluated the effectiveness of a participatory workplace intervention for 73 sick-listed employees with distress and on sick leave for 2-8 weeks in The Netherlands

The intervention was described as a 'participatory workplace intervention' which involved 7 steps lasting approximately 6 weeks. These steps included employee referral to a return to work coordinator, inventory of barriers to return to work drawn up with employee, employer and coordinator, discussion of solutions, implementation planning, implementation and coordinator checks.

The intervention was compared to 72 employees, who received care as usual in the Netherlands. Those currently engaged in legal conflict with their employer, working less than 12 hour week, pregnant, unable to complete the questionnaire in Dutch and reporting any other episode of sick leave within one month before current episode were excluded from the study. The intervention and control groups appeared comparable across all sociodemographic and outcome characteristics including age, gender diagnosis and length of sick leave although no statistical measure of difference was present and the sample was predominately male.

The primary outcomes were lasting return to work measured in calendar days from randomisation until at four weeks return to work, and presence of stress related symptoms measured by 4DSQ.

There was no significant differences between intervention and control groups with regards to lasting return to work at the 12 month follow-up period (median days intervention vs control: 96 [IQR 52-196] vs. 104 [IQR 52-195]; HR 0.99 [95%CI 0.70-

1.39] p=0.95). A post hoc analysis was undertaken with employees who at baseline intended to return to work despite symptoms, which demonstrated an observed statistical intervention effect over usual care at 12 months follow-up (median days intervention vs control: 55 [IQ27-89] vs. 120 [47-198]; HR 2.05 [95%CI 1.22-3.45] p=0.01). The results of the post hoc analysis should be interpreted with caution.

There was no significant between group differences between intervention and control groups for stress-related symptoms (measures of distress, depression, anxiety and somatisation) at the 12 month follow-up period. There were observed significant within group differences ($p<0.01$)

Total number of days of sick leave between intervention and control did not demonstrate an observed statistical difference at 12 month follow-up (p=0.88)

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [+]. These included: a lack of clarification regarding differences between intervention and control participants baseline characteristics and outcome measures; the loss to follow-up reduce the sample to below the required sample size outlined in the power calculation; employers, occupational health physicians and researcher were not blinded to allocation; the sample was predominately male; some outcome measures (behavioural measures) were taken with scales not validated for the return to work context and the main finding of the study is based on sick leave measures interacting with behaviour measures.

Evidence statement 24: physician/physiotherapist led intervention

There is moderate evidence of effectiveness from 1 non-RCT [+][1] in Sweden and 1 RCT [+][2] in The Netherlands for participatory workplace intervention for employees with work-related burnout and stress on return to work and stress related symptoms.

In terms of return to work measures, 1 non-RCT[1] found that return to work increased over time for all participants, but at 18 months follow-up the return to work patterns were more stable in those receiving the intervention (linear contrast: X^2 (1) = 26.07, p<0.0001)) vs. those receiving treatment as usual (quadratic contrast: χ^2 (1) = 7.48, p = 0.006) which increased and then decreased. In 1 RCT[2], over the 12 month follow-up period there appeared to be no main effect of the intervention on time to lasting return to work (median days intervention vs control: 96 [IQR 52-196] vs. 104 [IQR 52-195]; HR 0.99 [95%CI 0.70-1.39] p=0.95). However, a post hoc analysis indicated a significant difference for intervention over control in employees who at baseline intended to return to work despite symptoms (median days intervention vs control: 55 [IQ27-89] vs. 120 [47-198]; HR 2.05 [95%CI 1.22-3.45] p=0.01). The same intervention[2] had no effect on total days' sick leave.

In terms of stress-related symptoms, 1 RCT[2] did not find any significant effect of the intervention on measures of distress.

Applicability: The evidence is only partially applicable to the UK because the studies were conducted in Sweden and the Netherlands, however the intervention may be feasible in a UK-based setting.

1. Karlson et al 2010 [+]

2. Van Oostrom et al 2010 [+]

Physician/physiotherapist led intervention

One study evaluated a physician/ physiotherapist led intervention which focused on advice provision for employees and included interviews, examinations, discussions, advice and feedback for employees (Karjalainen et al 2004 [++]) in Finland with lower back pain (LBP).

Karjalainen et al 2004 [++] evaluated the effectiveness of advice-based intervention on sick leave and other pain related measures for 51 employees with low back pain in Finland. The intervention began with an initial interview and examination by a physician which lasted 1 hour in total, during this session working conditions and examination results were discussed and the employee was introduced to the psychiatrist/psychotherapist who offered further advice on staying active. After a 1.5 hour session with the physiotherapist where activities were assessed and exercises advised, there was a worksite visit by the physiotherapist which included the employer, employee, company nurse and occupational physician where additional advice was given if needed. Throughout the process, the physician sent feedback to the GP, who then coordinated treatment, and the employer was encouraged to continue liaising with the company physicians. The intervention was compared with 57 employees with the same symptoms who received care as usual and a leaflet on low back pain. Participants were eligible for the study if they were aged 25-60 and have current daily low back pain which had made working difficult for more than 4 weeks but less than 3 months. The intervention and control group were comparable on all sociodemographic characteristics.

Outcomes included sick leave due to back pain and several self-rated scales on pain and health including pain intensity (scale 0-10), frequency and 'bothersomeness' of pain, interference of pain with daily life, Oswestry disability index (ODI), health related quality of life (HRQL). All outcomes were measured at 3, 6, 12 and 24 months follow-up.

At 24 month follow-up, there was no significant difference between groups for the amount of sick leave taken (mean (range) [I] 45 (0-610), [C] 62 (0-630), p=0.133). Nor was there any significant differences in pain intensity scores (between group test 0.10 (95%CI -0.84 to 0.64); p=0.781), 'bothersomeness' of pain in previous week (between group test 0.71 (95%CI 0.38 to 1.32); p=0.284), pain interference with daily

life (between group test 0.71 (95%CI 0.38 to 1.32); p=0.284), ODI scores (between group test -0.42 (95%CI 5.02 to 4.18); p=0.857), and HRQL scores (between group test 0.003 (95%CI 0.019 to 0.024); p=0.802). There was an indication of a difference between groups for the proportion of employees experiencing daily symptoms, (between group test 0.52 (95%CI 0.26 to 1.02); p=0.059), with the decrease in proportion over time being larger in the control group than the intervention group, where fluctuations in proportions can be seen (see appendix 3c).
No major limitations of this study were identified.

Evidence statement 25: physician/physiotherapist led intervention

There was strong evidence from 1 RCT set in Finland [++] [1] on the effectiveness of an 'advice-based intervention' for employees on sick leave with lower back pain.

At 24 month follow-up, there was no observed significant difference between groups for the amount of sick leave taken (mean (range) [I] 45 (0-610), [C] 62 (0-630), p=0.133).

At 24 month follow-up there were no observed significant differences across all self-rated pain and health scales.

Applicability: The evidence is only partially applicable in the UK because the study was conducted in Finland, however the intervention may be feasible in a UK-based setting.

Karjalainen et al 2004 [++]

4.4 Review Four: Multi-component interventions

This section of the report contains a review of five studies focused on multi-component interventions

For the purposes of this review, 'multi-component' interventions were defined as interventions with several different components where there was a clear 'dominant' component to the intervention and where any effect of the intervention cannot be clearly attributed to a single component.

4.4.1 Characteristics of the included studies

Full details of the included studies are given in the evidence tables in Appendix 3d. Table 6 below shows the country in which the studies were conducted, and gives a brief summary of the interventions, populations and outcomes investigated in the studies.

Table 6: Summary of included studies: multi-component interventions.

Study	Participants, country and condition	Intervention	Comparator	Relevant outcomes	Quality
Holopainen et al 2004 **Uncontrolled before and after**	Finnish Air Force maintenance personnel, MSK symptoms causing sick leave of at least 60 days in previous 2 years Finland	Vocationally Oriented Medical Rehabilitation (VOMR) - Two parts; phase 1 lasted 12 days and phase 2 was held 6 months later and lasted 5 days	n/a – *Before and after study*	Physical strain, mental strain, neck pain, back pain Sick leave days in previous 6 months Physiotherapy days in previous 6 months Exercise breaks during work (days per week) General physical exercise	-

				(times per week)	
Arnetz et al 2003 **RCT**	Employees with musculoskeletal disorders Sweden	Interview, assessment and workplace visit	Treatment as usual	MSD Symptoms Days to rehabilitation Days to rehabilitation plan Rehabilitation costs Sick days Self-related health	+
Lambeek et al 2010 **RCT**	Primary care – employees with LBP lasting more than 12 weeks be on (partially) sick leave The Netherlands	Participatory ergonomics with graded activity	Care as usual	Sick days	++
Grossi et al 2009 **Controlled before and after**	Public sector – sick listed employees in the public sector Sweden	Multicomponent stress treatment intervention	Standard individual treatment programme offered by the municipal company healthcare	Sick leave Burnout RTW rates Self-reported depression scores Physiological outcomes including change in LDL/HDL	+

				and Glycated haemoglobin	
Larsson et al 2008 (#2) **Prospective single group pre – post-test studies**	Public sector workplace; Women with Musculoskeletal symptoms Sweden	Ergonomic education intervention	Usual Care	Health related factors Work ability Coping strategies Coping abilities for pain	-

4.4.2 Study findings

Intervention types

Five studies are included in this section of the report. Each of the five multi-component interventions are different therefore making synthesis difficult. As such the findings of these studies are reported individually. There are two RCTs (Arnetz et al 2003 [+]; Lambeek et al 2010 [++]; one CBA (Grossi et al 2009 [+]); one uncontrolled before and after (Holopainen et al 2004 [-]) and one prospective single group pre –post-test (Larsson et al 2008 #2 [-]). Four of the studies focused on employees with or on sick leave due to MSK (Arnetz et al 2003 [+]; Lambeek et al 2010 [++]; Holopainen et al 2004 [-]; Larsson et al 2008 #2 [-]), with one study focused on those with severe stress (Grossi et al 2009 [+]).

Comprehensive self-efficacy and physical activity intervention

Larsson et al 2008 #2 [-] evaluated the effectiveness of a comprehensive self-efficacy intervention on work ability among 21 women who were experiencing musculoskeletal symptoms in Sweden. The 10 week intervention aimed to improve individual self-efficacy, priority-making, self-reflection, empowerment, coping skills, physical activity patterns and insight into one's own life situation.

The intervention was delivered in groups of 10 by a psychologist. The groups met weekly for a 3 hour session over a 10 week period. They participated in group discussions and self-reflection with educational sessions provided by specialists in physical activity, diet, psychological stress, strain, mental training, work environment factors, insurance factors and social insurance liability. They also participated in 2-3 hours of individually tailored and supported physical activity per week at a training centre and an individual practice in the life and work situation for an additional 6 months with a follow-up session at 6 months

Employees were eligible for the study if they were female, employed by the public sector, experiencing MSD symptoms and working at least part-time at the time of baseline measurement.

All outcome measures were collected by self-report questionnaires at baseline, 10 weeks, and 9 month follow-up intervals. Work ability was assessed by 10 questions covering 7 items of the Work Ability Index (WAI). Health related factors such as general health, severity of symptoms, and mental strain were measured using a self-report questionnaire. Coping strategies in working life were measured on 3 scales taken from the Copenhagen Strategies Questionnaire. Coping abilities for pain were assessed by a single item from each of the 8 subscales in the Coping Strategies Questionnaire.

For the WAI outcomes: workability index scores increased from baseline (median 28, range 17-47) to at 10 weeks follow-up (median 31, range 20-49), and at 9 months (median 34, range 20-48) this change over time was significant (p=0.028). Workability physical demands scores demonstrated significant changes at 10 weeks (p=0.021) and at 9 months (p=0.012) with the median score at baseline being 3 (1-5), at 10 weeks being 3 (2-5), and at 9 months being 3 (2-5). Work impairment demonstrated a significant change at 10 weeks (p=0.047) with the median score at baseline being 2 (1-6), at 10 weeks being 2 (1-5). For the rest of the subscales, there was no change over time for work ability relative to the following: lifetime best, belief in workability, mental demands, diagnosed diseases, sickness absence, and psychological wellbeing.

From baseline to the 9 month follow-up, there was an observed change for the severity of symptoms at 10 weeks (p=0.023) but no change in any of the other

general health. There was also no change in any of the coping in relation to work scales or self-efficacy in relation to pain scales.

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [-]. These included: single group with no control, small sample size, self-selecting sample, no blinding, and 25% drop-out rate with no adjustment for missing data.

Evidence statement 26: Effectiveness of comprehensive self-efficacy and physical activity intervention.

There was weak evidence from 1 uncontrolled before and after study set in Sweden [-] [1] on the effectiveness of a comprehensive self-efficacy and physical activity intervention.

After receiving the intervention, participants' work ability index scores increased significantly at 9 months follow up (p=0.028), and their work impairment significantly changed at 10 weeks (p=0.047). However this finding should be interpreted with caution given the uncertainty around the data reported. There were no changes to any other work ability measures over the 9 month follow-up period.

There was no change in self-reported general health over the 9 month follow-up period, nor was there any change in self-reported coping strategies in relation to work. However, participants did experience a significant decrease in the severity of their symptoms at 10 weeks (p=0.023) however the improvement was not significant at 9 months (p=0.113)

Participants workability physical demands' median values (range) did not appear to change from baseline (3 [1-5]), at 10 weeks (3 [2-5]) and 9 months (3 ([2-5]) but the analysis observed a statistical difference between baseline and 10 weeks (p=0.021) and at 9 month follow-up (p=0.012). However this finding should be interpreted with caution given the uncertainty around the data reported.

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in Sweden.

1. Larsson et al 2008#2 [-]

Multicomponent stress management intervention

Grossi et al 2009 [+] evaluated the effectiveness of a stress management intervention for 12 female public sector employees on sick leave with severe stress in Sweden. The intervention was compared with 12 female employees on sick leave for the same purposes, who received the standard stress treatment programme offered by the municipal company healthcare system. To be eligible for the study, employees were required to have fulfilled the criteria for 'Reaction to Severe Stress' according to the International Classification of Diseases. The authors do not give details of any exclusion criteria. Participants were comparable on all sociodemographic characteristics and duration of illness (ranging from 1-3 years, mean 1.8 years).

The intervention had multiple components, consisting of standard care with additional group therapy, courses and consultations. The standard care was a stress treatment programme delivered by physicians, nurses, psychologists, wellness consultants, and physiotherapists. Treatment strategies included information provision about stress, medication for sleep disorders and depression, psychotherapy, physical exercise, and workplace rehabilitation. The programme is delivered with the corporation of the employers, trade unions, and the Social Insurance Agency. As well as receiving standard care, the intervention group took part in 1-2 individual consultations with the course leader where an assessment was made on potential stressors, coping resources, personality dispositions etc. The course leader was a licenced social worker and behavioural scientist. The intervention group then split into 2 groups of 6 and took part in a complimentary group therapy programme for 3 months (standard care stopped) which aimed to teach how to identify, understand and handle psychological signs of stress. The group met for half a day each week to share experiences, practice relaxation, and to attend theory lessons delivered by behavioural scientists, an ergonomist, and a wellness consultant. After 12 weeks, each participant had an individual session with the physician, course leader, immediate supervisor at work, personnel consultant, and social insurance officer, where rehabilitation was discussed. There was also a follow-up at 12 months.

Work-related outcome measurements included sick leave, burnout, RTW. No significant differences were found between the intervention and control group for sick leave, sickness benefits or return to work. However, the degree of sick leave significantly decreased in both groups between 1 and 3 years post treatment (intervention: $z=-2.41$, $p<0.05$; control: $z=-2.17$, $p<0.01$). By 5 year follow-up, the degree of sick leave had decreased again for both groups (intervention: $z=-3.20$, $p<0.01$; control: $z=-2.06$, $p<0.05$). For both groups, the proportion of employees on sickness benefits increased over time, as did the proportion in gainful employment.

Physiological and other health-related outcomes were assessed, such as glycated haemoglobin, self-report depression, total cholesterol, and triglycerides. No significant differences were found for any of the physiological outcome measures, however there were significant within-group differences over time. Both the intervention and control groups showed significant increases in glycated haemoglobin at post treatment, 6 and 12 month follow-ups. There were also no significant differences between groups for stress scores. However at 6 month follow-up, the intervention group had significantly lower depression scores ($F(2, 23) = 6.10$, $p<0.05$; Cohen's $d= 0.91$) and lower burnout scores ($F(2, 23) = 4.80$, $p < 0.05$; Cohen's $D = 0.82$) compared to the control group. These between-group differences were not present at 12 month follow-up.

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [+]. These included: a lack of randomisation and blinding, small sample size (lack of power to detect findings), sample was exclusively female.

Evidence statement 27: Effectiveness of multicomponent stress management intervention

There was moderate evidence from 1 controlled before and after study [+] [1] from Sweden that a multicomponent stress treatment intervention for those on sick leave with severe stress had inconsistent significant effects on work and health outcomes when compared to standard care.

When compared to standard care, the intervention showed no significantly different effect on sick leave, sickness benefits, or return to work throughout the 12 month follow-up period. All participants (regardless of experimental group) experienced significant drops in sick leave days taken, increase in sickness benefits and increased percentage in gainful employment. Similarly, all participants experienced significant increases in glycated haemoglobin, with no significant between-group differences. There were no differences observed (between or within group) for measures of high density lipoprotein, total cholesterol, triglycerides, and immunoglobin levels.

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in Sweden

1. Grossi et al 2009 [+]

Multi-component workplace interventions focused on interview, assessment and workplace adjustments

Arnetz et al 2003 [+] evaluated the effectiveness of a multi component early workplace intervention focussing on interview, assessment and adjustment, on return to work for 65 employees with musculoskeletal disorders (MSD) in Sweden. The intervention was delivered by a 'case manager' from the Swedish National Insurance Agency. It combined a semi-structured interview with the employee and worksite visits which involved the employer and the occupational therapist. Ergonomic assessments were performed and improvements introduced as well as conflict resolution between employer and employee to resolve any psychological issues. If necessary, the case manager assisted the employer in completing the rehabilitation investigation (a mandatory requirement in Sweden). If needed,

employees in both intervention and control could also receive vocational training directly at work from an ergonomist – those in the intervention were provided with a training schedule designed to adapt work tasks and allow for a gradual increase in workload. The intervention was compared with 72 employees also with MSDs who received care as usual which comprised of the same rehabilitation investigation from the employer but with no additional support from the National Insurance Agency case manager. Employees were eligible for the study if they were diagnosed with a first or recurrent MSD; no exclusion criteria were reported. The intervention and control were comparable on all baseline characteristics.

The primary outcomes were sick leave days, measured at 6 and 12 month follow-up. Whether the employer submitted the mandatory rehabilitation investigation to the National Insurance Agency was also recorded, along with how long it took to receive the submission (measured from first day of sick leave) and the amount of time it took for the National Insurance Agency to complete a rehabilitation plan. Various self-rated health ranking was undertaken throughout the follow-up period using a 5-graded response scale.

After 6 months of the intervention, employees in the intervention group had taken on average significantly fewer sick leave days than the control group ([I] 110 days (SD 6.5) vs [C] 131.1 (SD 5.9), $p<0.05$). This was also the case after 12 months ([I] 144.9 days (SD 11.8) vs [C] 197.9 (SD 14.0), $p<0.01$). The control group were significantly more likely to be on sick leave compared to the intervention group at 6 months (odds ratio 1.9, 95% CI = 1.0-3.6, $p=0.06$) and at 12 months (odds ratio 2.5, 95% CI not reported, $p<0.01$).

By the end of the 12 month follow-up period, a significantly higher proportion of employers of participants in the intervention group had submitted their mandatory rehabilitation investigation to the National Insurance Agency ([I] 84.6% vs [C] 27.8%, $p<0.05$) as well as taking less time to do so following the first day of sick leave ([I] 59.4 days (SD 5.2) vs [C] 126.8 (SD 19.2), $p<0.01$). Similarly, the National Insurance Agency took a smaller amount of time to produce a rehabilitation plan for the intervention group compared to control ([I] 49.4 days (SD 2.5) vs [C] 183.5 (SD 19.1), $p<0.0001$). There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [+]. These included: lack of

randomisation during allocation (employees were allocated intervention or control based on timing of visit to the Agency), at baseline the intervention group were more likely to be of the belief that they could influence things in order to return to work, there is a conflict of interest in that one of the lead authors is the owner of the ergonomics firm that was used in the intervention, and the authors have not reported on loss to follow-up.

Evidence statement 3: Effectiveness of multi-component workplace interventions focused on interview, assessment and workplace adjustments

There is moderate evidence from one prospective control trial set in the Sweden [+][1] which suggests that a nurse-based psychological intervention comprised of an interview between key actors, a workplace visit, workplace, physical and psychosocial assessment, ergonomic improvements and vocational training, significantly reduced mean sick leave days taken after 6 months ([I] 110 days (SD 6.5) vs [C] 131.1 (SD 5.9), $p<0.05$) and 12 months ([I] 144.9 days (SD 11.8) vs [C] 197.9 (SD 14.0), $p<0.01$); and reduced the likelihood of being on sick leave at 6m (odds ratio 1.9, 95% CI = 1.0-3.6, $p=0.06$) and at 12 months (odds ratio 2.5, 95% CI not reported, $p<0.01$)

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in Sweden

1. Arnetz et al 2003 [+]

Multi-component workplace interventions focused on interview, assessment and workplace adjustments

Holopainen et al 2004 [-] evaluated the effectiveness of a vocationally oriented medical rehabilitation intervention on work ability and pain measures in 20 male employees of the Finnish Air Force maintenance personnel. The intervention was developed and organised by the Finnish Air Force alongside a Finnish rehabilitation centre, and consisted of 2 phases. Phase 1 lasted 12 days and Phase 2 took place 6 months later and lasted 5 days. In brief, both phases consisted of group lectures, exercises, assessments, nutrition advice, fitness tests, clinical examinations,

massage, and individual feedback. For more specific details and a breakdown of each phase, see appendix 3d. This was an uncontrolled before and after study, therefore there was no comparator group. Employees were eligible for the study if they had been in their role for at least 3 years, had a motivation to work, MSD symptoms causing sick leave of at least 60 days in previous 2 years. If employees had any other conditions that prevented rehabilitation, they were not eligible for the study. The participants had a mean age of 36.9 (SD 4.5) and had worked for an average of 14.6 years (SD 5.1).

All outcome measures were taken at baseline, 6 months and 5 years follow-up. The primary outcomes were sick leave days and physiotherapy days both taken in the previous 6 months, self-report questionnaires (VAS) on both physical and mental strain, and both neck and back pain. Exercise levels were also measured by self-report both in terms of 'exercise breaks during work' measured in days per week, and 'physical exercise' measured in times per week.

Over the follow-up period, sick leave taken in previous 6 months significantly decreased from baseline (mean 4.6, SD 6.6) to 6 month follow-up (mean 1.2, SD 3.9) and to 5 year follow-up (mean 0, SD 0) (within-group difference $p<0.05$). Self-reported back pain was also found to significantly change over the follow-up period, with scores dropping from 3.4 (SD1.9) at baseline to 1.1 (SD1.0) at 6 months, however by 5 year follow-up scores were slightly elevated again at 1.8 (SD 2.2) (within-group difference $p<0.01$). Employees were also found to take significantly more exercise breaks during work, rising from 0.1 days per week (SD 0.3) at baseline to 2.4 days (SD 2.1) at 6 months and 2.6 days (SD 2.4) at 5 year follow-up (within-group difference $p<0.01$). There were no significant differences over time for the rest of the outcome measures.

There were some limitations identified during the review which resulted in this study being downgraded from a [++] to a [-]. These included: lack of control group, small sample size and no power calculation (study likely to be underpowered for any statistical comparison to be meaningful), high risk of selection bias as study was voluntary to those who had motivation to work and be rehabilitated, lack of generalisability to people outside the Finnish Royal Airforce.

Evidence statement 4: Effectiveness of multi-component workplace interventions focused on interview, assessment and workplace adjustments

There was weak evidence from 1 uncontrolled before and after study [-] [1] from Finland that a vocationally oriented rehabilitation intervention for those with MSD symptoms had significant effects on health and work outcomes.

The study demonstrated that after receiving the multicomponent intervention, sickness absence decreased significantly at both 6 month and 5 year follow-up ($p<0.05$). Self-reported back pain was also found to significantly decrease from baseline to 6 month follow-up and then stay relatively stable at 5 year follow-up ($p<0.01$). Finally, exercise breaks during work were found to significantly increase over the 5 year follow-up period ($p<0.01$). It is worth noting that this study had a small sample size and was likely to be underpowered for any statistical comparison to be meaningful.

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in Finland. However, the interventions may be feasible in a UK setting.

1. Holopainen et al 2004 [-]

Multi-component workplace interventions focused on participatory ergonomics and graded activity

Lambeek et al 2010 [++] evaluated the effectiveness of a multi component workplace intervention focused on a parallel integrated programme of participatory ergonomics and graded activity on duration of time off work and sustainable return to work for 66 employees who had visited an outpatient clinic with low back pain (LBP) in The Netherlands. Both the participatory ergonomics and graded activity interventions involved and delivered by a team consisting of clinical occupational physician, a medical specialist, an occupational therapist, and a physiotherapist. The participatory ergonomics intervention consisted of initial workplace observations, ranking of RTW obstacles and a subsequent consensus based plan. The graded activity intervention was undertaken over three sessions involving functional capacity

testing, individual graded activity programmes focused on teaching patients that, despite pain, moving is safe while increasing activity level based on CBT principles. The intervention was compared with 68 employees also with LBP who received care as usual from their medical specialist occupational physician, GP and/or health professional. Employees were eligible for the study if they were diagnosed with a first or recurrent MSD; no exclusion criteria were reported. The intervention and control were comparable with no statistically different on all baseline characteristics and outcomes.

The primary outcome was duration of time off work until full RTW measured at 3, 6 and 12 month follow-up. Secondary outcomes included intensity of pain and functional status. Prognostic factors for the duration of sick leave were also measured including work related psychosocial factors and data on workload.

The intervention demonstrated a significantly shorter median duration until return to work over usual care (88 days [IQR 52-164 days] vs. 208 days [99-366]; p=0.003) with Kaplan-Meier curves outlining a significant differences between the intervention and usual care (p=0.004) for absence from regular or similar work. The intervention also demonstrated a statistically significant effect over usual care on RTW (hazard ratio 1.9, 95% CI1.2 to 2.8, p=0.004). At 12 months the intervention demonstrated significantly lower median number of days of sick leave over usual care (82 [IQR 51 to164 days] vs. 175 [IQR 91 to 365], p=0.003). The intervention also demonstrated a significantly improved functional status over usual care (between group difference −2.86 [95%CI−4.9 to −0.9] p=0.01). There were no observed statistical differences for the improvement on pain outcomes.

There were some limitations identified during the review for example the lack of blinding and the use of patient self-report sick leave information but none that were sufficient to downgraded the quality of the study [++].

Evidence statement 5: Effectiveness of multi-component workplace interventions focused on participatory ergonomics and graded activity

There is strong evidence from one RCT set in The Netherlands [++] [1] which suggests that a nurse-based psychological intervention comprised participatory ergonomics and graded activity statistically reduced the duration until RTW over usual care (88 days [IQR 52-164 days] vs. 208 days [99-366]; p=0.003) and RTW (hazard ratio 1.9, 95% CI1.2 to 2.8, p=0.004). At 12 months the intervention significantly lowered the median number of days of sick leave over usual care (82 [IQR 51 to164 days] vs. 175 [IQR 91 to 365], p=0.003) and significantly improved functional status over usual care (between group difference −2.86 [95%CI−4.9 to −0.9] p=0.01).

Applicability: The evidence is only partially applicable to the UK because the study was undertaken in The Netherlands

1. Lambeek et al 2010 [++]

5 Discussion

5.1 Strengths and limitations of the review

The scope of this review is employees with long-term conditions or disabilities who are on 'short-term sickness absence'. Several condition- and disability-specific searches of the peer- reviewed literature and a systematic review of reviews, as well as issuing a call for evidence were undertaken. The initial chronic conditions and disability-specific approach to analysing and presenting the identified evidence was changed to an intervention led approach in discussion with the NICE committee. This approach was adopted in reaction to a paucity of evidence identified on disabilities and conditions other than MSK and CMD and the collective thinking regarding the usefulness of a more practice-based approach to the development of this particular guideline.

The process of screening at both title and abstract, and at full paper was a complicated process. A number of factors across the review protocol lay on a continuum and were not categorical. For example the definition of what constituted a ‘workplace’ intervention. This was particularly difficult for multi-component studies, where the workplace element was one of many components. If an intervention did not have sufficient employer input, which could be in terms of employer referral, the use of the workplace as the site for intervention delivery or employer funding or consultation, it was deemed to not be ‘workplace’ enough. This review adopted an inclusive approach at title and abstract but often a lack of sufficient detail regarding intervention content, location of implementation, employee referral and employer involvement meant that many of these studies were subsequently excluded at full paper screening.

The review identified a number of different interventions and these were grouped together under themes based on an assessment and NICE technical team agreement. These included physical activity interventions, active leave interventions, remote interventions, hospital based interventions, occupational therapy, relapse prevention, self-care or self- management interventions, talking therapy interventions, ergonomics, education advice and support and multi-component interventions. It is recognised that these intervention themes are open to interpretation and could be configured differently. Overall the quality of studies were

moderate + (n=24), high ++ (n=13) and low - (n=7). The interventions focused for the most part on MSK which included arthritic conditions, lower back pain, chronic pain and CMD which included stress, burnout and mild to moderate depression. Some studies (n=3) were identified that addressed what the study termed 'chronic diseases' and 2 studies focused on cancer and diabetes

A number of limitations were identified that moved studies from a ++ to a + or -. These included:

- Many studies lacked detail regarding the blinding of participant, providers and assessors or any measures to reduce the potential impact of the identified lack of blinding
- Some study designs did not involve randomisation during allocation of experimental group
- Some studies had major loss to follow-up and wide confidence intervals around effectiveness estimates indicating a possible bias to findings.
- In some studies the use of usual care was in the control of the employees and was not accounted for in the analysis. This may have lessened control interventions effect – leading to more favourable effects in the intervention.
- In some studies sample sizes were documented as small and follow-up brief.
- Some studies had an overrepresentation of certain ethnicities and participants from certain locations. This potentially limits the external validity of study findings
- In some studies participants were not restricted to intervention and control intervention, and were allowed to utilise other primary care, specialty care, behavioural health programs and/or standard EAP services – this is a potential source of confounding
- Some studies did not report a power calculation – with some studies highlighting that the sample may have been too small to detect impact of the intervention (under-powered).
- Some study interventions comprised multiple components within them making disaggregating the contributing effect of component parts difficult.

- Some studies were flagged as being at risk from possible selection bias introduced by methods of recruitment and a lack of information in methodologies

5.2 Applicability

Most studies were undertaken in Scandinavian countries and the Netherlands with only 4 of the studies (Coole et al 2013; Phillips et al 2012; Macedo et al 2009; Bee et al 2012) included in the review were conducted in the UK. This may limit the applicability of the findings due to differences in national healthcare set up, workplace sickness absence polices, drivers for the reduction of workplace absence and sick leave, intervention funding streams and service delivery models. For example, most studies were undertaken in countries with comprehensive workplace health systems, including mandatory actions for employers and funding and legislation to support people to return to work. The UK's Fit for Work, Access to Work and Fit Note programmes provide some support, but are very different from these workplace health systems. It is also noted that the structure of occupational health systems in other countries varies. Countries such as Australia and the US place responsibility for care and sickness with the individual. Countries such as Norway, Sweden and the Netherlands have varying levels of state intervention. This includes sick pay from national insurance-style contributions, with varying degrees of responsibility placed on the employer. (Both types of system seek to return the person to work as soon as possible.)

5.3 Gaps in the evidence

There was a very limited amount of evidence identified that met the inclusion criteria that related to chronic conditions other than common mental health conditions (CMD), or musculoskeletal conditions (MSK). There was no identified evidence regarding workplace interventions for disabled people. No evidence was found for chronic conditions that have a greater prevalence in ethnic minority populations. We had planned to answer a question on the impact of deliverer, setting, timing, frequency, duration and intensity of the intervention(s) on the effectiveness and acceptability of different interventions. However no direct evidence was found and due to the heterogeneity between interventions we were not able to assess this

question in the evidence review. If information on subgroups was given in the study, we have reported it in the evidence review. However, little data was found. The consideration of non-comparative, longitudinal and qualitative studies may have yielded more evidence. For example, such studies may have provided data on disabled people and those with conditions other than musculoskeletal or common mental health problems. In addition, they may have provided information on why a particular intervention or approach worked. But they would not necessarily have addressed the primary question raised in the scope of the review: 'what works for employers to support employees to return to or stay in work?'

No evidence was found for what was predefined in the review protocol as an ‘organisational intervention’ (see appendix 1). However some of the interventions outlined could be considered as having an ‘organisational impact’ for example, buying equipment to reduce the impact of lower back pain for one person could be described as 'organisational', in that it could potentially help someone else with back pain in the future within the same organisation. There was also lack of studies with suitably sized samples and power to detect the presence or absence of effect, a lack of long-term (at least 12 months) follow-up to determine effectiveness

6 Glossary

AOR	Adjusted odds ratio
BA	Before and after study
BMI	Body Mass Index
CBA	Controlled before and after study
CI	Confidence interval
CMD	Common mental disorder
CT	Controlled trial
LTC	Long term condition
MSK	Musculoskeletal disorder
NRCT	Non-randomised controlled trial
OR	Odds ratio
OA	Osteoarthritis
RA	Rheumatoid Arthritis
RCT	Randomised controlled trial
RR	Risk ratio
RTW	Return to work
WAI	Work Ability Index

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