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NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Workplace Health: Support for Employees with Disabilities and Long-Term Conditions: Cost-Effectiveness Systematic Review

Final Report

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INVESTORS IN PEOPLE

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Executive Summary

1. INTRODUCTION

The National Institute for Health and Care Excellence (NICE) Public Health Internal Guidelines Development (PHIGD) team has commissioned York Health Economics Consortium (YHEC) to carry out a systematic cost-effectiveness review and develop an economic model. This report outlines the methods, results and conclusions of the systematic review.

2. OBJECTIVES

The review considered the following question:

> *What evidence of cost-effectiveness of workplace health interventions for people with disabilities and long-term conditions is available and does this evidence show these interventions to be cost-effective?*

3. METHODS

All methods employed in this review were developed in accordance with the NICE methods manual [1]. Publications were selected based on criteria outlined in a review protocol developed in collaboration with the NICE research team, and the NICE team carrying the effectiveness review. All selected papers were assessed for applicability and quality and relevant data were extracted. Narrative summaries and evidence statements were constructed, taking into account the quality of findings and applicability to the research question.

4. FINDINGS

Fourteen studies met the inclusion criteria and underwent quality appraisal. After input from the Public Health Advisory Committee (PHAC), one study was excluded at applicability stage. Five additional studies were rated as having 'very serious limitations' and were, therefore, excluded from further analysis [3, 4, 8-10].

Of the eight remaining studies, four were rated as 'partially applicable' by the review team [11-14], two as 'directly applicable' [15, 16] and two were considered applicable by the PHAC [5, 6]. Five were rated as having 'potentially serious limitations' [5, 11-13, 15] and three as 'minor limitations' [6, 14, 16]. Two of the studies were conducted in the UK [15, 16], one in Sweden [11], one in Finland [14] and four in the Netherlands [5, 6, 12, 13]. All studies assessed relevant workplace interventions. One study [15] assessed the intervention in employees with depression, one in employees with distress [13], one in employees at high risk for sickness absence [14] and five [5, 6, 11, 12, 16] in a population of people on sick leave with some form of musculoskeletal disorder (MSDs). All studies compared the intervention to a control group or usual care. Seven of the studies did not develop a model but used trial data (collected over 1 year or less) to conduct an economic analysis [5, 6, 11-15], one of the studies developed an economic model with a lifetime time horizon [16].

Evidence statement one – Early workplace intervention

There is weak evidence [11] [potentially serious limitations] from a study in Sweden [partially applicable] about the cost-effectiveness of an early workplace intervention consisting of an interview and workplace visit by a Swedish National Insurance case manager and occupational therapist. The results estimated that the direct cost savings were $1,195 per case (£764.65). The study may have limited applicability to the UK. The study was conducted in Sweden with the intervention focusing on the insurance agency case manager. It is not clear how this intervention would be implemented in the UK or how this would affect the costs. In addition, the study had a short time horizon which may not capture all relevant costs and benefits. Very little information was given on the methods and results which makes interpreting the results difficult.

Evidence statement two – Computerised CBT

There is weak evidence [15] [potentially serious limitations] from a study applicable to the UK context [directly applicable] about the cost-effectiveness of providing a free computerised cognitive behavioural therapy (CBT) programme (MoodGYM) to employees in the UK from a societal perspective. The results estimated that the intervention was dominated at 6-weeks (more costly and less effective). However, results suggest the intervention may be more effective at 12-weeks but data on costs were not provided. In addition, there appear to be calculation errors in the costs table. The study author states that the apparent discrepancy in calculations is due to the valid number of cases varying (personal communication 10/02/16). However, at 12-week follow-up the intervention group had slightly higher difference in QALYs than the control group. The key limitations of this study are that it had calculation errors and a very short time horizon (6 weeks for costs) which may not capture all relevant costs and benefits. In addition, the study had a low retention rate (56% at 6 weeks) with more participants lost to follow up in the intervention arm.

Evidence statement three – Workplace modifications

There is good evidence [16] [minor limitations] from a study in the UK [directly applicable] about the cost-effectiveness of an intervention for employees with musculoskeletal disorders (MSDs) which consisted of a workplace assessment followed by workplace modifications. The results estimated that the intervention was dominant from an NHS, personal social services (PSS) and societal perspective. From the employers perspective would cost a net 34 pence per day on sick leave. The main limitations are that the effectiveness data is from non-UK countries and little information was given on the interventions in the original studies. Additionally, assumptions were made after 12 months to apply a lifetime time horizon. Sensitivity analysis shows that changes to the cost-effectiveness were minimal within the parameters varied.

Evidence statement four – Physical activity, education and workplace visit

There is good evidence [16] [minor limitations] from a study in the UK [directly applicable] about the cost-effectiveness of an intervention for employees with MSDs. The intervention consisted of any form of physical activity and education around how to deal with pain and body mechanics and a visit with the employee and physical therapist to the workplace to inform rehabilitation. The results estimated that the intervention was dominant from an NHS, PSS and societal perspective and cost-saving from the employer's perspective. The main limitations are that the effectiveness data come from non-UK countries and little information was given on the interventions. Additionally, assumptions were made after 12 months to apply a lifetime time horizon. Sensitivity analysis shows that changes to the cost-effectiveness were minimal within the parameters varied.

Evidence statement five – Occupational health intervention

There is good evidence [14] [minor limitations] from a study in Finland [partially applicable] about the cost-effectiveness of an intervention for employees at high risk of sickness absence which consisted of consultation at an occupational health service, construction of action plan and in some cases referral to a further consultation. The results estimated that the intervention was dominant from a healthcare perspective. The main limitations are with the cost data which may be biased due to the missing data in the control group, the data comes from a non-UK country and the study had only a one year time horizon which may not capture all important costs and benefits.

Evidence statement six – Integrated care (CBT-type therapy and plans for adaptations)

There is weak evidence [12] [potentially serious limitations] from a study in the Netherlands [partially applicable] assessing the cost-effectiveness of an intervention for integrated care, consisting of the employee and supervisor forming a plan for adaptations at work and a graded activity intervention based on cognitive behavioural principles. The results estimated that the intervention was dominant from a societal perspective. The study has limited applicability to the UK in that the usual care group would differ. Additionally, the study was conducted with a one-year time horizon which may not reflect all important costs and differences and the cost of work modifications was not included, meaning that the cost of the intervention is likely to be underestimated.

Evidence statement seven – Return-to-work coordinator

There is weak evidence [13] [potentially serious limitations] from a study in the Netherlands [partially applicable] assessing the cost-effectiveness of an intervention for a return-to-work coordinator, consisting of three meetings involving the employee and the supervisor. The CEA results estimated that the intervention was dominated (more costly and less effective). In a subgroup of participants who reported an intention to return to work at baseline, the CEA showed the intervention to be dominant (less costly and more effective) from a societal perspective. The study has limited applicability to the UK in that the usual care group would differ. Additionally, the study was conducted with a one year time horizon which may not reflect all important costs and differences and the cost of work modifications was not included, meaning that the cost of the intervention is likely to be underestimated.

Evidence statement eight – Employer perspective

There is mixed evidence [minor limitations [6]] [potentially serious limitations [5]] from two studies in the Netherlands assessing the cost-effectiveness of interventions for employees with MSDs. One study assessed a work style intervention and a work style intervention plus physical activity intervention [6]. The study found that compared to usual care, the costs in the workstyle intervention arm were lower and the costs in the workplace intervention with physical activity were higher. A second study investigated a graded activity intervention [5]. The results showed that the difference in health care costs were in favour of usual care in the first year. In the third year, the difference in productivity costs was in favour of the graded activity intervention. Both studies have limited applicability to the UK given that occupational practice differs and so do the costs incurred by employers. However, these studies were included at the request of PHAC.

5. CONCLUSIONS

The evidence identified evaluates specific interventions, in specific contexts, for specific population groups. Therefore, it is difficult to draw any broad conclusions from the studies as a whole. It is also difficult to draw conclusions due to the limitations of some of these studies. Each study shows results for specific scenarios. A flexible cost-calculator model will allow more broad conclusions to be drawn. This type of model could use sensitivity analysis in order to generate results that are more generalisable.

Acknowledgements

The authors would like to thank the PHAC for their comments and suggestions.

Abbreviations

CBA	Cost-benefit analysis
CBT	Cognitive behavioural therapy
CEA	Cost-effectiveness analysis
CORE	Clinical Outcomes in Routine Evaluation
CUA	Cost utility analysis
GAD	Generalised Anxiety Disorder
HIV	Human immunodeficiency virus
ICER	Incremental cost-effectiveness ratio
MSD	Musculoskeletal disorder
NHS	National Health Service
NICE	National Institute of Health and Care Excellence
NMB	Net monetary benefit
OECD	Organisation for Economic Cooperation and Development
OP	Occupational physician
PHIGD	Public Health Internal Guidelines Development
PHQ	Patient Health Questionnaire
PPP	Purchasing Price Parity
PSA	Probabilistic sensitivity analysis
PSS	Personal social services
QALY	Quality-adjusted life year
RCT	Randomised controlled trial
ROI	Return on investment
SDIS	Short-term disability claims
WSAS	Work and Social Adjustment Scale
YHEC	York Health Economics Consortium

Section 1: Introduction

The National Institute for Health and Care Excellence (NICE) Public Health Internal Guidelines Development (PHIGD) team has commissioned York Health Economics Consortium (YHEC) to carry out a systematic cost-effectiveness review and develop an economic model. This document reports on the cost-effectiveness review.

1.1 BACKGROUND

NICE has been asked by the Department of Health to produce guidance for employers and employees on approaches to support employees with disabilities and long-term conditions. This project will eventually form guidance that will be one of multiple workplace health based guidelines recently issued, or in development, by NICE:

In development:

- Workplace policy and management practices to improve the health and wellbeing of employees (NG13).

In addition, this guideline is likely to have some overlap with existing NICE guidance:

- Managing long-term sickness and incapacity for work (PH19);
- Promoting mental wellbeing at work (PH22);
- Workplace interventions to promote smoking cessation (PH5).

This guideline will cover employees who have a disability or long-term mental or physical health condition, (for example; asthma, cancer, Crohn's disease, dementia, depression, diabetes, hearing impairment, multiple sclerosis, obesity, osteoarthritis or sight impairment). People who are unemployed, self-employed or are under 16 are excluded from the scope of this project.

The interventions that will be assessed are those that aim to support employees to either stay in or return to work. The interventions must be aimed at employees but be the responsibility of the employer or be an organisational intervention. Due to the intervention, setting, stakeholders and conditions included in the scope of this guideline being wide, the guideline will consider factors such as size of organisation and the industry or sector. This cost-effectiveness review will inform the development of the guideline.

1.2 OBJECTIVES

The objective of the cost-effectiveness review and economic evaluation, as requested by NICE PHIGD, is to identify the following:

- What are the costs and benefits to employers and employees of organisational and individual level interventions [1] to support people with disabilities or long-term conditions to return to or stay in work?
- Which interventions are most cost-effective, and for which conditions and occupational groups? What is the impact of timing, duration and intensity of the intervention?

These objectives form the following research question to be answered by the cost-effectiveness review:

> *What evidence of cost-effectiveness of workplace health interventions for people with disabilities and long-term conditions is available and does this evidence show these interventions to be cost-effective?*

1.3 IDENTIFICATION OF POSSIBLE EQUALITY AND EQUITY ISSUES

The cost-effectiveness review focused on the following population groups:

- Employees that have an existing:
  - Chronic disease;
  - Disability;
  - Long-term mental or physical health condition.

In addition, employees aged 16 years or over are included in the scope of this project.

Therefore, there has been an inevitable emphasis on reviewing studies that included one or more of these population groups. Age and disability are protected characteristics under the Equality Act 2010. The systematic review does not exclude on the basis of other protected characteristics as long as they are in line with the proposed scope parameters as outlined by the NICE scope.

[1] Targeted interventions are covered under 'individual level' interventions.

Section 2: Methodology

Studies eligible for inclusion in this review will meet the inclusion criteria described below. Studies will be excluded if they meet the exclusion criteria described below. These criteria have been derived from the final scope and in close collaboration with the NICE team. The eligibility criteria align with that used by the NICE team in the effectiveness review as far as possible.

2.1 INCLUSION AND EXCLUSION CRITERIA

The following selection criteria were applied to the search results.

2.1.1 Populations

To be included in this review, studies must investigate at least one of the sub-groups listed below:

- Employees that have an existing:
  - Chronic disease;
  - Disability;
  - Long-term mental or physical health condition[2].
- Examples include (but are not limited to):
  - Cancer;
  - HIV;
  - Diabetes;
  - Musculoskeletal disorders;
  - Arthritis;
  - Asthma;
  - Crohn's disease;
  - Dementia;
  - Depression;
  - Hearing impairment;
  - Multiple sclerosis;
  - Obesity;
  - Osteoarthritis;
  - Sight impairment;
  - Medically unexplained symptoms;
  - Lupus;
  - Sickle cell disease;
  - Thalassemia.

[2] For the purposes of this review an 'existing disability or long-term condition' may or may not have been diagnosed, and includes people who self-identify with a condition, and those who are enrolled in any type of employee assistance programme (EAP).

The definition of 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 may also be known as 'chronic conditions' and 'life-limiting conditions'. Long-term normally means for more than one year (NICE Final Scope).

The definition of disability in employment is defined as 'a physical or mental impairment that has a 'substantial' and 'long-term' effect on their ability to do normal daily activities (Equality Act, 2010[3]).

Employees can be:

- In work and never had a sickness episode (primary sickness prevention);
- In work but previously had periods of sickness absence;
- Currently on sickness absence (return to work).

Studies will be excluded if the population is any of those listed below.

- People who are unemployed;
- People who are self-employed, and those who are not employed or contracted to work by an organisation of any size;
- Children and young people under the age of 16;
- People who are unable to work due to disability or long-term condition, (for example, anyone receiving benefits that cover unemployment due to disability or long term condition).

2.1.2 Interventions

To be included in this review, interventions must aim to be one or more of the following:

- Activities that support employees with disabilities or long term-conditions (populations identified in Section 2.1) to stay in or return to work. These include but are not limited to[4]:
    - Targeted interventions for employees, such as:
        - Non-treatment work programmes to help people manage their health condition (such as, motivational interviewing);
        - Adjustments in work activities, station, processes or place (including assistive technology or practices, changes to job design or flexible working);
        - Job coaching or peer support;
        - Information, advice and training (including self-support information);
        - Access and transport to work;
        - Redeployment.

[3] https://www.gov.uk/definition-of-disability-under-equality-act-2010.
[4] Interventions must be something that can be delivered, funded or initiated by the employer.

- Organisational interventions, including but not limited to:
  - Educational campaigns and workplace groups;
  - Showing people how to get help from employee support schemes;
  - Risk assessment and assessment of work capacity or ability;
  - Systems for monitoring employees and responding to need.

Studies will be excluded if interventions are in the following areas:

- Mitigating health problems or functional decline in the general workforce;
- Health screening;
- Clinical diagnosis, management and treatment of conditions;
- National employment and social security policies;
- Managing sickness absence (including long-term sickness)[5];
- Clinical interventions or interventions in which the patient is referred on to an intervention which is not paid for or run by the employer; interventions which do not occur in the workplace or are not referred from the workplace;
- National-level funded interventions such as clinical support (e.g. occupational therapy);
- Self-management interventions (unless the employer is providing some sort or support to encourage the self-management intervention);
- Prevention of long-term or chronic diseases;
- Where the emphasis of an intervention is 'work as treatment';
- Interventions that manage clinical diagnosis, management and treatment of conditions are excluded (e.g. making HIV treatment accessible in the workplace) - interventions delivered in a clinical setting are unlikely to meet this criterion and will be excluded at intervention criterion.

2.1.3 Comparators

To be included in the review, studies must feature a comparator. Eligible comparators are:

- Any other eligible intervention;
- Current practice;
- No activity.

[5] Note: This guideline is focused on preventing people with disabilities and/or long-term conditions from progressing from short term sickness to long term sickness and keeping them in work. All full paper study selection will be aligned with the effectiveness review team.

2.1.4 Outcomes

To be eligible for inclusion in the review, studies must report one of the following outcomes:

- Cost per quality-adjusted life year (QALY);
- Cost per case of relevant condition/disease averted;
- Cost per life year gained;
- Cost per unit of benefit;
- Costs and benefits of an intervention presented as a cost-consequences analysis;
- Return on investment.

2.1.5 Study Features

To be eligible for inclusion in the review studies must be:

- Published in January 2000 or later;
- Published in English (as per NICE methods manual [1]);
- Conducted within an Organisation for Economic Cooperation and Development (OECD) country.

2.1.6 Study Design

Only the following study types will be eligible:

- Cost-utility analyses;
- Cost-effectiveness analyses;
- Cost-benefit analyses;
- Cost-minimisation analyses;
- Cost-consequences analyses;
- Other study types that include economic data expected in the study designs outlined above[6].

Burden of disease and cost of illness studies will not be eligible for inclusion in the cost-effectiveness review.

[6] Note: 'other study types' will be included only if no standard economic studies are identified.

2.2 METHODS OF STUDY IDENTIFICATION

Search strategies were developed by a NICE Information Specialist.

Full search strategies are provided in Appendix B.

2.2.1 Downloading Results

The de-duplicated results of the NICE searches were provided to YHEC in a .ris file. YHEC downloaded the records to Endnote X7 bibliographic software where a first sift took place. Following the first sift, the results were added to Microsoft Excel where remaining study selection took place.

2.3 STUDY SELECTION

The search results were assessed and categorised according to the inclusion and exclusion criteria set out in Section 2.1. The numbers of records included and excluded at each stage of the study selection process were recorded and are presented in Section 3.1.

Two reviewers independently selected records by firstly screening the title and/or the abstract of the record. The full text documents of the studies thought to be relevant to the review were obtained. Studies that were excluded at the full paper screening stage have been tabulated along with their reason for exclusion, in Appendix C. To ensure a high degree of inter-rater reliability, the reviewers worked through a sample of studies meeting the inclusion criteria and discussed any relevance issues before both reviewers individually screening the rest of the retrieved studies.

2.4 QUALITY APPRAISAL, DATA EXTRACTION AND DATA SYNTHESIS

Each study was quality assessed using the economic evaluation checklist in Appendix I of the NICE methods manual [1]. Two reviewers independently assessed the quality of the individual studies. Disagreements were resolved through consensus and if necessary a third reviewer was consulted. An assessment of applicability of the study to the current UK healthcare system and NICE decision-making was made, whereby studies were classified as:

- Directly applicable – the applicability criteria are met, or one or more criteria are not met but this is not likely to change the conclusions about cost-effectiveness;
- Partially applicable – one or more of the applicability criteria are not met, and this might possibly change the conclusions about cost-effectiveness;
- Not applicable – one or more of the applicability criteria are not met, and this is likely to change the conclusions about cost-effectiveness.

Studies rated as ‘not applicable’ were excluded from further consideration as per the NICE methods manual [1].

An assessment of the methodological quality of included studies was also undertaken, whereby studies had:

- Minor limitations – the study meets all quality criteria, or the study fails to meet one or more quality criteria, but this is unlikely to change the conclusions about cost-effectiveness;
- Potentially serious limitations – the study fails to meet one or more quality criteria, and this could change the conclusion about cost-effectiveness;
- Very serious limitations – the study fails to meet one or more quality criteria and this is very likely to change the conclusions about cost-effectiveness.

Studies rated as having ‘very serious limitations’ were excluded from further consideration as per the NICE methods manual [1].

One reviewer extracted the data from each of the included studies using a standardised template, and a second reviewer checked the extraction. Any discrepancies were resolved through discussion or by consulting a third researcher. The data extraction tables can be found in Appendix D. Where a non-UK study was included, the results were converted into UK pounds sterling using the appropriate purchasing power parity [2].

Section 3: Results

3.1 SEARCH RESULTS

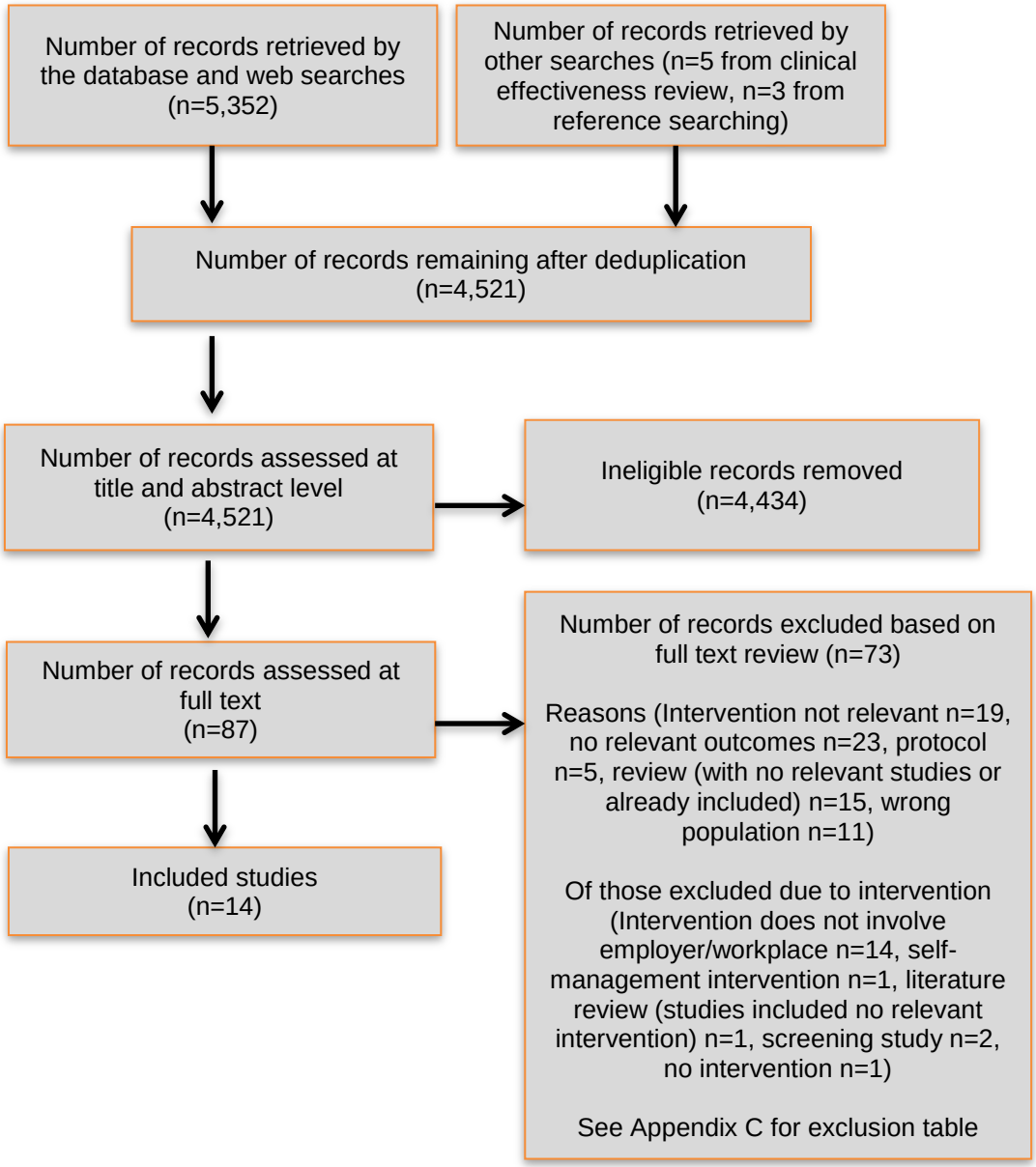
The searches identified 5,352 records, leaving 4,521 once duplicate records were removed. The source of these records can be found in the PRISMA diagram (Figure 3.1).

Studies which were obviously irrelevant were removed at screening stage by an experienced Research Consultant in EndNote. Specifically these studies were:

- Animal or other non-human populations;
- Case reports;
- Non OECD settings;
- Non English language;
- Not a relevant intervention;
- Not a relevant population.

The remaining records were screened by two reviewers for further assessment. Of these, 87 studies were identified as being potentially relevant to the review based on the title and abstract and the full paper of these was screened. Of the full papers screened, 14 studies met the inclusion criteria for the review. However, six were excluded after quality appraisal (one due to applicability issues and five were excluded due to quality issues).

Figure 3.1: PRISMA flow chart



3.2 OVERVIEW OF QUALITY APPRAISAL

Fourteen studies met the inclusion criteria and underwent quality appraisal (Appendix E). One study was excluded at applicability stage as it was rated as 'not applicable'. The reasons for this are discussed further in Section 3.2.1. Five studies were excluded at quality assessment stage as they were rated as having 'very serious limitations'. The reasons for this are discussed in Section 3.2.2. Eight studies remained (discussion in Section 3.3). Full quality appraisal checklists are available in Appendix E.

3.2.1 Applicability

The review team initially excluded five studies at applicability stage. The reasons for this are outlined below. However, the PHAC requested the studies that were excluded due to a lack of applicability to the UK be considered further [3-6]. After input from the PHAC, only one study was excluded at this stage [7].

3.2.1.1 Studies initially excluded (considered further at request of the PHAC)

Dewa *et al.* (2014 and 2014a) [3, 4] were both excluded by the review team for the same reasons. The studies were conducted in a single institution in Canada and few details on the study population or intervention were provided. The interventions were a collaborative return-to-work programme and a stigma programme. No further detail was provided. The studies looked only at short-term disability (SDIS) claims. Short-term disability claims are a specific type of claim that a company must pay. The claims are differentiated from other types of claim (such as sick days or a long-term disability claim) by the days covered and the medical certification required. The study compared the reduction in short-term disability cost relative to the interventions cost from an employer perspective. The analysis was not based on actual data but, instead, aimed to show the break-even point if a stigma programme were implemented. The studies were originally excluded because they investigate only SDIS claims which are not relevant to the UK context. Following input from the PHAC, these studies were considered further.

Hlobil *et al.* [5] and Bernaards *et al.* [6] were excluded by the review team for the same reasons. Hlobil *et al.* considered an exercise and cognitive behavioural therapy (CBT) intervention for sick-listed workers with low back pain. Bernaards *et al.* investigated a work-style intervention which focused on posture, workplace adjustments, breaks and coping with stress plus a physical activity intervention for computer workers with neck and upper limb symptoms. Neither study developed an economic model. They conducted one year analyses based on trial data. Both studies were conducted in the Netherlands. The process for sick-leave rehabilitation differs in the Netherlands and the UK. In the Netherlands, companies have a contract with occupational health services. In the UK, occupational health services are rare. The difference is that employers in the Netherlands pay for clinical care attendances whereas in the UK they do not. It also means that in some cases, the employer may not pay for the intervention, whereas in the Netherlands the employer would pay. Because both of these studies took an employer perspective only, they were considered by the review team not relevant to the UK context. Following input from the PHAC, these studies were considered further.

3.2.1.2 Study excluded at applicability stage

Karjalainen *et al.* [7] did not include any intervention costs and therefore is not considered a full economic evaluation. For this reason, this study was excluded from further consideration.

3.2.2 Quality

Table 3.1 shows an overview of the studies that were excluded due to quality issues and the reasons for these exclusions. Many of these excluded studies contained calculation errors and/or interpretation errors related to the direction of effect. This seriously undermines the confidence that we have in these studies and, therefore, it is very difficult to draw conclusions from these studies. Studies that included negative ICERs but that reported disaggregated data that were consistently reported throughout the paper and did not contain calculation errors were included. It is possible to be reasonably confident in the findings of these studies. In addition, some studies were excluded based on the methodological limitations as identified when completing NICE recommended quality appraisal checklist. The limitations of these studies are reported throughout. Full quality appraisal checklists are available in Appendix E.

There were several quality issues with Arends *et al.* (2013) [8]. One issue was the calculation and interpretation of net monetary benefit (NMB). NMB appears to be simply the difference between the incremental cost of the intervention and any savings made. No measure of benefit with the maximum acceptable incremental cost-effectiveness ratio (ICER) was made. In addition, negative NMB would usually represent a case in which the intervention was not cost-effective. However, in this study, negative values represent lower costs of the intervention group. Another issue is that negative ICERs were reported. Negative ICERs should not be reported. Negative ICERs could occur if the costs of the intervention are lower and the benefits are higher, in which case this should be reported as the intervention is 'dominant' (cost saving and more effective); they could also occur if the costs of an intervention are higher and the benefits are lower, in which case the intervention is 'dominated' (more costly and less effective). It appears in the results that the ICER would represent the intervention being dominant but the conclusions state that the intervention is not cost-effective. Finally, the ICER calculations are incorrect. The paper reports the cost and benefits separately, but when the incremental costs are divided by the incremental benefits, this does not give the ICER reported in the paper.

Geraedts *et al.* (2015) [9] had similar issues to those reported above. The paper reports negative ICERs and no adjustment is made when the effect measure is positive or negative. In addition, it is not clear what the correct results are. The calculations suggest that there is a decrease in QALYs while the text suggests an increase. In addition, the calculations would appear to show that the intervention is cost-effective in most scenarios while the conclusions state that the intervention is not cost-effective.

Steenstra *et al.* (2006) [10] had similar issues to those reported above. The paper reports negative ICERs. It is not possible to calculate the ICERs reported based on the disaggregated results reported in the paper. It is not clear if this is due to a calculation error or due to the relevant data not being reported. However, due to the disaggregated data not being reported, it is not possible to infer whether the negative ICERs represent a case of the intervention being dominant or dominated. In addition, when looking at the distributions on the cost-effectiveness plane to infer what the results mean, the calculations used in the results table are not consistent across different scenarios.

Dewa *et al.* (2014 and 2014a) [3, 4] were both excluded at quality appraisal for the same reasons. The overall assessment of methodological quality highlighted that there were issues with each item of the quality appraisal checklist. For example, the time horizon was not reported, health outcomes are not included, data sources for the treatment effects, resource use and costs were not described, and only selected inputs were investigated using sensitivity analysis. In addition, little detail on the study population and intervention was given. However, PHAC requested that these studies be considered further when they were excluded at *applicability appraisal*. Therefore, a brief summary of the results is reported here, for information only and these studies should not be considered as part of the final included studies due to not meeting the quality criteria required for inclusion, as stated in the NICE public health methods manual (see Section 2.4 for methods). Dewa *et al.* (2014a) [4] reported that from an employer's perspective in Canada, to break even a stigma program with no reduction in the length of SDIS would need to prevent at least 2.5 SDIS claims in an organisation of 1,000 employees. Dewa *et al.* (2014) [3] reported that the breakeven point occurs when the average SDIS episode is reduced by at least seven days.

Table 3.1: Overview of studies excluded due to quality

Study	Applicability	Intervention (brief)	Time horizon	Errors in calculations or reporting of results?	Country	Perspective	Type of analysis	Conclusions
Arends *et al. (*2013) [8]	Partially applicable	SHARP-at work intervention	One year	Yes. ICERs appear to have been calculated incorrectly. Cost-benefit analysis (CBA) is simply a cost difference. NMB not reported intuitively.	Netherlands	Societal (and employer perspective not reported in this document).	No model. Cost-effectiveness analysis (CEA) and CBA based on randomised controlled trial (RCT) data.	It is not clear if the intervention is cost-effective due to issues with the results reported.
Geraedts *et al.* (2015) [9]	Partially applicable	Happy@Work: web-based intervention	One year	Yes. Negative ICERs reported in cases of dominance. Conclusions appear incorrect.	Netherlands	Societal (and employer perspective not reported in this document).	Cost-effectiveness analysis, cost-utility analysis and return-on-investment (ROI) analysis.	It is not clear if the intervention is cost-effective due to issues with the results reported.
Steenstra et al. (2006) [10]	Partially applicable	Workplace assessment and modifications and workplace intervention plus clinical intervention	One year	Yes. Negative ICERs reported. It is not possible to determine if ICERs represent dominant or dominated.	Netherlands	Societal perspective	No model. Cost-effectiveness analysis (CEA) and CBA based on randomised controlled trial (RCT) data.	It is not clear if the intervention is cost-effective due to issues with the results reported.
Dewa *et al*. (2014) [4]	Partially applicable (as advised by PHAC)	Stigma programme to address mental illness.	Not reported. Annual inferred.	No. However, the study failed to meet standard for all methodological criteria in QA checklist and this could change the conclusions of the study.	Canada	Employer	Limited details provided	The study reported when the intervention would break even based on SDIS claims.

Study	Applicability	Intervention (brief)	Time horizon	Errors in calculations or reporting of results?	Country	Perspective	Type of analysis	Conclusions
Dewa *et al*. (2014)[3]	Partially applicable (as advised by PHAC)	Collaborative return-to-work program	Not reported. Annual inferred	No. However, the study failed to meet standard for all methodological criteria in QA checklist and this could change the conclusions of the study.	Canada	Employer	Limited details provided. A simple model was used.	The study reported when the intervention would break even based on SDIS claims.

3.3 OVERVIEW OF SELECTED STUDIES

Of the eight remaining studies, four were rated as 'partially applicable' by the review team [11-14], two as 'directly applicable' [15, 16] and two were considered applicable by the PHAC [5, 6]. Five were rated as having 'potentially serious limitations' [5, 11-13, 15] and three as 'minor limitations' [6, 14, 16]. Two of the studies were conducted in the UK [15, 16], one in Sweden [11], one in Finland [14] and four in the Netherlands [5, 6, 12, 13]. All studies assessed relevant workplace interventions. One study [15] assessed the intervention in employees with depression, one in employees with distress [13], one in employees at high risk for sickness absence [14] and five [5, 6, 11, 12, 16] in a population of people on sick leave with some form of musculoskeletal disorder (MSDs). All studies compared to a control group or usual care. Seven of the studies did not develop a model but used trial data (collected over 1 year or less) to conduct an economic analysis [5, 6, 11-15], one of the studies developed an economic model with a lifetime time horizon [16].

A summary is provided in Table 3.2, which provides an overview of the studies selected for inclusion. Full data extraction tables are available in Appendix D.

Table 3.2: Summary of included studies

Study	Applicability	Quality	Intervention (brief)	Time horizon	Country	Perspective	Type of analysis
Arnetz *et al.* (2003) [11]	Partially applicable	Potentially serious limitations	Early workplace intervention	One year	Sweden	Not stated. Appears to include employer and national insurance.	Cost-benefit analysis stated but appears to be cost-consequence
Lambeek *et al.* (2010) [12]	Partially applicable	Potentially serious limitations	Integrated care	One year	Netherlands	Societal perspective	CEA, CUA and cost benefit (ROI)
Phillips *et al.* (2014) [15]	Directly applicable	Potentially serious limitations	Computerised cognitive behavioural therapy (CBT) intervention (MoodGYM)	Six weeks (for economics)	UK	NHS/personal social services (PSS) and employer inferred	CUA (can be calculated)
Squires *et al.* (2012) [16]	Directly applicable	Minor limitations	Physical activity, education and workplace visit	Lifetime	UK	NHS and PSS and societal (employer perspective)	CEA and CUA
Taimela *et al.* (2008) [14]	Partially applicable	Minor limitations	Occupational health intervention	One year	Finland	Healthcare perspective	CEA
Van Oostrom *et al.* [13]	Partially applicable	Potentially serious limitations	Return to work coordinator	One year	Netherlands	Societal and employer perspective	Societal perspective (CEA and CUA), employer perspective (states CBA but appears to be cost difference)
Hlobil *et al.* [5]	Partially applicable (as advised by PHAC)	Potentially serious limitations	Work-style intervention plus lifestyle physical activity	Up to three years	Netherlands	Employer	Cost minimisation
Bernaards *et al.* [6]	Partially applicable (as advised by PHAC)	Minor limitations	Graded activity intervention (physical exercise and CBT)	One year	Netherlands	Employer	Cost difference and CEA

3.3.1 Narrative Summary

An evidence table is provided in Table 3.3. Full data extraction tables are available in Appendix D.

Table 3.3: Evidence table by population group

Study details: author, year, aim, design, quality ratings	Population and setting	Intervention and comparators	Outcomes	Primary results	Limitations
Arnetz *et al.* (2003) [11] To assess the possible beneficial effects from early medical, rehabilitation and vocational interventions on employee absenteeism and well-being States it is a cost-benefit analysis. RCT data was used (no model developed) Quality score: Potentially serious limitations Applicability: Partially applicable	Patients with physician-diagnosed musculoskeletal disorders Sweden	Intervention: Early workplace intervention consisting of an interview and workplace visit with vocational training in some cases Comparator: Usual care	Direct costs (cost relating to the intervention) and reimbursement paid out during the study period	The direct cost savings were $1,195 (£764.65) per case, yielding a direct cost-to-benefit ratio of 6.8.	There is very little information reported on the methods and sources used in the economic evaluation. Short time horizon (1 year) No sensitivity analysis performed. Limited applicability to the UK
Lambeek *et al.* (2010) [12] To evaluate the cost effectiveness, cost utility and cost-benefit of an integrated care programme compared with usual care for sick listed patients with chronic low back pain CEA, CUA and cost benefit (ROI). RCT data was used (no model developed) Quality score: Potentially serious limitations	Adults aged 18-65 sick listed due to chronic low back pain Netherlands	Integrated care which consisted of workplace intervention and graded activity programme. Comparator: Usual care provided by GPs and occupational physicians (OPs) according to Dutch guidelines	Economic outcomes, ICER, ICUR, cost-benefit. Other outcomes: Duration until sustainable work and QALYs	ICER* (effectiveness = mean difference in net sick leave in days) Cost difference: £217, effect difference: -68, ICER: -£3 ICUR* Cost difference: -£5,310, effect difference: 0.09, ICUR: -£61,000 (intervention dominant) CBA/ROI** (calculated using direct health care costs and	The cost of work modifications was not included so the cost of the intervention is likely to be underestimated. Sensitivity analysis was carried out around this. Short time horizon (1 year) Limited applicability to the UK ICERs not presented correctly.

Study details: author, year, aim, design, quality ratings	Population and setting	Intervention and comparators	Outcomes	Primary results	Limitations
Applicability: Partially applicable				productivity costs) Net societal benefit: £5,744 per patient ROI: £26 (for every £1 invested, £26 will be returned)	
Phillips *et al.* (2014) [15] To investigate the effectiveness of a computerized CBT intervention (MoodGYM) in a workplace context RCT. Cost-utility analysis can be carried out using the results reported. Quality score: Potentially serious limitations Applicability: Directly applicable	Employed people with a given Patient Health Questionnaire (PHQ -9) score UK workplace	Intervention: MoodGYM – a freely available computerised course. Employers promoted this to staff. Comparator: Control group: websites selected from a previous review of self-help in mental health judged to be reliable sources of information.	Economic outcomes: costs and QALYs. Other outcomes: Work and Social Adjustment Scale (WSAS), Patient Health Questionnaire (PHQ-9), Clinical Outcomes in Routine Evaluation (CORE-10), Generalised Anxiety Disorder (GAD), EQ-5D	Difference in QALYs gained at baseline and follow up was 0.082 (MoodGYM) and 0.083 (control). The cost results are not clear due to what appear to be calculation errors in the cost table. However, if taking only cost totals (which do not sum up to the figure in the column) there was a higher reduction in costs in the control group which would suggest that the intervention is dominated at 6-weeks. However, the difference in QALYs at 12-weeks shows the intervention to be more effective but costs were not provided for this time frame.	There appear to be calculation errors. The study author states that the apparent calculation error is due to the valid number of cases varying (personal communication 10/02/16) Data can only be calculated at 6-weeks and it appears that the results significantly change at 12-weeks. Cost data were not available at 12 weeks (personal communication 10/02/16) Study retention rate was low (56% at 6 weeks). More participants were lost to follow up in the intervention arm. Short time horizon (6 weeks) No sensitivity analysis.
Squires *et al.* (2012) [16] To assess the cost-effectiveness of interventions to return employees with musculoskeletal disorders	Employed men and women who had been on sick leave for between 1 week	Intervention: Two relevant interventions to the current topic: (1) workplace intervention and (2)	Costs of health care and sick leave. Utility. ICERs	NHS and societal perspective reported together as results were very similar: Intervention 1) dominant	The authors acknowledge that the evidence identified for the effectiveness was poor quality and from non-UK countries. Little

Study details: author, year, aim, design, quality ratings	Population and setting	Intervention and comparators	Outcomes	Primary results	Limitations
(MSDs) to work using a mathematical model CEA and CUA Quality score: Minor limitations Applicability: Directly applicable	and 6 months with musculoskeletal disorders over a lifetime UK workplace	physical activity, education and workplace visit intervention Comparator: Usual care		Intervention 2) dominant Employer perspective: Intervention 1) costs employer a net 34 pence per day of sick leave avoided Intervention 2) likely to be cost saving.	information was given about the interventions. Authors acknowledge that assumptions had to be made after 12 months. It is not clear how the intervention cost was arrived at. Although the report does not state if discounting was applied or not, a NICE report of the same model states that it was applied [17]. Utilities used are for a general population on sick leave, not restricted to MSDs. This means the utility values may not be estimated correctly. It is not clear in which direction this would affect the results.
Taimela *et al.* (2008) [14] To assess whether an occupational health intervention is cost effective in reducing sickness absence when compared with usual care in occupational health in workers with high risk of sickness absence Cost-effectiveness analysis (CEA) Quality score: Minor limitations	Employees at high risk of sickness absence One corporation in Finland(49% from a construction industry, 51% employed in repair, service	Intervention: Consultation at their local occupational health service (OHS) with the construction of an action plan, and if appropriate, referral to a further consultation by a specialist or psychologist	Cost (or savings) per day of sickness avoided. Other outcomes: sickness days avoided, self-rated health outcomes (e.g. depression, fatigue	Intervention is dominant (cost saving and more effective) PSA - Only workers with completed cost data: mean incremental cost for the intervention was -€80 (95% CI -€429 to +€290) and the mean incremental effect was 1.8 days (95% CI -9.7 to +12.4)	There was a potential bias in cost results, since responders in the control group appear to have incurred fewer costs than non-responders Imputations was not possible for health outcomes so results should be interpreted with caution

Study details: author, year, aim, design, quality ratings	Population and setting	Intervention and comparators	Outcomes	Primary results	Limitations
Applicability: Partially applicable	and maintenance of buildings)	Comparator: Usual care consisted in workers consultation with their occupational nurse or physician on request but not action plan		of avoided work absence. The intervention was therefore always dominant. PSA – When missing data were imputed: mean incremental cost for the intervention was -€180 (95% -€452 to +€98) and the mean incremental effect was 10.5 days (95% CI 0.6 to +20.4) of avoided work absence The intervention was therefore always dominant.	The study was conducted in Finland and some data might not be transferable to the UK Healthcare utilisation collected using self-report postal survey Short time horizon which may not reflect all important costs and benefits. Cost are expressed in 2004 prices (paper was published in 2008)
Van Oostrom *et al.*(2010) [13] To evaluate the cost effectiveness, cost utility and cost benefit of a workplace intervention compared with usual care for sick-listed employees with distress Cost-effectiveness (CEA), cost-utility (CUA) and cost benefit (CBA stated but appears to be cost different. RCT data was used (no model developed) Quality score: Potentially serious limitations Applicability: Partially applicable	Employees with distress, sick listed for 2 to 8 weeks Netherlands	Intervention: Usual care plus referred to a return-to-work (RTW) coordinator. Three meetings were planned within 3 weeks Comparator: Usual care – treatment by the occupational physician (OP) according to the guideline of the Dutch Associated of Occupational Physicians	Economic outcomes: CEA, ICER (per day or duration of sick leave). CUA, ICER (per QALY). CBA, NMB*. Other outcomes: EQ-5D, health care utilisation	CEA (mean difference in days until lasting return to work) ICER = €627 (£484) CUA Human capital approach (HCA) ICER= -€184,562 (£142,605) (intervention dominated) Friction cost approach (FCA) ICER = -€155,850 (£120,420) (intervention dominated) CBA HCA NMB***= €1,987 (£1,535) FCA NMB*= €1,700 (£1,314)	Short time horizon (1 year) Limited applicability to the UK ICERs not presented correctly.

Study details: author, year, aim, design, quality ratings	Population and setting	Intervention and comparators	Outcomes	Primary results	Limitations
Bernaards *et al.* (2011) To evaluate the cost-effectiveness of a work style (WS) intervention and a work style plus physical activity (WSPA) intervention in computer workers with neck and upper limb symptoms compared with usual care. Cost-effectiveness analysis alongside a RCT Quality score: Minor limitations Applicability: Partially applicable (as rated by PHAC)	Netherlands	Intervention: work style intervention plus lifestyle physical activity Comparator: Usual care	Recovery from neck and upper limb symptoms; pain intensity; total costs.	Differences in economic and clinical outcomes were not statistically significant among the three groups. Total costs were €1,907 (£1,607) with WS, €2,811 (£2,369) with WSPA and €2,310 (£1,947) with usual care. Compared to usual care, inc. WS cost -€451 (£380) (cost saving), inc. WSPA costs €230 (£194) (cost incurring).	Limited applicability to the UK Short time horizon Sources of cost data were not clearly stated A measure of the impact of the intervention on quality of life was not used Authors acknowledge the following: The high number of participants with missing effect data Absenteeism data were highly skewed resulting in large standard deviations Data could not be provided from company records The subjective measures for recovery may have been affected by psychological factors
Hlobil *et al.* (2007) To compare the costs and benefits of a graded activity (GA) intervention to usual care (UC) for sick-listed workers with non-specific low back pain (LBP).	Netherlands	Graded activity (GA). Routine guidance from occupational physician plus twice a week a 60-min physical exercise session with a cognitive behavioural	Economic outcomes: cost difference. Other outcomes: Costs of health care utilisation and lost productivity days	<u>Cumulative over 3 years:</u> Difference in health care costs: not provided Mean difference in lost productivity = €1,661 (£1,250(net), €7,581 (£5,706) (gross) (in favour of GA)	Limited applicability to the UK Short time horizon No discounting was applied in the 3 year calculations.

Study details: author, year, aim, design, quality ratings	Population and setting	Intervention and comparators	Outcomes	Primary results	Limitations
Cost-benefit analysis is stated but the study appears to be a cost-consequences analysis Quality score: Potentially serious limitations Applicability: Partially applicable (as rated by PHAC)		approach under the supervision of specifically trained physiotherapists **Comparator** Usual care (UC). Routine guidance from occupational physician			Healthcare utilisation collected using retrospective, self-reported measures Authors acknowledge that: The study was performed within one company with the majority being male, blue-collar workers. Sick leave is used as a proxy for productivity loss, this may not accurately reflect true productivity losses

* Results are reported as they are in the article. Negative ICER's should indicate that the intervention is dominant (less costly and more effective). However, this is not the case here as the intervention is both more costly and more effective. The breakdown of costs and benefits is reported in this table.

** CBA calculations appear to be just the different between the costs of the intervention and the cost of the benefits.

Arnetz *et al.* [11] carried out a prospective controlled intervention study which assessed an early workplace intervention for employees with musculoskeletal disorders (MSDs) in the Swedish setting. The aim of the study was to assess the beneficial effects of the intervention on employee absenteeism and well-being. The intervention consisted of an interview with the Swedish National Insurance rehabilitation case manager. One week later, the employee, case manager, occupational therapist and the employer met at the employee's workplace. The occupational therapist assessed physical and psychosocial stressors in the employee's workplace and ergonomic improvements were made. Participants were also given vocational training when it was thought that this would be of benefit. The employer was encouraged to complete a rehabilitation investigation. Participants filled in a self-rated health questionnaire at baseline and 6 months. Administrative data were collected at baseline, 6 months and 12 months. Administrative data included the number of sick days, days to rehabilitation and rehabilitation and vocational equipment service costs. Very little information was given on the methods used to calculate the economic results. The authors state it was a cost-benefit analysis which took into account only direct costs. The perspective was not provided but a societal perspective is inferred.

The results reported state that the direct cost of the intervention was approximately $1,410 per person for a total saving of $1,195 (£764.65). The benefit-to-cost ratio was 6.8. No further information was given.

The study has limited applicability to the UK. The study was conducted in Sweden with the intervention focusing on the insurance agency case manager. It is not clear how this intervention would be implemented in the UK or how this would affect the costs. The study was conducted with a one year time horizon which may not reflect all important costs and differences. No sensitivity analysis was carried out. In addition, very little information was given on the methods and results which make interpreting the results difficult. Overall, it is not possible to draw clear conclusions on whether this intervention would be cost-effective, especially within in a UK context.

Lambeek *et al.* (2010) [12] carried out a randomised controlled trial which assessed a workplace intervention for employees sick listed with chronic low back pain compared with usual care. The intervention was an integrated care intervention based on participatory ergonomics in which the employee and supervisor formed a plan for adaptations at work. It also consisted of graded activity intervention based on cognitive behavioural principles. Participants in usual care were referred to their OP and GP and treated according to Dutch guidelines. Participants were followed-up over one year. Data were collected from patients at baseline, 3, 6, 9 and 12 months. Effectiveness outcomes included QALYs and duration until sustainable return to work. Resource use was collected for patients and costs from standard Dutch sources applied. The economic evaluation took a societal perspective. An economic model was not developed but the costs and effectiveness outcomes from the trial were utilised.

The results of the cost-effectiveness analysis showed that the difference in mean days until sustainable return to work were lower in the intervention group (-68) and costs were slightly higher (£217), resulting in an ICER of -£3 per day. In the cost-utility analysis, the intervention was dominant (although it is reported as -£61,000). The authors also used direct health care and productivity costs to calculate a net societal benefit of £5,744 and a ROI of £26. Six sensitivity analyses were carried out on the CEA and CUA and the direction of results remained the same with the intervention remaining dominant for the CUA.

The study has limited applicability to the UK. It is not clear if the costs would change when implementing the intervention in the UK (i.e. the NHS may incur some costs, not the employer). Further, the usual care group would differ in the UK because most employees will not routinely be referred to an occupational physician. The study was conducted with a one year time horizon which may not reflect all important costs and differences. In addition, the cost of work modifications was not included, meaning that the cost of the intervention is likely to be underestimated[7].

Squires *et al.* [16] developed a Markov model investigating the cost-effectiveness of interventions to return employees to work following long-term sickness absence due to MSDs in the UK setting. The interventions and the related effectiveness data were identified through a systematic review. The study assessed three interventions of which two are relevant to this review. The first intervention is a workplace intervention which involves a workplace assessment and work modifications based on participative ergonomics. The second intervention is a physical activity, education and workplace visit. The physical activity and education component consists of any form of physical activity and education around how to deal with pain and body mechanics. The workplace visit consisted of a visit with the employee and physical therapist to the workplace to inform rehabilitation. The model was developed over a lifetime time horizon with an NHS, personal social services (PSS) and societal perspective and an employer perspective. Model inputs were derived from the systematic review, literature and standard cost sources in the UK.

The model showed that from the NHS and societal perspective, interventions 1 and 2 were dominant (cost saving and more effective). From the employer perspective, the interventions which do not require a large cost input from the employer (intervention 2) are likely to be cost saving. Intervention 1 would cost the employer a net 34 pence per day of sick leave avoided. The authors carried out univariate sensitivity analyses which showed that the interventions were still dominant from the NHS and societal perspective. From the employer perspective doubling the probability of recurring sickness increased net cost per day avoided to over £1. All other assumptions tested improved cost-effectiveness. Two-way sensitivity analysis showed that if an intervention costs less than £3,000 and returns at least 3% of people to work, the cost per QALY gained is likely to be below £20,000.

[7] There are also problems with reporting of ICERs in the paper. Negative ICERs are reported.

The authors acknowledge that the evidence identified around effectiveness was poor quality, provided little detail about the intervention itself and was from non-UK countries. They also acknowledge that the lack of long-term data meant assumptions had to be made about return-to-work after 12 months. It was not possible to incorporate the structural uncertainties within probabilistic sensitivity analysis (PSA) so this was not undertaken. The utilities from published data are for a general population on sick leave, not a population restricted to MSDs. However, this appears to be the best available data for this input.

Taimela *et al.* [14] carried out an RCT which investigated the difference between the occupational health intervention programme and usual care for employees at high risk of sickness absence. The intervention consisted of consultation and employees' local occupational health services with the construction of an appropriate action plan and, if appropriate, referral to a further consultant to a specialist or psychologist. The usual care group could consult with the occupational nurse of physician, but on request and no action plan was developed. Patients were followed up for one year. Outcomes included the number of sickness absence days avoided and self-rated health outcomes. Resource use was collected using retrospective surveys and costs were obtained from standard Finnish cost sources. The economic evaluation took a healthcare perspective. An economic model was not developed but the costs and effectiveness outcomes from the trial were utilised.

The results showed that the intervention was dominant (more effective and cost saving) from the healthcare perspective. Two analyses were carried out: 1) included only worked with completed cost data, 2) imputed missing data. Analysis 1 showed that the cost of the intervention was -€80 (95%CI -€429 to €290) and the mean incremental effect was 1.8 (95%CI -9.7 to 12.4) days of avoided sickness absence. Analysis 2 showed that the mean incremental cost for the intervention was -€180 (95%CI -€452 to €98) and the mean incremntal effect was 10.5 (95%CI 0.6 to 20.4) days of avoided absence. The intervention was dominant in all one-way sensitivity analyses. Bootstrapping showed that in analysis 1, 49.9% of simulations were dominant and in analysis 2, 89.5% of simulations were dominant.

The authors acknowledge that there was a potential bias in cost results. Analysis between the two group indicated thsat total cost data of employees was not missing completely at random. Non-responders in the usual care group had significantly more sickness absence than the responders. This was addressed with imputation of missing data, which may underesitmate the costs in the control group. In addion, the authors acknowledge that imputation was not possible for health outcomes so these results should be interpreted with caution. In addition, the study was conducted in Finland so it may have limited applicability to the UK. Health utilisation data was collected using retrospective, self-report measures and the study had a short time horizon (one year) that may not reflect all important costs and differences.

Phillips *et al.* [15] carried out an RCT which investigated the costs and effectiveness of a computerised CBT for employees with depressive symptoms in a UK workplace setting. The intervention (MoodGYM) is a freely available course. Employers promoted the programme to employees. Participants undertook five one hour modules. The modules were usually taken weekly but the participant could progress at their own pace. The control group was given self-help websites which had been judged to be reliable sources of information in a previous review. Effectiveness outcomes included the EQ-5D, Patient Health Questionnaire (PHQ-9), Generalised Anxiety Disorder (GAD) and Clinical Outcomes in Routine Evaluation (CORE-10). Cost and lost employment data were collected using telephone interviews. Costs included hospital costs, community health care costs and the cost of lost work. The study took a societal perspective.

The intervention lasted five weeks, after which a 6-week and 12-week follow-up was carried out. Costs were only provided for six-week follow up so these are the results considered here. The study author confirmed that follow-up costs at 12 weeks were not available (personal communication 30/01/16). The study was not an economic evaluation but provided the costs and QALYs at 6-weeks which allowed ICERs to be calculated. The difference in QALYs gained between baseline and follow up was 0.082 (MoodGYM) and 0.083 (control). The cost results are not clear due to what appear to be calculation errors in the cost table. The study author states that the apparent discrepancy in calculations is due to the valid number of cases varying (personal communication 10/02/16). However, if taking only cost totals (which do not sum up to the figure in the same) there was a greater reduction in costs in the control group which would suggest that the intervention is dominated at 6-weeks. However, the difference in QALYs at 12-weeks shows the intervention to be more effective but costs were not provided for this time frame.

It was not possible to calculate ICERs for 12-week follow-up. However at 12-week follow-up the difference in QALYs gained at baseline and follow up was 0.170 (MoodGYM) and 0.167 (control), suggesting the intervention may be more effective at 12 weeks.

The authors acknowledge that study retention rate was low (56% at 6 weeks) and that more participants were lost to follow up in the intervention arm. In addition, the results were only available for a short time-horizon which may not reflect all important costs and benefits. Health care utilisation data was collect using self-report measures and consequently may lack reliability. Finally, this was not an economic evaluation (but allowed incremental results to be calculated) and, therefore, no sensitivity analysis was carried out.

Van Oostrom *et al.* (2010) [13] assessed a workplace intervention for employees on sick leave with distress compared to usual care. The intervention involved the employees and the supervisors aimed at formulating a consensus-based plan for return to work over a course of three meetings. Employees in the intervention arm received care from their OP and a return-to-work coordinator. Employees in the control arm were treated by their OP according to Dutch guidelines. Participants were followed-up over one year. Data were collected from patients at baseline, 3, 6, 9 and 12 months. Effectiveness outcomes included QALYs and duration until sustainable return to work. Resource use was collected for patients and costs from standard Dutch sources applied. The economic evaluation took a societal and an employer perspective. An economic model was not developed but the costs and effectiveness outcomes from the trial were utilised.

The CEA results showed that the intervention cost more but was more effective (mean duration of sick leave -0.71 in the intervention group) giving an ICER of €627 (£484). For the CUA, using the human capital approach (HCA) and friction cost approach (FCA)[8], the intervention was dominated (more costly and less effective). From the employers perspective using the HCA a cost saving of €1,987 (£1,535) was estimated and a cost saving of €6,243 (£4,824) using the FCA. A sensitivity analysis was carried out with a subgroup of patients who had an intention to return to work as baseline assessment. The CEA showed that for this subgroup the intervention was dominant (less costly and more effective).

The study has limited applicability to the UK. It is not clear if the costs would change when implementing the intervention in the UK (i.e. the NHS may incur some costs, not the employer). Further, the usual care group would differ in the UK because most employees will not routinely be referred to an occupational physician. The study was conducted with a one year time horizon which may not reflect all important costs and differences. In addition, the cost of work modifications was not included, meaning that the cost of the intervention is likely to be underestimated[7].

[8] HCA = 'considers the patient's hours of productivity that are lost and calculates productivity costs as the product of those total lost hours with the hourly wage. Every hour not worked is an hour lost, possibly until the patient's retirement age';
FCA = 'takes the employer's perspective and only counts those hours until another employee takes over the patient's work.8 Long-term absentees are replaced'[18].

Bernaards *et al.* (2011) [6] assessed two workplace interventions for computer workers with neck and upper limb symptoms compared with usual care in the Netherlands. One intervention was a work style intervention, which focused on behaviour change with regard to posture, workplace adjustments, breaks and work stress. The second intervention added on a physical activity component to the work style intervention. The goal of the physical activity intervention was to increase engagement with moderate to high intensity physical activity following group counselling. Recovery from neck and upper limb symptoms was assessed at 6 and 12 months after randomisation. Pain intensity was assessed at baseline, and at 6 months and 12 months after randomisation. Outcome measures also included costs of production losses, which were estimated using the human capital approach using the mean income of the Dutch population. The economic evaluation took an employer perspective. An economic model was not developed but costs were assigned to data collected in the RCT.

The economic analysis showed that the total costs for each arm were €1,907 (£1,607) (workstyle intervention), €2,811 (£2,369) (workplace and physical activity intervention) and €2,310 (£1,947) (usual care). Compared to usual care, the costs in the workstyle intervention arm were lower and the costs in the workplace intervention with physical activity arm were higher. The authors concluded that a workstyle intervention does not seem to be cost-effective for improving recovery from neck and upper limb symptoms but does seem to be cost-effective in reducing pain intensity. Combining a workstyle intervention with a physical activity intervention does not appear to be cost-effective from the employer's perspective.

The study has limited applicability to the UK. The costs are based on Dutch salaries and it is likely that 'usual care' differs in the UK due to the difference in occupational health practices between the Netherlands and the UK. In addition, the study was conducted with a one year time horizon which may not reflect all important costs and differences.

Hlobil *et al.* (2007) [5] assessed a workplace intervention for employees with non-specific subacute low back pain in the Netherlands. The intervention was a graded activity intervention, (in addition to usual care) which consisted of one-hour exercise sessions twice per week for a maximum of three months provided by trained physiotherapists (reported in RCT paper [19]. Participants were followed up for up to three years, although cost diaries (to collect healthcare utilisation data) were only collected throughout the first year. The economic evaluation took an employer perspective and examined the cost difference based on intervention costs, productivity costs and health care costs. An economic model was not developed, but a cost analysis was carried out.

The results showed that the difference in health care costs were €83 (£62) (in favour of usual care) in the first year. In the third year, the difference in health care costs is not provided but the difference in productiivty costs is €1,661 (£1,250) (net), €7,581 (£5,706) (gross) (in favour of the graded activity intervention).

The study has limited applicability to the UK given that health care costs are unlikely to be paid for by the employer in the UK. There is no mention of discounting the costs so it is not clear if this is applied. The study has a short time horizon when including health care costs, the three year analysis does not include health care resource use.

3.3.2 Evidence Statements Grouped By Type of Intervention

Evidence statement one – Early workplace intervention

There is weak evidence [11] [potentially serious limitations] from a study in Sweden [partially applicable] about the cost-effectiveness of an early workplace intervention consisting of an interview and workplace visit by a Swedish National Insurance case manager and occupational therapist. The results estimated that the direct cost savings were $1,195 per case (£765). The study may have limited applicability to the UK. The study was conducted in Sweden with the intervention focusing on the insurance agency case manager. It is not clear how this intervention would be implemented in the UK or how this would affect the costs. In addition, the study had a short time horizon which may not capture all relevant costs and benefits. Very little information was given on the methods and results which makes interpreting the results difficult.

Evidence statement two – Computerised CBT

There is weak evidence [15] [potentially serious limitations] from a study applicable to the UK context [directly applicable] about the cost-effectiveness of providing a free computerised CBT programme (MoodGYM) to employees in the UK from a societal perspective. The results estimated that the intervention was dominated (more costly and less effective) at 6-weeks. However, results suggest the intervention may be more effective at 12-weeks but data on costs were not provided. In addition, there appear to be calculation errors in the costs table. The study author states that the apparent discrepancy in calculations is due to the valid number of cases varying (personal communication 10/02/16). However, at 12-week follow-up the intervention group had slightly higher difference in QALYs than the control group. The key limitations of this study are that it had calculation errors and a very short time horizon (6 weeks for costs) which may not capture all relevant costs and benefits. In addition, the study had a low retention rate (56% at 6 weeks) with more participants lost to follow up in the intervention arm.

Evidence statement three – Workplace modifications

There is good evidence [16] [minor limitations] from a study in the UK [directly applicable] about the cost-effectiveness of an intervention for employees with MSDs which consisted of a workplace assessment followed by workplace modifications. The results estimated that the intervention was dominant from an NHS, personal social services (PSS) and societal perspective. From the employers perspective would cost a net 34 pence per day on sick leave. The main limitations are that the effectiveness data is from non-UK countries and little information was given on the interventions in the original studies. Additionally, assumptions were made after 12 months to apply a lifetime time horizon. Sensitivity analysis shows that changes to the cost-effectiveness were minimal within the parameters varied.

Evidence statement four – Physical activity, education and workplace visit

There is good evidence [16] [minor limitations] from a study in the UK [directly applicable] about the cost-effectiveness of an intervention for employees with MSDs. The intervention consisted of any form of physical activity and education around how to deal with pain and body mechanics and a visit with the employee and physical therapist to the workplace to inform rehabilitation. The results estimated that the intervention was dominant from an NHS, PSS and societal perspective and cost-saving from the employer's perspective. The main limitations are that the effectiveness data come from non-UK countries and little information was given on the interventions. Additionally, assumptions were made after 12 months to apply a lifetime time horizon. Sensitivity analysis shows that changes to the cost-effectiveness were minimal within the parameters varied.

Evidence statement five – Occupational health intervention

There is good evidence [14] [minor limitations] from a study in Finland [partially applicable] about the cost-effectiveness of an intervention for employees at high risk of sickness absence which consisted of consultation at an occupational health service, construction of action plan and in some cases referral to a further consultation. The results estimated that the intervention was dominant from a healthcare perspective. The main limitations are with the cost data which may be biased due to the missing data in the control group, the data come from a non-UK country and the study had only a one year time horizon which may not capture all important costs and benefits.

Evidence statement six – Integrated care (CBT-type therapy and plans for adaptations)

There is weak evidence [12] [potentially serious limitations] from a study in the Netherlands [partially applicable] assessing the cost-effectiveness of an intervention for integrated care, consisting of the employee and supervisor forming a plan for adaptations at work and a graded activity intervention based on cognitive behavioural principles. The results estimated that the intervention was dominant from a societal perspective. The study has limited applicability to the UK in that the usual care group would differ. Additionally, the study was conducted with a one year time horizon which may not reflect all important costs and differences and the cost of work modifications was not included, meaning that the cost of the intervention is likely to be underestimated.

Evidence statement seven – Return-to-work coordinator

There is weak evidence [13] [potentially serious limitations] from a study in the Netherlands [partially applicable] assessing the cost-effectiveness of an intervention for a return-to-work coordinator, consisting of three meetings involving the employee and the supervisor. The CEA results estimated that the intervention was dominated (more costly and less effective). In a subgroup of participants who reported an intention to return to work at baseline, the CEA showed the intervention to be dominant (less costly and more effective) from a societal perspective. The study has limited applicability to the UK in that the usual care group would differ. Additionally, the study was conducted with a one year time horizon which may not reflect all important costs and differences and the cost of work modifications was not included, meaning that the cost of the intervention is likely to be underestimated.

3.3.3 Evidence statements for non-UK studies taking an employer perspective

Evidence statement eight – Employer perspective

There is mixed evidence [minor limitations [6]] [potentially serious limitations [5]] from two studies in the Netherlands assessing the cost-effectiveness of interventions for employees with MSDs. One study assessed a work style intervention and a work style intervention plus physical activity intervention [6]. The study found that compared to usual care, the costs in the workstyle intervention arm were lower and the costs in the workplace intervention with physical activity were higher. A second study investigated a graded activity intervention [5]. The results showed that the difference in health care costs were in favour of usual care in the first year. In the third year, the difference in productivity costs was in favour of the graded activity intervention. Both studies have limited applicability to the UK given that occupational practice differs and so do the costs incurred by employers. However, these studies were included at the request of PHAC..

Section 4: Discussion

The following discussion gives an overview of the evidence identified, along with limitations of the evidence. The review identified a small body of literature that investigated the cost-effectiveness of workplace health interventions in populations with a chronic or long-term condition. Due to applicability and quality issues with studies rated as 'not applicable' or having 'very serious limitations' when completing the NICE recommended economic evaluation quality appraisal checklists, some studies were excluded at quality appraisal stage, as per the NICE methods manual [1].

Overall, eight studies were included in the review. Four of the studies were partially applicable and two directly applicable. Two further studies taking an employer perspective were included at the request of the PHAC. Five studies were rated as having potentially serious limitations and three as 'minor limitations'. Two of the studies were carried out within a UK context; one was carried out in Sweden, one in Finland and four in the Netherlands.

Seven of the studies did not include a model, but used trial data to calculate cost-effectiveness; these studies had time horizons of less than one year (with the exception of one study which gave some analysis for up to three years). One study used an economic model and took a lifetime time horizon. Five studies took broad perspectives, one took a healthcare system perspective and two studies reported a separate employer-only perspective. Two studies reported only an employer perspective.

One study [11] which examined an early workplace intervention compared to usual care for people with MSDs in Sweden concluded that the intervention resulted in cost-savings. However, there was very little data reported from this study, it had a short time horizon and it was carried out in a context which may not be applicable to the UK. It is not clear how the intervention would be carried out in the UK and how this would affect the costs. It is not possible to conclude from this study if such an intervention is likely to be cost-saving in the UK.

Another study [15] examined a computerised CBT intervention compared to usual care for people with depressive symptoms. The study results showed were difficult to interpret due to calculation errors. The results appear to show that the intervention was dominated at 6-weeks. However, effectiveness data shows that the intervention is more effective at 12 weeks. This study had only a short time horizon of six weeks. The effectiveness results were reported at 12 weeks at which point the intervention was more effective. The study had a poor participant retention rate. It is difficult to conclude with any certainty if the intervention would be cost-effective, given the short time horizon, and due to the data at 6 weeks showing that the intervention was less effective, but data at 12 weeks showing the intervention to be more effective, for which no cost data were provided and due to calculation errors.

Squires *et al.* [16] investigated the cost-effectiveness of two interventions relevant to this review for people with MSDs in the UK context. The first was an intervention in which workplace modifications were carried out (intervention 1) and the second was an intervention involving physical activity, education and a workplace visit (intervention 2). The results showed that intervention 1 and 2 were dominant from the NHS, PSS and societal perspective. From the employer perspective, intervention 1 cost the employer 34 pence per day on sick leave avoided and intervention 2 was cost-saving. Sensitivity analysis shows that changes to the cost-effectiveness were minimal within the parameters varied. The effectiveness data came from non-UK countries and assumptions were made after 12 months.

Taimela *et al.* [14] investigated cost-effectiveness of an occupational health intervention in employees with high risk of sickness absence. The analysis took the perspective of the Finnish healthcare system. The cost-effectiveness analysis showed the intervention to be dominant (cost saving and more effective). The study had limited applicability to the UK, had a short time horizon (one year) and had missing cost data, which may have affected the results.

Lambeek *et al.* [12] investigated cost-effectiveness of an intervention for employees with chronic low back pain in the Netherlands. The intervention was an integrated care intervention. In the cost-utility analysis, the intervention was dominant. The authors also used direct health care and productivity costs to calculate a net societal benefit of £5,744 and a ROI of £26. Six sensitivity analyses were carried out on the CEA and CUA and the direction of results remained the same with the intervention remaining dominant for the CUA. The study had limited applicability to the UK, had a short time horizon and excluded the cost of work modifications.

Van Oostrom *et al.* [13] assessed the cost-effectiveness of a workplace intervention for employees with distress in the Netherlands. The intervention involved the employees and the supervisors aimed at formulating a consensus-based plan for return to work over a course of three meetings. For the CUA, using the HCA and FCA, the intervention was dominated (more costly and less effective). A sensitivity analysis was carried out with a subgroup of patients who had an intention to return to work as baseline assessment. The CEA showed that for this subgroup the intervention was dominant (less costly and more effective). The study had limited applicability to the UK, had a short time horizon and excluded the cost of work modifications.

Hlobil *et al.* [5] and Bernaards *et al.* [6] carried out studies with employer only perspectives. The results were mixed and are difficult to draw conclusions relating the UK employers. Both studies were set in the Netherlands where the occupational health practice varies to the UK. In the Netherlands, employers pay for occupational health services. Employers in the Netherlands incur costs that are not applicable to UK employers and it is likely the 'usual care' will differ due to the occupational health practices differing.

Overall, the most frequently occurring limitations of the included studies were that the studies were not set in the UK, the time horizon was short and a model was not used. Results from studies taking place in countries other than the UK must be interpreted with caution. These differences vary by country but include: different costs being incurred to the UK, cost incurred by different payers to the UK and baseline rates differing due to occupational health practices differing between countries. The majority of analyses used a very short time horizon of one year or less. This time horizon might not capture all relevant effectiveness data. Where a model was used to extrapolate results to more than one year, assumptions had to be made resulting in a lot of uncertainty in the model results.

The evidence identified evaluates specific interventions, in specific contexts, for specific population groups. Therefore, it is difficult to draw any broad conclusions from the studies above. It is also difficult to draw conclusions due to the limitations of these studies. Each study shows results for specific scenarios. A flexible cost-calculator model will allow more broad conclusions to be drawn. This type of model could use sensitivity analysis in order to generate results that are more generalisable. For example, if an intervention costs 'x' amount, it must reduce sick days by 'y' amount to be considered cost-effective. Or conversely, if an intervention reduces sick days by 'c' amount, a maximum of 'd' should be paid for the intervention.

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APPENDIX A

PRISMA Checklist

Section/topic	#	Checklist item	Reported in Section
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	Title page
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	Executive summary
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	1.1 & 1.2
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	1.2 & 2.1
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	N/A
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	2.1
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	2.2
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix B
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	2.3 & 2.4
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	2.3 & 2.4
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	N/A
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	N/A
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	N/A
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	N/A
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	N/A
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	N/A

Section/topic	#	Checklist item	Reported in Section
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	3.1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Table 3.3 Appendix D
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Appendix E
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	N/A
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	N/A
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N/A
DISCUSSION			
Summary of evidence	24	Summarise the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	Section 4
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	Section 4
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	Section 4
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	This project has been funded by NICE

APPENDIX B

Search Strategies

Database Strategies

Database name: Medline

Strategy		
1	exp Workplace/ or exp Employment/ or exp Work/ or exp Industry/	321910
2	((job* or employ* or work*) adj (place* or site* or setting* or location* or organisation* or organization* or force*)).ti,ab.	9726
3	(workplace* or business* or shop* or factory or factories or company or companies or office* or industry or industries).ti,ab.	218365
4	(employee* or employer*).ti,ab.	41013
5	((labor or labour) adj market*).ti,ab.	2699
6	or/1-5	521683
7	Return to Work/	662
8	Employment, Supported/	931
9	Rehabilitation, Vocational/	8664
10	Social Support/	54647
11	Occupational Health/	26383
12	Occupational Health Services/	9818
13	((return* or stay* or remain* or back or keep* or retain*) adj2 work*).ti,ab.	11427
14	((support* or competitive) adj2 (work* or employment)).ti,ab.	6733
15	rehabilit*.ti,ab.	105547
16	(self management adj (programme or program)).ti,ab.	598
17	((peer or social) adj2 support*).ti,ab.	25499
18	((work* or employment or occupational) adj2 (intervention* or health* or accreditat* or train*)).ti,ab.	55535
19	(motivational adj2 interview*).ti,ab.	1919
20	((regulat* or adapt* or adjust* or change* or modif* or redesign* or re-design*) adj2 (premise* or building* or work* or equipment or office* or shop* or industry or industries or factory or factories or company or companies or practice* or hour* or responsib* or environment* or job*)).ti,ab.	43071
21	((flex* or part-time or "part time") adj4 (career* or employ* or work* or time* or job* or hour* or intervention*)).ti,ab.	7820
22	((job* or employment* or work*) adj2 coach*).ti,ab.	116
23	redeploy*.ti,ab.	378
24	workplace champion*.ti,ab.	1
25	(self help or self support*).ti,ab.	5097
26	or/7-25	319057
27	6 and 26	47601
28	((long term or long-term) adj4 (condition* or ill*)).ti,ab.	5657
29	(chronic adj4 (disease* or illness* or condition*)).ti,ab.	199135
30	Chronic Disease/	227619
31	Disabled Persons/	33265
32	((disabled or disability) adj3 (person* or people*)).ti,ab.	5295

33	Hypertension/	200321
34	hypertension.ti,ab.	276628
35	Depression/	83672
36	(depress* or anxiet*).ti,ab.	378304
37	Anxiety/	57291
38	Asthma/	109064
39	Asthma.ti,ab.	109531
40	Diabetes Mellitus/	95261
41	diabet*.ti,ab.	414065
42	Coronary Disease/	128384
43	((Coronary or ischemic) adj Heart Disease).ti,ab.	58955
44	(heart attack* or angina or myocardial infarction).ti,ab.	163680
45	Renal Insufficiency, Chronic/	8526
46	((Kidney* or renal) adj3 (disease* or failure* or insufficienc*)).ti,ab.	169760
47	Hypothyroidism/	24473
48	Hypothyroidism.ti,ab.	22811
49	Stroke/	66694
50	Ischemic Attack, Transient/	18455
51	(Stroke or Transient Ischemic Attack).ti,ab.	147633
52	Pulmonary Disease, Chronic Obstructive/	25537
53	Chronic Obstructive Pulmonary Disease.ti,ab.	28014
54	cancer*.ti,ab.	1104020
55	Cancer/	316866
56	Atrial Fibrillation/	37833
57	(atrial fibrilation or atrial fibrillation).ti,ab.	39433
58	Mental Health/	23742
59	((mental or somatic) adj (health or illness*)).ti,ab.	89556
60	Schizophrenia.ti,ab.	76126
61	Schizophrenia/	85795
62	Heart Failure/	90542
63	heart failure.ti,ab.	107817
64	Epilepsy/	63926
65	Epilep*.ti,ab.	96982
66	Cataract/	24331
67	cataract*.ti,ab.	42468
68	Dementia/	39350
69	dementia.ti,ab.	66694
70	(cognitive adj (impair* or disorder*)).ti,ab.	34374
71	Hypertension/	200321
72	hypertension.ti,ab.	276628

73	Arthritis, Rheumatoid/	85201
74	?Arthritis.ti,ab.	125747
75	Kidney Diseases/	73643
76	Multiple Sclerosis/	42754
77	Multiple Sclerosis.ti,ab.	49928
78	Colitis/	13653
79	Colitis.ti,ab.	44808
80	Crohn Disease/	32482
81	Crohn* Disease.ti,ab.	31622
82	Musculoskeletal Diseases/	8913
83	(Musculoskeletal adj (Disease* or disorder* or pain)).ti,ab.	8009
84	back pain*.ti,ab. or back pain/	37037
85	(spinal cord injur* or paraplegi*).ti,ab.	35177
86	Stress, Psychological/	93098
87	psychological stress*.ti,ab.	5393
88	HIV/	17166
89	Acquired Immunodeficiency Syndrome/	75682
90	(hiv or aquired immunodeficiency syndrome).ti,ab.	233242
91	Vision Disorders/ or Blindness/	40421
92	((sight or hearing or vision) adj3 (impairment* or disabilit* or disorder*)).ti,ab.	11280
93	blindness.ti,ab.	18958
94	Hearing Loss/	9333
95	(deafness or hearing loss).ti,ab.	42615
96	((carpal adj tunnel) or (repetitive adj strain*)).ti,ab.	7918
97	(parkinson* adj disease*).ti,ab.	57620
98	Parkinson Disease/	51087
99	((intellectual or developmental or psychiatric) adj disabilit*).ti,ab.	10530
100	(burn* or amputat*).ti,ab.	95507
101	(limb adj injur*).ti,ab.	766
102	(chronic adj2 fatigue).ti,ab.	5302
103	fatigue syndrome, chronic/	4690
104	Intellectual Disability/	48523
105	burns/	38854
106	amputation/	16808
107	or/28-106	4683441
108	27 and 107	16688
109	animals/	5544558
110	humans/	14246208
111	109 not 110	3989744
112	108 not 111	16670

113	(comment or editorial or news or letter).pt.	1561848
114	112 not 113	16390
115	limit 114 to (english language and yr="2000 - 2015")	10136
116	Economics/ or exp "Costs and Cost Analysis"/ or Economics, Dental/ or exp Economics, Hospital/ or exp Economics, Medical/ or Economics, Nursing/ or Economics, Pharmaceutical/ or Budgets/ or exp Models, Economic/ or Markov Chains/ or Monte Carlo Method/ or Decision Trees/	287215
117	(Economic* or cost or costs or costly or costing or costed or price or prices or pricing or pharmacoeconomic* or pharmaco economic* or budget*).ti,ab.	466385
118	((monte adj carlo) or markov or (decision adj2 (tree$ or analys$))).ti,ab.	38894
119	(value adj2 (money or monetary)).ti,ab.	1313
120	Quality of Life/ or Health Status Indicators/ or Quality-Adjusted Life Years/ or Value of Life/	156086
121	(quality of life or quality adjusted life or qaly* or qald* or qale* or qtime* or quality of wellbeing or quality of well-being or willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab.	152965
122	(disability adjusted life or daly).ti,ab.	1613
123	health* year* equivalent*.ti,ab.	38
124	(sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab.	16376
125	(sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).ti,ab.	1043
126	(sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab.	2930
127	(sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab.	21
128	(sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab.	340
129	(euroqol or euro qol or eq5d or eq 5d).ti,ab.	4363
130	or/116-129	825144
131	(((energy or oxygen) adj cost*) or (metabolic adj cost*) or ((energy or oxygen) adj expenditure*)).ti,ab.	21091
132	Animals/ not humans/	3989744
133	(comment or editorial or letter or news).pt.	1561848
134	or/131-133	5502186
135	130 not 134	731119
136	115 and 135	2408

Database name: MIP

Strategy		
1	((job* or employ* or work*) adj (place* or site* or setting* or location* or organisation* or organization* or force*)).ti,ab.	772
2	(workplace* or business* or shop* or factory or factories or company or companies or office* or industry or industries).ti,ab.	25134
3	(employee* or employer*).ti,ab.	2937
4	((labor or labour) adj market*).ti,ab.	269
5	((return* or stay* or remain* or back or keep* or retain*) adj2 work*).ti,ab.	1175
6	((support* or competitive) adj2 (work* or employment)).ti,ab.	1013
7	rehabilit*.ti,ab.	10896
8	(self management adj (programme or program)).ti,ab.	91
9	((peer or social) adj2 support*).ti,ab.	3063
10	((work* or employment or occupational) adj2 (intervention* or health* or accreditat* or train*)).ti,ab.	6355
11	(motivational adj2 interview*).ti,ab.	349
12	((regulat* or adapt* or adjust* or change* or modif* or redesign* or re-design*) adj2 (premise* or building* or work* or equipment or office* or shop* or industry or industries or factory or factories or company or companies or practice* or hour* or responsib* or environment* or job*)).ti,ab.	4847
13	((flex* or part-time or "part time") adj4 (career* or employ* or work* or time* or job* or hour* or intervention*)).ti,ab.	979
14	((job* or employmernt* or work*) adj2 coach*).ti,ab.	23
15	redeploy*.ti,ab.	45
16	workplace champion*.ti,ab.	0
17	(self help or self support*).ti,ab.	623
18	((long term or long-term) adj4 (condition* or ill*)).ti,ab.	700
19	(chronic adj4 (disease* or illness* or condition*)).ti,ab.	22139
20	((disabled or disability) adj3 (person* or people*)).ti,ab.	424
21	hypertension.ti,ab.	20146
22	(depress* or anxiet*).ti,ab.	33219
23	Asthma.ti,ab.	7168
24	diabet*.ti,ab.	40072
25	((Coronary or ischemic) adj Heart Disease).ti,ab.	3263
26	(heart attack* or angina or myocardial infarction).ti,ab.	9990
27	((Kidney* or renal) adj3 (disease* or failure* or insufficienc*)).ti,ab.	13000
28	Hypothyroidism.ti,ab.	1651
29	(Stroke or Transient Ischemic Attack).ti,ab.	15638
30	Chronic Obstructive Pulmonary Disease.ti,ab.	3157
31	cancer*.ti,ab.	107950
32	(atrial fibrilation or atrial fibrillation).ti,ab.	4308
33	((mental or somatic) adj (health or illness*)).ti,ab.	11200

34	Schizophrenia.ti,ab.	7234
35	heart failure.ti,ab.	8953
36	Epilep*.ti,ab.	7450
37	cataract*.ti,ab.	2916
38	dementia.ti,ab.	6621
39	(cognitive adj (impair* or disorder*)).ti,ab.	4929
40	hypertension.ti,ab.	20146
41	?Arthritis.ti,ab.	9467
42	Multiple Sclerosis.ti,ab.	4500
43	Colitis.ti,ab.	3567
44	Crohn* Disease.ti,ab.	2684
45	(Musculoskeletal adj (Disease* or disorder* or pain)).ti,ab.	1121
46	back pain*.ti,ab. or back pain/	3900
47	(spinal cord injur* or paraplegi*).ti,ab.	2973
48	psychological stress*.ti,ab.	525
49	Acquired Immunodeficiency Syndrome/	0
50	(hiv or aquired immunodeficiency syndrome).ti,ab.	17285
51	((sight or hearing or vision) adj3 (impairment* or disabilit* or disorder*)).ti,ab.	858
52	blindness.ti,ab.	1943
53	(deafness or hearing loss).ti,ab.	3259
54	((carpal adj tunnel) or (repetitive adj strain*)).ti,ab.	624
55	(parkinson* adj disease*).ti,ab.	6000
56	((intellectual or developmental or psychiatric) adj disabilit*).ti,ab.	1645
57	(burn* or amputat*).ti,ab.	8772
58	(limb adj injur*).ti,ab.	116
59	(chronic adj2 fatigue).ti,ab.	414
60	1 or 2 or 3 or 4	27704
61	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17	28072
62	or/18-59	331459
63	60 and 61 and 62	733
64	(comment or editorial or news or letter).pt.	94540
65	63 not 64	723
66	limit 65 to (english language and yr="2000 - 2015")	643
67	(Economic* or cost or costs or costly or costing or costed or price or prices or pricing or pharmacoeconomic* or pharmaco economic* or budget*).ti,ab.	65415
68	((monte adj carlo) or markov or (decision adj2 (tree$ or analys$))).ti,ab.	13067
69	(value adj2 (money or monetary)).ti,ab.	173
70	(quality of life or quality adjusted life or qaly* or qald* or qale* or qtime* or quality of wellbeing or quality of well-being or willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab.	20599
71	(disability adjusted life or daly).ti,ab.	315

72	health* year* equivalent*.ti,ab.	1
73	(sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab.	1710
74	(sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).ti,ab.	446
75	(sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab.	416
76	(sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab.	3
77	(sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab.	11
78	(euroqol or euro qol or eq5d or eq 5d).ti,ab.	726
79	(((energy or oxygen) adj cost*) or (metabolic adj cost*) or ((energy or oxygen) adj expenditure*)).ti,ab.	2081
80	or/67-78	95902
81	(comment or editorial or letter or news).pt.	94540
82	79 or 81	96598
83	80 not 82	93618
84	66 and 83	122

Database name: NHS EED

Strategy		
1	Workplace/	32
2	exp Employment/	97
3	exp Workplace/	32
4	exp Work/	6
5	exp Industry/	50
6	exp Commerce/	33
7	((job* or employ* or work*) adj (place* or site* or setting* or location* or organisation* or organization* or force*)).ti.	6
8	(workplace* or business* or shop* or factory or factories or company or companies or office* or industry or industries).ti.	63
9	(employee* or employer*).ti.	32
10	((labor or labour) adj market*).ti.	0
11	or/1-10	250
12	Employment, Supported/	8
13	Rehabilitation, Vocational/	15
14	Social Support/	63
15	Occupational Health/	30
16	Occupational Health Services/	29
17	((return* or stay* or remain* or back or keep* or retain*) adj2 work*).ti.	6
18	((support* or competitive) adj2 (work* or employment)).ti.	9
19	rehabilit*.ti.	117
20	(self management adj (programme or program)).ti.	11
21	((peer or social) adj2 support*).ti.	8
22	((work* or employment or occupational) adj2 (intervention* or health* or accreditat* or train*)).ti.	75
23	(motivational adj2 interview*).ti.	5
24	((regulat* or adapt * or adjust* or change* or modif* or redesign* or re-design*) adj2 (premise* or building* or work* or equipment or office* or shop* or industry or industries or factory or factories or company or companies or practice* or hour* or responsib* or environment* or job*)).ti.	5
25	((flex* or part-time or "part time") adj4 (career* or employ* or work* or time* or job* or hour* or intervention*)).ti.	0
26	((job* or employment* or work*) adj2 coach*).ti.	0
27	redeploy*.ti.	0
28	workplace champion*.ti.	0
29	(self help or self support*).ti.	7
30	Self-Help Groups/	21
31	or/12-30	359
32	11 and 31	54
33	limit 32 to yr="2000 - 2015"	47

Database name: EconLit

Strategy			
1	((job* or employ* or work*) adj (place* or site* or setting* or location* or organisation* or organization* or force*)).ti,ab.	2113	Advanced
2	(workplace* or business* or shop* or factory or factories or company or companies or office* or industry or industries).ti,ab.	164715	Advanced
3	(employee* or employer*).ti,ab.	20333	Advanced
4	((labor or labour) adj market*).ti,ab.	31182	Advanced
5	or/1-4	203235	Advanced
6	((return* or stay* or remain* or back or keep* or retain*) adj2 work*).ti,ab.	1123	Advanced
7	((support* or competitive) adj2 (work* or employment)).ti,ab.	736	Advanced
8	rehabilit*.ti,ab.	1036	Advanced
9	(self management adj (programme or program)).ti,ab.	2	Advanced
10	((peer or social) adj2 support*).ti,ab.	652	Advanced
11	((work* or employment or occupational) adj2 (intervention* or health* or accreditat* or train*)).ti,ab.	2335	Advanced
12	(motivational adj2 interview*).ti,ab.	1	Advanced
13	((regulat* or adapt* or adjust* or change* or modif* or redesign* or re-design*) adj2 (premise* or building* or work* or equipment or office* or shop* or industry or industries or factory or factories or company or companies or practice* or hour* or responsib* or environment* or job*)).ti,ab.	9494	Advanced
14	((flex* or part-time or "part time") adj4 (career* or employ* or work* or time* or job* or hour* or intervention*)).ti,ab.	3166	Advanced
15	((job* or employment* or work*) adj2 coach*).ti,ab.	16	Advanced
16	redeploy*.ti,ab.	152	Advanced
17	workplace champion*.ti,ab.	0	Advanced
18	(self help or self support*).ti,ab.	479	Advanced
19	or/6-18	18601	Advanced
20	5 and 19	8516	Advanced
21	((long term or long-term) adj4 (condition* or ill*)).ti,ab.	223	Advanced
22	(chronic adj4 (disease* or illness* or condition*)).ti,ab.	691	Advanced
23	((disabled or disability) adj3 (person* or people*)).ti,ab.	296	Advanced
24	hypertension.ti,ab.	173	Advanced
25	(depress* or anxiet*).ti,ab.	5603	Advanced
26	Asthma.ti,ab.	173	Advanced
27	diabet*.ti,ab.	388	Advanced
28	((Coronary or ischemic) adj Heart Disease).ti,ab.	76	Advanced
29	(heart attack* or angina or myocardial infarction).ti,ab.	269	Advanced
30	((Kidney* or renal) adj3 (disease* or failure* or insufficienc*)).ti,ab.	89	Advanced
31	Hypothyroidism.ti,ab.	1	Advanced
32	Chronic Obstructive Pulmonary Disease.ti,ab.	33	Advanced
33	cancer*.ti,ab.	1134	Advanced

34	(atrial fibrilation or atrial fibrillation).ti,ab.	10	Advanced
35	((mental or somatic) adj (health or illness*)).ti,ab.	1339	Advanced
36	Schizophrenia.ti,ab.	125	Advanced
37	heart failure.ti,ab.	75	Advanced
38	Epilep*.ti,ab.	32	Advanced
39	cataract*.ti,ab.	24	Advanced
40	dementia.ti,ab.	65	Advanced
41	(cognitive adj (impair* or disorder*)).ti,ab.	22	Advanced
42	hypertension.ti,ab.	173	Advanced
43	Arthritis.ti,ab.	90	Advanced
44	Multiple Sclerosis.ti,ab.	39	Advanced
45	Colitis.ti,ab.	3	Advanced
46	Crohn* Disease.ti,ab.	4	Advanced
47	(Musculoskeletal adj (Disease* or disorder* or pain)).ti,ab.	18	Advanced
48	back pain*.ti,ab.	28	Advanced
49	(spinal cord injur* or paraplegi*).ti,ab.	12	Advanced
50	psychological stress*.ti,ab.	28	Advanced
51	(hiv or aquired immunodeficiency syndrome).ti,ab.	1531	Advanced
52	((sight or hearing or vision) adj3 (impairment* or disabilit* or disorder*)).ti,ab.	19	Advanced
53	blindness.ti,ab.	81	Advanced
54	(deafness or hearing loss).ti,ab.	14	Advanced
55	((carpal adj tunnel) or (repetitive adj strain*)).ti,ab.	5	Advanced
56	(parkinson* adj disease*).ti,ab.	34	Advanced
57	((intellectual or developmental or psychiatric) adj disabilit*).ti,ab.	39	Advanced
58	(burn* or amputat*).ti,ab.	998	Advanced
59	(limb adj injur*).ti,ab.	0	Advanced
60	(chronic adj2 fatigue).ti,ab.	3	Advanced
61	or/21-60	12812	Advanced
62	20 and 61	175	Advanced
63	limit 62 to yr="2000 - 2015"	142	Advanced

Database name: Embase

Strategy		
1	exp Workplace/ or exp Employment/ or exp Work/ or exp Industry/	525555
2	((job* or employ* or work*) adj (place* or site* or setting* or location* or organisation* or organization* or force*)).ti,ab.	12704
3	(workplace* or worksite* or workforce* or work force).ti,ab.	51571
4	((business* or office* or company or companies) adj2 (place* or site* or location* or setting*)).ti,ab.	3147
5	(employee* or employer*).ti,ab.	51154
6	((labor or labour) adj market*).ti,ab.	3056
7	or/1-6	582338
8	return to work/	1737
9	work resumption/	3236
10	vocational rehabilitation/	8039
11	social support/	63579
12	occupational health/	36414
13	occupational health service/	9405
14	((return* or stay* or remain* or back or keep* or retain*) adj2 work*).ti,ab.	15306
15	((support* or competitive) adj2 (work* or employment)).ti,ab.	10287
16	(rehabilit* adj2 (vocational or workplace or work or job)).ti,ab.	3272
17	(self management adj program*).ti,ab.	1371
18	((peer or social) adj2 support*).ti,ab.	35257
19	((work* or employment or occupational) adj2 (intervention* or health* or accreditat* or train*)).ti,ab.	70952
20	((regulat* or adapt* or adjust* or change* or modif* or redesign* or re-design*) adj2 (premise* or building* or work* or equipment or office* or shop* or industry or industries or factory or factories or company or companies or practice* or hour* or responsib* or environment* or job*)).ti,ab.	57900
21	((flex* or part-time or "part time") adj4 (career* or employ* or work* or time* or job* or hour* or intervention*)).ti,ab.	10691
22	((job* or employment* or work*) adj2 coach*).ti,ab.	222
23	redeploy*.ti,ab.	497
24	workplace champion*.ti,ab.	1
25	(motivational adj2 interview*).ti,ab.	3271
26	(self help or self support*).ti,ab.	7001
27	or/8-26	282272
28	7 and 27	65881
29	((long term or long-term) adj4 (condition* or ill*)).ti,ab.	7807
30	(chronic adj4 (disease* or illness* or condition*)).ti,ab.	294226
31	chronic disease/	159259
32	disabled person/	26677
33	((disabled or disability) adj3 (person* or people*)).ti,ab.	7604

34	hypertension/	419557
35	hypertension.ti,ab.	399069
36	depression/	262309
37	(depress* or anxiet*).ti,ab.	507242
38	anxiety/	131212
39	asthma/	175000
40	asthma.ti,ab.	154208
41	diabetes mellitus/	395819
42	diabet*.ti,ab.	623476
43	coronary artery disease/	160103
44	((Coronary or ischemic) adj Heart* Disease*).ti,ab.	79749
45	(heart attack* or angina or myocardial infarction).ti,ab.	227356
46	chronic kidney failure/	53862
47	((Kidney* or renal) adj3 (disease* or failure* or insufficienc*)).ti,ab.	232581
48	hypothyroidism/	42631
49	Hypothyroidism.ti,ab.	30541
50	cerebrovascular accident/	104682
51	transient ischemic attack/	26863
52	(Stroke or Transient Ischemic Attack).ti,ab.	236563
53	chronic obstructive lung disease/	78625
54	cancer*.ti,ab.	1585530
55	neoplasm/	385612
56	heart atrium fibrillation/	88745
57	(atrial fibrilation or atrial fibrillation).ti,ab.	71571
58	mental health/	83745
59	((mental or somatic) adj (health or illness*)).ti,ab.	125669
60	schizophrenia/	141126
61	Schizophrenia.ti,ab.	108135
62	heart failure/	155112
63	heart failure.ti,ab.	173728
64	epilepsy/	107556
65	Epilep*.ti,ab.	141751
66	cataract/	40526
67	cataract*.ti,ab.	49371
68	dementia/	84862
69	dementia.ti,ab.	99290
70	(cognitive adj (impair* or disorder*)).ti,ab.	58270
71	rheumatoid arthritis/	139153
72	?Arthritis.ti,ab.	176378
73	kidney disease/	90488

74	multiple sclerosis/	87529
75	Multiple Sclerosis.ti,ab.	74812
76	colitis/	31111
77	Colitis.ti,ab.	66895
78	Crohn disease/	61362
79	Crohn* Disease.ti,ab.	48326
80	musculoskeletal disease/	19827
81	(Musculoskeletal adj (Disease* or disorder* or pain)).ti,ab.	11987
82	backache/ or back pain*.ti,ab.	65883
83	(spinal cord injur* or paraplegi*).ti,ab.	46482
84	stress/	104192
85	psychological stress*.ti,ab.	7641
86	Human immunodeficiency virus/	79459
87	acquired immune deficiency syndrome/	125028
88	(hiv or aquired immunodeficiency syndrome).ti,ab.	289283
89	blindness/	25568
90	((sight or hearing or vision) adj3 (impairment* or disabilit* or disorder*)).ti,ab.	14157
91	blindness.ti,ab.	23575
92	hearing impairment/	41434
93	(deafness or hearing loss).ti,ab.	51381
94	((carpal adj tunnel) or (repetitive adj strain*)).ti,ab.	9907
95	(parkinson* adj disease*).ti,ab.	84854
96	Parkinson disease/	104448
97	((intellectual or developmental or psychiatric) adj disabilit*).ti,ab.	16161
98	(burn* or amputat*).ti,ab.	124712
99	(limb adj injur*).ti,ab.	1053
100	(chronic adj2 fatigue).ti,ab.	7379
101	chronic fatigue syndrome/	7750
102	intellectual impairment/	12645
103	burn/	46161
104	amputation/	16758
105	or/29-104	6436540
106	28 and 105	22992
107	limit 106 to (english language and yr="2000 - 2015")	16903
108	animals/	1674065
109	humans/	16020889
110	108 not 109	1257441
111	107 not 110	16898
112	limit 111 to (conference abstract or conference paper or conference proceeding or "conference review")	3373
113	111 not 112	13525

114	limit 113 to embase	9232
115	health-economics/ or exp economic-evaluation/ or exp health-care-cost/ or pharmacoeconomics/ or Monte Carlo Method/ or Decision Tree/	439963
116	(Economic* or cost or costs or costly or costing or costed or price or prices or pricing or pharmacoeconomic* or pharmaco economic* or budget*).ti,ab.	666717
117	((monte adj carlo) or markov or (decision adj2 (tree$ or analys$))).ti,ab.	55483
118	(value adj2 (money or monetary)).ti,ab.	2029
119	Quality of Life/ or Quality Adjusted Life Year/ or Quality of Life Index/ or Short Form 36/ or Health Status/	381174
120	(quality of life or quality adjusted life or qaly* or qald* or qale* or qtime* or quality of wellbeing or quality of well-being or willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab.	256741
121	(disability adjusted life or daly).ti,ab.	2307
122	Health* year* equivalent*.ti,ab.	39
123	(sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six or sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six or sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve or sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen or sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty or euroqol or euro qol or eq5d or eq 5d).ti,ab.	40802
124	or/115-123	1282547
125	exp animal/ or exp animal-experiment/ or nonhuman/	21468098
126	(rat or rats or mouse or mice or hamster or hamsters or animal or animals or dog or dogs or cat or cats or bovine or sheep).ti,ab,sh.	4820956
127	exp human/ or human-experiment/	16091963
128	125 or 126	21594291
129	128 not (128 and 127)	5503260
130	(comment or editorial or letter or news).pt.	1375197
131	(((energy or oxygen) adj cost*) or (metabolic adj cost*) or ((energy or oxygen) adj expenditure*)).ti,ab.	27127
132	or/129-131	6846078
133	124 not 132	1126852
134	114 and 133	2639

APPENDIX C

Excluded Studies List

Author	Title	Year	Reason
Abbass A.	Intensive short-term dynamic psychotherapy in a private psychiatric office: Clinical and cost effectiveness.	2002	Intervention not relevant
Abbott J-a M, *et al*.	A cluster randomised trial of an internet-based intervention program for tinnitus distress in an industrial setting.	2009	No relevant outcomes
Adepoju O E, *et al*.	Can chronic disease management programs for patients with type 2 diabetes reduce productivity-related indirect costs of the disease? Evidence from a randomized controlled trial.	2014	Intervention not relevant
Aelfers E, *et al*.	Effectiveness of a minimal psychological intervention to reduce mild to moderate depression and chronic fatigue in a working population: the design of a randomized controlled trial.	2013	Protocol
Akinci F, *et al*.	Improving the health status of US working adults with type 2 diabetes mellitus: A review.	2003	No relevant outcomes
Aldana S G.	Financial impact of health promotion programs: a comprehensive review of the literature.	2001	Review
Aldana S G, *et al*.	Financial impact of a comprehensive multisite workplace health promotion program.	2005	Wrong population
Anderson P, *et al*.	Reducing the silent burden of impaired mental health.	2011	Review
Arends I, *et al*.	Interventions to facilitate return to work in adults with adjustment disorders.	2012	Review
Arends I, *et al*.	Prevention of recurrent sickness absence among employees with common mental disorders: design of a cluster-randomised controlled trial with cost-benefit and effectiveness evaluation.	2010	Protocol
Backman C L.	Employment and work disability in rheumatoid arthritis.	2004	No relevant outcomes
Badii M, *et al*.	Evaluation of a comprehensive integrated workplace-based program to reduce occupational musculoskeletal injury and its associated morbidity in a large hospital.	2006	No relevant outcomes
Barham K, *et al*.	Diabetes prevention and control in the workplace: a pilot project for county employees.	2011	No relevant outcomes
Bell J A, *et al*.	Exercise for the primary, secondary and tertiary prevention of low back pain in the workplace: a systematic review.	2009	Review
Bernacki E J, *et al*.	A facilitated early return to work program at a large urban medical center.	2000	No relevant outcomes
Boocock M G, *et al*.	Interventions for the prevention and management of neck/upper extremity musculoskeletal conditions: a systematic review.	2007	Review
Brattberg G.	Internet-based rehabilitation for individuals with chronic pain and burnout II: a long-term follow-up.	2007	No relevant outcomes
Bultmann U, *et al*.	Coordinated and tailored work rehabilitation: a randomized controlled trial with economic evaluation undertaken with workers on sick leave due to musculoskeletal disorders.	2009	Intervention not relevant
Burton W N, *et al*.	Worksite-based diabetes disease management program.	2002	No relevant outcomes
Carroll C, *et al*.	Workplace involvement improves return to work rates among employees with back pain on long-term sick leave: a systematic review of the effectiveness and cost-effectiveness of interventions.	2010	Review
Centre For R, *et al*.	Economic evaluation of a weight control program with e-mail and telephone counseling among overweight employees: a randomized controlled trial (Provisional abstract).	2012	Wrong population

Author	Title	Year	Reason
Centre For R, *et al*.	Cost-effectiveness of a workplace-based incentivized weight loss program (Provisional abstract).	2012	Wrong population
Cherniack M.	Integrated health programs, health outcomes, and return on investment: measuring workplace health promotion and integrated program effectiveness.	2013	Wrong population
Cocker F, *et al*.	Depression in working adults: comparing the costs and health outcomes of working when ill.	2014	Intervention not relevant
Dahl J, *et al*.	Acceptance and commitment therapy and the treatment of persons at risk for long-term disability resulting from stress and pain symptoms: A preliminary randomized trial.	2004	No relevant outcomes
Dewa C S, *et al*.	Cost, effectiveness, and cost-effectiveness of a collaborative mental health care program for people receiving short-term disability benefits for psychiatric disorders.	2009	Intervention not relevant
Dowler D L, *et al*.	Personal assistance services in the workplace: A literature review.	2011	No relevant outcomes
Dunning K K, *et al*.	Can a transitional work grant program in a workers' compensation system reduce cost and facilitate return to work?	2008	Wrong population
Ebert D D, *et al*.	Efficacy and cost-effectiveness of minimal guided and unguided internet-based mobile supported stress-management in employees with occupational stress: a three-armed randomised controlled trial.	2014	Protocol
Feuerstein M, *et al*.	Multicomponent intervention for work-related upper extremity disorders.	2000	No relevant outcomes
Furlan A D, *et al*.	Systematic review of intervention practices for depression in the workplace.	2012	No relevant outcomes
Geraedts A S, *et al*.	Web-based guided self-help for employees with depressive symptoms (Happy@Work): design of a randomized controlled trial.	2013	Protocol
Goldberg R J.	Depression in the workplace: economics and interventions.	2001	No relevant outcomes
Hamberg-Van Reenen H H, *et al*.	Worksite mental health interventions: a systematic review of economic evaluations.	2012	Review
Hoving J L, *et al*.	Non-pharmacological interventions for preventing job loss in workers with inflammatory arthritis.	2014	No relevant outcomes
Jensen C, *et al*.	Cost-effectiveness and cost-benefit analyses of a multidisciplinary intervention compared with a brief intervention to facilitate return to work in sick-listed patients with low back pain.	2013	Intervention not relevant
Jensen I B, *et al*.	Cost effectiveness of two rehabilitation programmes for neck and back pain patients: A seven year follow-up.	2009	Intervention not relevant
Johannigman M J, *et al*.	Medication therapy management and condition care services in a community-based employer setting.	2010	Intervention not relevant
Karrholm J, *et al*.	Effects on work resumption of a co-operation project in vocational rehabilitation. Systematic, multi-professional, client-centred and solution-oriented co-operation.	2006	Intervention not relevant
Lagerveld S E, *et al*.	Work-focused treatment of common mental disorders and return to work: a comparative outcome study.	2012	Intervention not relevant
Leon L, *et al*.	Effectiveness of an early cognitive-behavioral treatment in patients with work disability due to musculoskeletal disorders.	2009	Intervention not relevant
Lerner D, *et al*.	Impact of a work-focused intervention on the productivity and symptoms of employees with depression.	2012	No relevant outcomes
Lidal I B, *et al*.	Return to work following spinal cord injury: A review.	2007	Review

Author	Title	Year	Reason
Lo Sasso A T, *et al*.	Modeling the impact of enhanced depression treatment on workplace functioning and costs: a cost-benefit approach.	2006	Intervention not relevant
Lu C, *et al*.	Effects of an incentive-based online physical activity intervention on health care costs.	2008	Wrong population
Meijster T, *et al*.	Cost-benefit analysis in occupational health: a comparison of intervention scenarios for occupational asthma and rhinitis among bakery workers.	2011	Wrong population
Nishina M.	Applications of teleworking based on a study of disabled workers.	2010	No relevant outcomes
Nord D, *et al*.	The state of the science of employment and economic self-sufficiency for people with intellectual and developmental disabilities.	2013	No relevant outcomes
Osilla K C, *et al*.	Systematic review of the impact of worksite wellness programs.	2012	Review
Ozminkowski R J, *et al*.	Long-term impact of Johnson & Johnson's Health & Wellness Program on health care utilization and expenditures.	2002	Wrong population
Palmer K T, *et al*.	Effectiveness of community- and workplace-based interventions to manage musculoskeletal-related sickness absence and job loss: a systematic review.	2012	Review
Pengel H M, *et al*.	Systematic review of conservative interventions for subacute low back pain.	2002	Review
Pomaki G, *et al*.	Workplace-based work disability prevention interventions for workers with common mental health conditions: a review of the literature.	2012	Review
Riotto M.	Depression in the workplace: negative effects, perspective on drug costs and benefit solutions.	2001	No relevant outcomes
Roelofs P D D M, *et al*.	Cost-effectiveness of lumbar supports for home care workers with recurrent low back pain: An economic evaluation alongside a randomized-controlled trial.	2010	Wrong population
Salkever D.	Social costs of expanding access to evidence-based supported employment: concepts and interpretive review of evidence.	2013	Intervention not relevant
Schene A H, *et al*.	Adjuvant occupational therapy for work-related major depression works: Randomized trial including economic evaluation.	2007	Intervention not relevant
Schweikert B, *et al*.	Effectiveness and cost-effectiveness of adding a cognitive behavioral treatment to the rehabilitation of chronic low back pain.	2006	Intervention not relevant
Serxner S, *et al*.	The impact of a worksite health promotion program on short-term disability usage.	2001	No relevant outcomes
Soklaridis S, *et al*.	The economic cost of return to work: an employer's perspective.	2012	No relevant outcomes
Solovieva T I, *et al*.	Employer benefits from making workplace accommodations.	2011	No relevant outcomes
Solovieva T I, *et al*.	Cost of workplace accommodations for individuals with disabilities: with or without personal assistance services.	2009	No relevant outcomes
Tompa E, *et al*.	A systematic review of disability management interventions with economic evaluations.	2008	Review
Tompa E, *et al*.	Practice and potential of economic evaluation of workplace-based interventions for occupational health and safety.	2006	Review
Tveito T H, *et al*.	Low back pain interventions at the workplace: a systematic literature review.	2004	Review
Van Der Feltz-Cornelis C M, *et al*.	Randomised controlled trial of a psychiatric consultation model for treatment of common mental disorder in the occupational health setting.	2007	Protocol

Author	Title	Year	Reason
Van Der Meer V, *et al*.	Cost-effectiveness of internet-based self-management compared with usual care in Asthma.	2011	Intervention not relevant
Van Duijn M, *et al*.	The effects of timing on the cost-effectiveness of interventions for workers on sick leave due to low back pain.	2010	Intervention not relevant
Vermeulen S J, *et al*.	Economic evaluation of a participatory return-to-work intervention for temporary agency and unemployed workers sick-listed due to musculoskeletal disorders.	2013	Wrong population
Wang P S, *et al*.	The costs and benefits of enhanced depression care to employers.	2006	Intervention not relevant
Loisel *et al*	Cost-benefit and cost-effectiveness analysis of a disability prevention model for back pain management: a six year follow up study.	2002	No relevant outcomes
Rebergen *et al*. 2009	Cost-effectiveness of guideline-based care for workers with mental health problems.	2009	Intervention not relevant
Vogt *et al*. 2004	Economic evaluation of CISM - A pilot study.		Wrong population

APPENDIX D

Data Extraction Tables

Study details: Arnetz *et al.* (2003)

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
Authors: Arnetz *et al*. **Year:** 2003 **Aim of study:** The purpose of the present prospective controlled study was to assess the possible beneficial effects from early medical, rehabilitation and vocational interventions on employee absenteeism and well-being **Type of economic analysis:** Study states that is it a cost-benefit analysis but it appears a cost consequences analysis **Economic perspective:** NR **Quality score:** Very serious limitations **Applicability:** Partially applicable	**Source population/s:** Patients with physician-diagnosed first or recurrent musculoskeletal disorders **Setting:** Study conducted in Sweden. Participants recruited from the Swedish National Insurance Agency at two local branches **Data sources:** Effectiveness: RCT data Resource use and costs: Resource use from the RCT, unit costs might have been taken from the National Insurance Agency (not clearly reported) Self-rated health: questionnaire	**Intervention/s description:** Early workplace intervention consisting of an interview and workplace visit with vocational training in some cases **Comparator / control/s description:** Usual care **Sample sizes:** Intervention group n=65, usual care group n=72	**Outcomes:** Economic outcomes: rehab and vocational costs, sick days reimbursements, other outcomes: days to rehab investigation, rehab and rehab plan, sick days, work hours, self-rated health **Time horizon:** 1 year **Discount rates:** **Benefits:** N/A **Costs:** N/A **Perspective:** NR **Measures of uncertainty:** None performed **Modelling method**: No economic model. RCT data was used	**Primary analysis:** Benefit-to-cost ratio based on direct benefits and costs only was calculated to be 6.8, representing a cost saving of 7,164 Skr ($1,195) (£764.65) per case. **Secondary analysis:** No sensitivity analysis carried out	**Limitations identified by author:** NR **Limitations identified by review team**: Very little information on the sources for cost data used in the economic evaluation. Short time horizon which may not reflect all important costs and benefits Incremental analysis not reported Sensitivity analysis not performed Self-rated health not estimated quantitatively but qualitatively (good, bad etc.) Study was conducted in Sweden with the intervention focusing on the insurance agency case manager which may not be applicable to the UK **Evidence gaps and/or recommendations for future research:** Need to study the role and attitude of employer and its impact on return-to-work. Research to identify which specific parts of the intervention are effective. Research on long-term sick leave **Source of funding:** Research Unit of the Stockholm Branch of the Swedish National Insurance Plan

Study details: Lambeek *et al.* (2010)

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
Authors: Lambeek *et al.* **Year:** 2010 **Aim of study:** To evaluate the cost effectiveness, cost utility and cost-benefit of an integrated care programme compared with usual care for sick listed patients with chronic low back pain **Type of economic analysis:** Cost-effectiveness, cost-utility analysis and cost-benefit (ROI) **Economic perspective:** Societal perspective **Quality score:** Potentially serious limitations **Applicability:** Partially applicable	**Source population/s:** Adults aged 18-65 sick listed due to chronic low back pain **Setting:** Primary care and secondary care in the Netherlands 2005-9 **Data sources:** Effectiveness outcomes: RCT Health outcomes: EG-5D RCT Costs: standard sources Resource use: RCT	**Intervention/s description:** Integrated care which consisted of workplace intervention and graded activity programme. **Comparator / control/s description:** Usual care provided by GPs and OPs according to Dutch guidelines **Sample sizes:** Intervention n=66 Usual care n=68	**Outcomes:** Economic outcomes, ICER, ICUR, cost-benefit. Other outcomes: Duration until sustainable work and QALYs **Time horizon:** One year **Discount rates:** **Benefits:** N/A **Costs:** N/A **Perspective:** Societal perspective **Measures of uncertainty:** Six sensitivity analyses and bootstrapping **Modelling method**: No economic model. RCT data used,	**Primary analysis:** ICER* (effectiveness = mean difference in net sick leave in days) Cost difference: £217, effect difference: -68, ICER: -£3 ICUR** Cost difference: -£5,310, effect difference: 0.09, ICUR: -£61,000 (intervention dominant) **CBA/ROI*** ** (calculated using direct health care costs and productivity costs) Net societal benefit: £5,744 ROI: £26 (for every £1 invested, £26 will be returned) **Secondary analysis:** Six sensitivity analyses were carried out. For the ICER these were reported as ranging from -£2 to -£15. The ICUR ranged from -£42,000 to -£66,000	**Limitations identified by author:** The cost of work modifications was not included so the cost of the intervention is likely to be underestimated. Sensitivity analysis was carried out around this. Use of retrospective data collection **Limitations identified by review team**: The study was conducted in the Netherlands where employers pay for occupational health services so this has limited generalisability to UK employers. Short time horizon which may not reflect all important costs and benefits. The ICER calculations appear incorrect and are not presented correctly (negative ICERs should not be presented). **Evidence gaps and/or recommendations for future research:** Research on long-term effects **Source of funding:** VU University Medical Center, TNO Work and Employment, Dutch Health Insurance Executive Council

* Results are reported as they are in the article. There are some problems with calculations and interpretation. Negative ICER's should indicate that the intervention is dominant (less costly and more effective). However, this is not the case here as the intervention is both more costly and more effective. The breakdown of costs and benefits is reported in this table.

** Results are reported as they are in the article. There are some problems with calculations and interpretation.

*** CBA calculations appear to be just the different between the costs of the intervention and the cost of the benefits.

Study details: Phillips *et al.* (2014)

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
Authors: Phillips *et al.* **Year:** 2014 **Aim of study:** To investigate the effectiveness of a computerized CBT intervention (MoodGYM) in a workplace context **Type of economic analysis:** Cost study (cost-effectiveness can be calculated at 6 weeks follow-up) **Economic perspective:** Societal **Quality score:** Very serious limitations **Applicability:** Directly applicable	**Source population/s:** Employed people with a given PHQ -9 (depression questionnaire) score **Setting:** UK workplace context **Data sources:** Effectiveness and resource use: RCT Costs: PSSRU	**Intervention/s description:** MoodGYM – a freely available computerised course. Employers promoted this to staff. **Comparator / control/s description:** Control group: website selected from a previous review of self-help in mental health judged to be reliable sources of information. **Sample sizes:** 359 completed 6-week online assessments	**Outcomes:** Economic outcomes: costs and QALYs Other outcomes: work-related performance, PHQ-9, CORE-10, GAD, EQ-5D **Time horizon:** 5 week intervention period and 6 weeks follow-up **Discount rates:** **Benefits:** N/A **Costs:** N/A **Perspective:** Societal **Measures of uncertainty:** None **Modelling method**: Cost and QALYs collected in the trial	**Primary analysis:** at 6 week follow up QALYs gained: MoodGYM = 0.082 Control = 0.083 Cost reduction at 6 weeks: MoodGYM = -£1,526 Control =-£1,581 ICER: dominated (intervention less effective and more costly) The cost results are not clear due to what appear to be calculation errors in the cost table. However, if taking only cost totals (which do not sum up to the figure in the same) there was a higher reduction in costs in the control group which would suggest that the intervention is dominated at 6-weeks. However, the difference in QALYs at 12-weeks shows the intervention to be more effective but costs were not provided for this time frame. **Secondary analysis:** None	**Limitations identified by author:** Study retention rate was low (56% at 6 weeks). More participants were lost to follow up in the intervention arm. **Limitations identified by review team**: Calculation errors in the paper The study author states that the apparent discrepancy in calculations is due to the valid number of cases varying (personal communication 10/02/16). The study was limited to a 6 week follow-up. Short time horizon which may not reflect all important costs and benefits. No sensitivity analysis was carried out. Healthcare utilisation collected using self-reported measures. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** Funded by the British Occupational Health Research Foundation

PHQ-9 patient health questionnaire, CORE-10 clinical outcomes in routine evaluation, GAD generalised anxiety disorder, PSSRU personal social services research unit.

Study details: Squires *et al.* (2012)

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
Authors: Squires *et al.* **Year:** 2012 **Aim of study:** To assess the cost-effectiveness of interventions to return employees with musculoskeletal disorders (MSDs) to work using a mathematical model **Type of economic analysis:** Cost-effectiveness analysis and cost-utility analysis **Economic perspective:** NHS & PSS, societal (employer) **Quality score:** Minor limitations **Applicability:** Directly applicable	**Source population/s:** Employed men and women who had been on sick leave for between 1 week and 6 months with musculoskeletal disorders over a lifetime **Setting:** UK workplace **Data sources:** Effectiveness: published RCTs based on a systematic review Utilities: Published literature Costs of sick pay and production loss: assumption and national average salary Costs of usual care: literature and expert opinion	**Intervention/s description:** Two relevant interventions to the current topic: (1) workplace intervention and (2) physical activity, education and workplace visit intervention **Comparator / control/s description:** Usual care **Sample sizes:** N/A	**Outcomes:** Economic outcomes: ICERs. Other outcomes: cost of health care and sick leave **Time horizon:** Lifetime **Discount rates:** **Benefits:** NR **Costs:** NR **Perspective** NHS & PSS and societal and employer's **Measures of uncertainty** Univariate sensitivity analysis and two-way sensitivity analysis **Modelling method**: Markov model	**Primary analysis:** NHS and societal perspective reported together as results were very similar: Intervention 1) dominant Intervention 2) dominant Employer perspective: Intervention 1) cost employer a net 34 pence per day on sick leave avoided Intervention 2) likely to be cost saving. **Secondary analysis:** In the univariate sensitivity analysis, the interventions are still dominant from NHS and societal perspective. From employer perspective, doubling probability or recurring sickness increase net cost per day avoided to over £1. All other assumptions tested improved cost-effectiveness. Two-way SA showed that if an intervention costs <£3,000 and returns at least 3% of people to work cost per QALY gained is likely to be below £20,000	**Limitations identified by author:** Evidence identified around effectiveness was poor quality and from non-UK countries Lack of long-term data meant assumption had to be made about return to work after 12 months It was not possible to incorporate the structural uncertainties within a PSA so this was not undertaken **Limitations identified by review team**: Not clear how cost of intervention arrived at. Although the report does not state if discounting was applied or not, a NICE report of the same model states that it was applied [17]. Utilities from published study is for a general population on sick-leave, not restricted to MSDs **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** Work was supported by NICE

Study details: Taimela *et al.* (2008)

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes by review team
Authors: Taimela *et al.* **Year:** 2008 **Aim of study:** to assess whether an occupational health intervention is cost effective in reducing sickness absence when compared with usual care in occupational health in workers with high risk of sickness absence **Type of economic analysis:** Cost-effectiveness analysis (CEA), cost-consequences analysis. **Economic perspective:** Healthcare perspective **Quality score:** Minor limitations **Applicability:** Partially applicable	**Source population/s:** Employees at high risk of sickness absence from one corporation in Finland (49% from a construction industry, 51% employed in repair, service and maintenance of buildings) **Setting:** Workplace in Finland (one corporation) **Data sources:** Effectiveness: RCT (sickness days), postal survey (presence of health problems) Unit Costs: Finnish tariffs Healthcare resource use: Self-reported from a postal survey	**Intervention/s description:** Consultation at their local occupational health service (OHS) with the construction of an action plan, and if appropriate, referral to a further consultation by a specialist or psychologist **Comparator/control/s description:** Usual care consisted in workers consultation with their occupational nurse or physician on request but not action plan **Sample sizes:** RCT. Baseline: n=209 (intervention), n=209 (usual care); Sickness data: n=192 (intervention), n=192 (usual care); Cost data: n=134 (intervention): Sickness data: n=138 (usual care),	**Outcomes:** Cost (or savings) per day of sickness avoided. Other outcomes: sickness days avoided, self-rated health outcomes (e.g. depression, fatigue) **Time horizon:** One year **Discount rates:** **Benefits:** N/A **Costs:** N/A **Perspective:** Healthcare perspective **Measures of uncertainty:** Univariate sensitivity analyses were conducted on almost all variables. Bootstrapping was also performed to conduct a stochastic analysis. Missing data on costs were imputed with logit ordinary least squares technique. **Modelling method**: No decision model was developed.	**Primary analysis:** Intervention is dominant (cost saving and more effective) PSA - Only workers with completed cost data: mean incremental cost for the intervention was -€80 (95% CI -€429 to +€290) and the mean incremental effect was 1.8 days (95% CI -9.7 to +12.4) of avoided work absence. The intervention was therefore always dominant. PSA – When missing data were imputed: mean incremental cost for the intervention was -€180 (95% -€452 to +€98) and the mean incremental effect was 10.5 days (95% CI 0.6 to +20.4) of avoided work absence The intervention was therefore always dominant. **Sensitivity analyses:** The probabilistic sensitivity analyses showed that the intervention was dominant in 49.9% of simulations when only workers with available cost data were considered, while it was dominant in 89.5% of	**Limitations identified by author:** There was a potential bias in cost results, since responders in the control group appear to have incurred fewer costs than non-responders. This was addressed with imputation of missing data that, however, might have underestimated the costs in the control group Imputations was not possible for health outcomes so results should be interpreted with caution **Limitations identified by review team**: The study was conducted in Finland and some data might not be transferable to the UK Healthcare utilisation collected using self-report postal survey Short time horizon which may not reflect all important costs and benefits.

Study details	Population and setting	Intervention/comparator	Outcomes and methods of analysis	Results	Notes by review team
				simulations when missing data were imputed The one-way sensitivity analysis showed that the intervention was dominant for any variation of cost parameter	Cost are expressed in 2004 prices (paper was published in 2008) **Evidence gaps and/or recommendations for future research:** Future studies should confirm the findings that this type of intervention is cost-effective for the subgroup of high-risk workers, and should investigate other subgroups **Source of funding:** Funded by the Finnish Funding Agency for Technology and Innovation (TEKES); the Finnish National Fund for Research and Development (SITRA); Pfizer Oy

Study details: Van Oostrom *et al.* (2010)

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
Authors: Van Oostrom *et al.* **Year:** 2010 **Aim of study:** To evaluate the cost effectiveness, cost utility and cost benefit of a workplace intervention compared with usual care for sick-listed employees with distress **Type of economic analysis:** Cost-effectiveness (CEA), cost-utility (CUA) and cost benefit (CBA) **Economic perspective:** Societal perspective (CEA and CUA) and employer perspective (CBA) **Quality score:** Minor limitations **Applicability:** Partially applicable	**Source population/s:** Employees with distress, sick listed for 2 to 8 weeks **Setting:** Workplace in the Netherlands **Data sources:** Effectiveness: RCT Unit Costs: Dutch Manual for Costing, Dutch Central Organization for Health Care Charges, Royal Dutch Society for Pharmacy Healthcare resource use: Self-reported and from RCT Occupational health measures: medical records	**Intervention/s description:** Usual care plus referred to a return-to-work (RTW) coordinator. Three meetings were planned within 3 weeks **Comparator / control/s description:** Usual care – treatment by the occupational physician (OP) according to the guideline of the Dutch Associated of Occupational Physicians. **Sample sizes:** RCT: n=73 (intervention), n=72 (usual care)	**Outcomes:** Economic outcomes: CEA, ICER (per day or duration of sick leave). CUA, ICER (per QALY). CBA, NMB*. Other outcomes: EQ-5D, health care utilisation **Time horizon:** One year **Discount rates:** **Benefits:** N/A **Costs:** N/A **Perspective:** Societal perspective (CEA and CUA) and employer perspective (CBA) **Measures of uncertainty** Bootstrapping was conducted to generate CIs and acceptability curves. Univariate sensitivity analysis and subgroup analyses **Modelling method**: No decision model was developed. Used data collected in the RCT	**Primary analysis**:** CEA ICER = €627 (£484) CUA HCA ICER= -€184,562 (£142,605) (intervention was dominated) FCA ICER = -€155,850 (£120,420) (intervention was dominated) CBA HCA NMB***= €1,987 (£1,535) FCA NMB*= €1,700 (£1,314) **Secondary analysis:** Subgroup analysis (of employees with baseline intentions to return to work) CEA ICER = -€10 (£7.73) (intervention dominant) CUA HCA ICER = -€7,195 (£5,559) CBA HCA NMB = -€6,243* (£4,824)	**Limitations identified by author:** The cost of work modifications was not included so the cost of the intervention is likely to be underestimated. Sick days are used as a proxy for productivity loss and did not take into account presenteeism. Small sample size resulted in wide CIs for costs 20 out of the 73 participants did not receive the workplace intervention **Limitations identified by review team:** The study was conducted in the Netherlands where employers pay for occupational health services so this has limited generalisability to UK employers. Healthcare utilisation collected using retrospective measures. Short time horizon which may not reflect all important costs and benefits.

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
					Evidence gaps and/or recommendations for future research: Future studies should evaluate if workplace interventions will reduce presenteeism Future studies should confirm the findings that the workplace intervention is cost-effective for the subgroup of employees intending to return to work. **Source of funding:** Funded by the Dutch Ministry of Social Affairs and Employment

HCA human capital approach, FCA friction cost approach, CI confidence interval

* The cost-benefit analysis appear just the difference between the incremental cost of the intervention and the potential savings due to reduced time to return to work. No measure of benefit measured with a willingness to pay approach was undertaken.

** ICERs are reported as they are in the study.

*** Positive value of the NMB imply higher costs for the intervention group compared to the control group.

Study details: Hlobil *et al.* (2007)

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
Authors: Hlobil *et al.* **Year:** 2007 **Aim of study:** To compare the costs and benefits of a graded activity (GA) intervention to usual care (UC) for sick-listed workers with non-specific low back pain (LBP) **Type of economic analysis:** Cost-benefit analysis is stated but the study appears to be a cost-consequences analysis **Economic perspective:** Employer perspective **Quality score:** Potentially serious limitations **Applicability:** Partially applicable	**Source population/s:** Sick-listed workers with LBP **Setting:** Workplace setting in the Netherlands **Data sources:** Effectiveness data: RCT by authors Health care costs: Dutch tariff publications Cost of lost productivity for each worker: calculation using mean daily wage	**Intervention/s description:** Graded activity (GA). Routine guidance from occupational physician plus twice a week a 60-min physical exercise session with a cognitive behavioural approach under the supervision of specifically trained physiotherapists **Comparator / control/s description:** Usual care (UC). Routine guidance from occupational physician **Sample sizes:** RCT – at last follow up: n=65 (GA), n=64 (UC)	**Outcomes:** Economic outcomes: cost difference. Other outcomes: Costs of health care utilisation and lost productivity days **Time horizon:** Three years **Discount rates:** **Benefits:** None applied **Costs:** None applied **Perspective:** Employer (in the Netherlands) **Measures of uncertainty** One-way sensitivity analysis **Modelling method** Costing study based on trial data (healthcare resource use and lost productivity days)	**Primary analysis:** <u>First year:</u> Difference in health care costs (including intervention) = €83 (in favour of UC) Mean difference in lost productivity = €999 (net), €3,655 (gross) (in favour of GA) <u>Cumulative over 3 years:</u> Difference in health care costs: not provided Mean difference in lost productivity = €1,661 (£1,250)(net), €7,581 (£5,706) (gross) (in favour of GA) **Secondary analysis:** Sensitivity analysis 25% and 50% decrease in work performance (in year 1) resulted in: Mean difference in lost productivity = €1,663 (25%) and €2,327 (50%) from €999	**Limitations identified by author:** The study was performed within one company with the majority being male, blue-collar workers. Sick leave is used as a proxy for productivity loss, this may not accurately reflect true productivity losses **Limitations identified by review team**: The study was conducted in the Netherlands where employers pay for occupational health services so this has limited generalisability to UK employers. No discounting was applied in the 3 year calculations. Healthcare utilisation collected using retrospective, self-reported measures.

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
					Evidence gaps and/or recommendations for future research: Future research should evaluate more trial and develop methodology of economic evaluation for practical use by employers, occupational services and workers. **Source of funding:** Grant support by the Dutch Health Insurance Executive Council

Study details: Bernaards *et al.* (2011)

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
Authors: Bernaards *et al.* **Year:** 2011 **Aim of study:** to valuate the cost-effectiveness of a work style (WS) intervention and a work style plus physical activity (WSPA) intervention in computer workers with neck and upper limb symptoms compared with usual care. **Type of economic analysis:** Cost-effectiveness analysis alongside a RCT **Economic perspective:** Employers' perspective **Quality score:** Minor limitations **Applicability:** Partially applicable	**Source population/s:** computer workers with neck and upper limb symptoms **Setting:** Netherlands workplace **Data sources:** Effectiveness: previously published RCTs Costs of sick pay and production loss: assumption and national average salary Other costs: not clearly stated	**Intervention/s description:** Two relevant interventions: (1) work style (WS) intervention and a work style plus physical activity (WSPA) intervention **Comparator / control/s description:** Usual care (UC) **Sample sizes:** WS group: n=152; WSPA: n=156; UC: n=158.	**Outcomes:** Recovery from neck and upper limb symptoms; pain intensity; total costs. **Time horizon:** one year **Discount rates:** **Benefits:** NR **Costs:** NR **Perspective** Employer's perspective **Measures of uncertainty** Two-way sensitivity analyses and bootstrapping **Modelling method**: NR	**Primary analysis:** Differences in economic and clinical outcomes were not statistically significant among the three groups. Total costs were £1,607 (€1,907) with WS, £2,369 (€2,811) with WSPA and £1,947 (€2,310) with usual care. Compared to usual care, inc. WS cost -£380 (€451), inc. WSPA costs £194 (€230) Overall recovery: neither intervention cost-effective Reducing average pain: WS cost-effective Neck/shoulder recovery: WS cost-effective	**Limitations identified by author:** The high number of participants with missing effect data Absenteeism data were highly skewed resulting in large standard deviations Data could not be provided from company records The subjective measures for recovery may have been affected by psychological factors **Limitations identified by review team**: Sources of cost data were not clearly stated A measure of the impact of the intervention on quality of life was not used **Evidence gaps and/or recommendations for future research:** Need for high-quality cost-effectiveness studies Future studies should

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
				Hand/arm recovery: WS not cost-effective Neck/shoulder pain: WS cost-effective Hand/arm pain: WS ans WSPA not cost-effective. **Secondary analysis:** When a company is willing to pay approximately £758 (€900) for a 1-point reduction in average pain, the probability of cost-effectiveness compared to usual care is 95%. When a company is WTP approximately £2,528 (€3,000) for a recovered worker, the probability of cost-effectiveness compared to usual care is 95%. When a company is WTP approximately £506 (€600) for 1-point reduction in next	examine the association between pain reduction and estimates of productivity Need to carry out subgroup analyses **Source of funding:** This study was funded by Body@Work Research Center on Physical Activity, Work and Health, TNO-VUmc, Amsterdam, The Netherlands.

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes by review team
				pain, the probability of cost-effectiveness compared to usual care is 95%. Complete case analysis showed total costs and effects did not differ significantly between study groups.	

APPENDIX E

Quality Appraisal Checklists

Excluded at applicability stage

Study identification:	Karjalainen *et al.* (2004) [7]		
Guidance topic:	A mini-intervention (provide accurate information and encourage physical activity) and a worksite visit for patients with subacute disabling low back pain		
Checklist completed by:	Alex Filby & Marco Barbieri		
Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated?	Yes	Patients with sub-acute low back pain
1.2	Are the interventions appropriate for the topic being evaluated?	Yes	The two interventions compared plus usual care were described in detail. Mini–intervention and mini-intervention plus worksite visit (worksite visit intervention relevant)
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Study conducted in Finland
1.4	Was/were the perspective(s) clearly stated and what were they?	No	The perspective of the analysis was not explicitly reported
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	No	It seems that the cost of the intervention was not included
1.6	Are both costs and health effects discounted appropriately?	No	2 year time horizon
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	Quality of life was estimated using the 15D questionnaire but no calculation of QALYs made
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	
Overall judgement: directly applicable/partially applicable/not applicable. There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Not applicable	No intervention costs included so not a true economic evaluation.
Other comments:		In addition, the study appears not directly applicable to the UK as conducted in a setting with important differences	

Excluded at quality stage

Study identification:	Arends *et al.* (2013)		
Guidance topic:	Workplace health: support for employees with disabilities and long-term conditions		
Checklist completed by:	Alex Filby & Marco Barbieri		
Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated?	Yes	Workers with common mental health disorders
1.2	Are the interventions appropriate for the topic being evaluated?	Yes	Problem-solving intervention aimed at preventing recurrent sickness absence
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly.	Netherlands. All companies must have contract with an occupational health service or employers can arrange OH activities themselves
1.4	Was/were the perspective(s) clearly stated and what were they?	Yes	Societal and employer perspectives
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	No	QALYs not reported. Only health care utilisation and lost work days.
1.6	Are both costs and health effects discounted appropriately?	N/A	Annual time horizon
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	Prevented recurrence of sickness absence
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	A wide range of costs and outcomes were considered
Overall judgement: directly applicable/partially applicable/not applicable. There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Partially applicable	Netherlands - not completely applicable to UK
Other comments:			
Quality			
Section 2: Study limitations (the level of methodological quality). This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].		Yes/No/Partly/ Unclear/N.A.	Comments
2.1	Does the model structure adequately reflect the nature of the topic under evaluation?	Partly	Cost study
2.2	Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Partly	Annual time horizon. Long term effects not considered (acknowledged as a limitation)
2.3	Are all important and relevant health outcomes included?	Partly	No QALYs
2.4	Are the estimates of baseline health outcomes from the best available source?	N/A	
2.5	Are the estimates of relative 'treatment' effects from the best available source?	Yes	RCT
2.6	Are all important and relevant costs included?	Yes	

2.7	Are the estimates of resource use from the best available source?	Partly	Self-reported health care utilisation
2.8	Are the unit costs of resources from the best available source?	Yes	Dutch guidelines for costing studies and Royal Dutch Society for Pharmacy
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	Partly	No QALYs. ICERs presented for incidence of recurrent sickness and time to recurrent sickness. ICERs presented appear incorrect.
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Partly	PSA and some univariate SA. Distributions are not provided. No justification for number of iterations
2.11	Is there any potential conflict of interest?	No	
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Very serious limitations	Short time horizon. There are some serious issues in calculations of ICERs and their interpretation
Other comments:			

Study identification:	Dewa et al. (2014) Estimating the Net Benefit of a Specialized Return-to-Work Program for Workers on Short-Term Disability
Guidance topic:	Workplace health: support for employees with disabilities and long-term conditions
Checklist completed by:	Alex Filby & Marco Barbieri

Applicability		
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies	Yes/No/Partly/ Unclear/N.A.	Comments
1.1 Is the study population appropriate for the topic being evaluated??	Partly	Workers on short-term disability leave related to mental disorder. Study population was not clearly described
1.2 Are the interventions appropriate for the topic being evaluated??	Yes	Little details on the main interventions and its comparator were given (referred to other paper). Collaborative return-to-work program
1.3 Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Canada. Employer pays disability claims.
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes	Employer perspective inferred
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	No	Only short term disability claims included, sick days and long-term disability claims are not included
1.6 Are both costs and health effects discounted appropriately?	N/A	Annual time horizon inferred
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	No	Costs only
Overall judgement: directly applicable/partially applicable/not applicable There is no need to complete section 2 of the checklist if the study is considered 'not applicable'	Partly	Only SDIS claims are considered and these are not applicable to the UK. PHAC have requested this is included.
Other comments:	Study conducted in a single institution in Canada. No details on study population, interventions and perspective were provided.	

Quality		
Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].	Yes/No/Partly/ Unclear/N.A.	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Partly	A very simplified model was used
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Unclear	A short term horizon appears to have been adopted
2.3 Are all important and relevant health outcomes included?	Partly	Limited health outcomes were considered
2.4 Are the estimates of baseline health	Unclear	Sources of data were not

	outcomes from the best available source?		described
2.5	Are the estimates of relative 'treatment' effects from the best available source?	Unclear	A description of data sources was not given
2.6	Are all important and relevant costs included?	No	The perspective of the study was not explicitly stated
2.7	Are the estimates of resource use from the best available source?	Unclear	Sources of data were not described
2.8	Are the unit costs of resources from the best available source?	Unclear	Sources of data were not described
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	No	Incremental results were not clearly reported
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Partly	
2.11	Is there any potential conflict of interest?	Unclear	
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Very serious limitations	
Other comments:			

Study identification:	Dewa *et al.* (2014) When Could a Stigma Program to Address Mental Illness in the Workplace Break Even?
Guidance topic:	Workplace health: support for employees with disabilities and long-term conditions
Checklist completed by:	Alex Filby & Marco Barbieri

Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated??	Partly	1000 hypothetical employees. Study population was not clearly described
1.2	Are the interventions appropriate for the topic being evaluated??	Yes	Stigma programme to address mental illness. Takes place in the workplace
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Canada. Employer pays disability claims.
1.4	Was/were the perspective(s) clearly stated and what were they?	Yes	Employer perspective inferred
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	No	Only short term disability claims included, sick days and long-term disability claims are not included
1.6	Are both costs and health effects discounted appropriately?	N/A/Unclear	Annual time horizon inferred
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	No	Costs only
Overall judgement: directly applicable/partially applicable/not applicable There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Not applicable	Excluded because only SDIS claims are considered and these are not applicable to the UK.
Other comments:		Study conducted in a hypothetical institution in Canada. Little details on study population and interventions given.	

Quality			
Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].		Yes/No/Partly/ Unclear/N.A.	Comments
2.1	Does the model structure adequately reflect the nature of the topic under evaluation?	Partly	A simple economic model was used, with limited details
2.2	Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Unclear	Short-term horizon
2.3	Are all important and relevant health outcomes included?	No	The analysis focused only on short-term disability
2.4	Are the estimates of baseline health outcomes from the best available source?	Unclear	Data sources were not clearly described
2.5	Are the estimates of relative 'treatment' effects from the best available source?	Unclear	Data sources were not clearly described
2.6	Are all important and relevant costs included?	Partly	The analysis included a

			limited range of costs
2.7	Are the estimates of resource use from the best available source?	Unclear	Data sources were not clearly described
2.8	Are the unit costs of resources from the best available source?	Unclear	Data sources were not clearly described
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	Partly	
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Partly	Only selected inputs were investigated
2.11	Is there any potential conflict of interest?	Unclear	
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Very serious limitations	
Other comments:			

Study identification:	Geraedts *et al.* (2015)	
Guidance topic:	Workplace health: support for employees with disabilities and long-term conditions	
Checklist completed by:	Alex Filby & Marco Barbieri	
Applicability		
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies	Yes/No/Partly/ Unclear/N.A.	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Yes	Employees with depressive symptoms not on sick leave
1.2 Are the interventions appropriate for the topic being evaluated?	Yes	Web-based guidance intervention
1.3 Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Netherlands. All companies must have contract with an occupational health service or employers can arrange OH activities themselves
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes	Societal and employer perspective
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes	
1.6 Are both costs and health effects discounted appropriately?	N/A	Annual time horizon
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	Yes	The EQ-5D questionnaire was used
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	A wide range of costs and outcomes were considered
Overall judgement: directly applicable/partially applicable/not applicable. There is no need to complete section 2 of the checklist if the study is considered 'not applicable'	Partially applicable	
Other comments:		
Quality		
Section 2: Study limitations (the level of methodological quality). This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].	Yes/No/Partly/ Unclear/N.A.	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Partly	Cost study
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Partly	Annual time horizon based on 12-month follow-up
2.3 Are all important and relevant health outcomes included?	Yes	
2.4 Are the estimates of baseline health outcomes from the best available source?	Yes	EQ-5D
2.5 Are the estimates of relative 'treatment' effects from the best available source?	Yes	RCT
2.6 Are all important and relevant costs included?	Yes	
2.7 Are the estimates of resource use from the best available source?	Partly	Self-reported patient surveys at multiple time points
2.8 Are the unit costs of resources from the best available source?	Yes	Dutch Standard costs and Dutch Society of

			Pharmacy
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	Partly	ICERs. It is unclear why ICERs were calculated in case of dominance with some problems of interpretation
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Partly	PSA and four scenario analyses. Distributions are not provided. No justification for number of iterations
2.11	Is there any potential conflict of interest?	No	
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Very serious limitations	Short time horizon could change results. Some calculations of ICERs and authors' conclusions appear incorrect
Other comments:			

Study identification:	Steenstra *et al.* (2006)		
Guidance topic:	Workplace health: support for employees with disabilities and long-term conditions		
Checklist completed by:	Alex Filby & Gabriella Giunta		
Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated?	Yes	Workers on sick leave due to low back pain
1.2	Are the interventions appropriate for the topic being evaluated??	Partly	Two interventions. Workplace intervention and clinical intervention. Only workplace intervention is relevant
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Netherlands. All companies must have contract with an occupational health service or employers can arrange OH activities themselves
1.4	Was/were the perspective(s) clearly stated and what were they?	Yes	Societal perspective
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes	A wide range of health outcomes was used
1.6	Are both costs and health effects discounted appropriately?	N/A	Annual time horizon
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	Yes	QALYs were estimated using the EuroQoL
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	It appears so but not directly stated
Overall judgement: directly applicable/partially applicable/not applicable There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Partially applicable	Set in Netherlands
Other comments:			
Quality			
Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].		Yes/No/Partly/ Unclear/N.A.	Comments
2.1	Does the model structure adequately reflect the nature of the topic under evaluation?	Partly	Cost study
2.2	Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Partly	One year. A longer time horizon may have been more appropriate.
2.3	Are all important and relevant health outcomes included?	Yes	
2.4	Are the estimates of baseline health outcomes from the best available source?	Yes	Patient questionnaire EuroQOL

2.5	Are the estimates of relative 'treatment' effects from the best available source?	Yes	RCT
2.6	Are all important and relevant costs included?	Yes	
2.7	Are the estimates of resource use from the best available source?	Partly	Self-reported
2.8	Are the unit costs of resources from the best available source?	Yes	Dutch Central Organisation for Health Care Charges, Royal Dutch Society for Pharmacy
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	Partly	Costs and utilities not reported separately clearly. Negative ICERs reported.
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Partly	PSA and some sensitivity analyses. Distributions are not provided. No justification for number of iterations
2.11	Is there any potential conflict of interest?	No	
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Very serious limitations	Time horizon
Other comments:			

Included

Study identification:	Arnetz *et al.* (2003)		
Guidance topic:	Early workplacebased interventions, focusing on ergonomic improvement and adaptation of workplace conditions, for employees with muskoloskeletal disorders		
Checklist completed by:	Marco Barbieri & Alex Filby		
Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated??	Yes	Patients with physician-diagnosed MSDs
1.2	Are the interventions appropriate for the topic being evaluated??	Yes	Both interventions were described in depth. Workplace assessment.
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Study conducted in Sweden
1.4	Was/were the perspective(s) clearly stated and what were they?	No	The perspective of the analysis was not explicitly reported
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	Unclear	
1.6	Are both costs and health effects discounted appropriately?	N/A	One year time horizon
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	Sick days and questionnaire of health status reported
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	
Overall judgement: directly applicable/partially applicable/not applicable There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Partially applicable	
Other comments:		The study appears not directly applicable to the UK as conducted in a setting with some important differences	
Quality			
Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].		Yes/No/Partly/ Unclear/N.A.	Comments
2.1	Does the model structure adequately reflect the nature of the topic under evaluation?	N/A.	No model used
2.2	Is the time horizon sufficiently long to reflect	No	Only 1 year time horizon,

	all important differences in costs and outcomes?		long term effects not considered
2.3	Are all important and relevant health outcomes included?	Partly	Little information on impact on quality of life
2.4	Are the estimates of baseline health outcomes from the best available source?	N/A	
2.5	Are the estimates of relative 'treatment' effects from the best available source?	Yes	Prospective RCT
2.6	Are all important and relevant costs included?	Unclear	More information would be needed
2.7	Are the estimates of resource use from the best available source?	Partly	Obtained from trial, but little information provided
2.8	Are the unit costs of resources from the best available source?	Unclear	Sources not fully reported
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	No	No incremental analysis conducted
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	No	Sensitivity analysis not performed
2.11	Is there any potential conflict of interest?	No	The first author declared no conflict of interest
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Potentially serious limitations	
Other comments:		This study presents serious limitations. No incremental analysis was conducted and uncertainty not investigated. Limited information was given on some cost data.	

Study identification:	Lambeek *et al.* (2010)		
Guidance topic:	Integrated care for sick listed patients with chronic low back pain		
Checklist completed by:	Alex Filby & Gabriella Giunta		
Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated?	Yes	Adults aged 18-65 sick listed due to chronic low back pain
1.2	Are the interventions appropriate for the topic being evaluated?	Yes	Integrated care
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Netherlands. All companies must have contract with an occupational health service or employers can arrange OH activities themselves
1.4	Was/were the perspective(s) clearly stated and what were they?	Yes	Societal perspective
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes	
1.6	Are both costs and health effects discounted appropriately?	N/A	One year time horizon
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	Yes	EQ-5D
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	A wide range of costs and outcomes were considered
Overall judgement: directly applicable/partially applicable/not applicable. There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Partially applicable	Set in Netherlands
Other comments:			
Quality			
Section 2: Study limitations (the level of methodological quality). This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].		Yes/No/Partly/ Unclear/N.A.	Comments
2.1	Does the model structure adequately reflect the nature of the topic under evaluation?	Partly	Cost study
2.2	Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Partly	Annual. A longer time horizon may have been more appropriate.
2.3	Are all important and relevant health outcomes included?	Yes	
2.4	Are the estimates of baseline health outcomes from the best available source?	Yes	EQ-5D from RCT
2.5	Are the estimates of relative 'treatment' effects from the best available source?	Yes	RCT
2.6	Are all important and relevant costs included?	Yes	A wide perspective was adopted
2.7	Are the estimates of resource use from the best available source?	Partly	Self-reported from RCT
2.8	Are the unit costs of resources from the best available source?	Yes	Standard costs for the Netherlands

2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	Some problems with reporting and interpreting results (negative ICERs)
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Yes	Six sensitivity analyses and bootstrapping.
2.11	Is there any potential conflict of interest?	No	
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Very serious limitations	
Other comments:			

Study identification:	Phillips *et al.* (2014)		
Guidance topic:	Workplace health: support for employees with disabilities and long-term conditions		
Checklist completed by:	Alex Filby		
Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated??	Yes	Employed people with a given PHQ -9 (depression questionnaire) score
1.2	Are the interventions appropriate for the topic being evaluated??	Yes	Computerised CBT intervention (MoodGYM) in a workplace context
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Yes	NHS
1.4	Was/were the perspective(s) clearly stated and what were they?	Partly	Perspective not stated but can infer NHS/PSS and employer
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes	
1.6	Are both costs and health effects discounted appropriately?	N/A	Less than one year time horizon (6 months baseline and 6 weeks follow up)
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	Yes	QALYs were calculated using EQ-5D questionnaire
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	Yes	
Overall judgement: directly applicable/partially applicable/not applicable There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Directly applicable	
Other comments:			
Quality			
Section 2: Study limitations (the level of methodological quality). This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].		Yes/No/Partly/ Unclear/N.A.	Comments
2.1	Does the model structure adequately reflect the nature of the topic under evaluation?	Partly	Just cost analysis
2.2	Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	No	Follow-up for 6 weeks. A longer time horizon would have been more appropriate.

2.3	Are all important and relevant health outcomes included?	Yes	
2.4	Are the estimates of baseline health outcomes from the best available source?	Yes	RCT data.
2.5	Are the estimates of relative 'treatment' effects from the best available source?	Partly	RCT data but only a short follow-up (6 weeks)
2.6	Are all important and relevant costs included?	Yes	
2.7	Are the estimates of resource use from the best available source?	Yes	RCT data but only a short follow-up (6 weeks). Data collected on 6 months prior but participants asked to recall service use in past 6 months.
2.8	Are the unit costs of resources from the best available source?	Partly	PSSRU and average earnings. Costs and resource use not reported separately
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	An incremental cost-utility ratio was not reported but data allow calculation of incremental results
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	No	No sensitivity analysis
2.11	Is there any potential conflict of interest?	Unclear	Not reported
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Potentially serious limitations	
Other comments:			

Study identification:	Taimela *et al.* (2008)		
Guidance topic:	Occupational health intervention programme for workers at high risk for sickness absence		
Checklist completed by:	Marco Barbieri/Alex Filby		
Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated??	Partly	High-risk workers were not described, but the authors referred to a previous published study
1.2	Are the interventions appropriate for the topic being evaluated??	Yes	The intervention was described in detail
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Study conducted in Finland
1.4	Was/were the perspective(s) clearly stated and what were they?	Yes	Healthcare
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes	
1.6	Are both costs and health effects discounted appropriately?	N/A	One year time horizon
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	Quality of life was not assessed with a standard questionnaire
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	Only healthcare costs considered according to the perspective
Overall judgement: directly applicable/partially applicable/not applicable There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Partially applicable	
Other comments:		The study appears not directly applicable to the UK since conducted in a country with some potential differences	
Quality			
Section 2: Study limitations (the level of methodological quality). This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].		Yes/No/Partly/ Unclear/N.A.	Comments
2.1	Does the model structure adequately reflect the nature of the topic under evaluation?	N/A	No model used
2.2	Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	No	Only 1 year time horizon, long term effects not considered
2.3	Are all important and relevant health outcomes included?	Partly	Only sickness days reported and presence of health problems. No standard measure of QOL.
2.4	Are the estimates of baseline health outcomes from the best available source?	Yes	Randomised RCT to select workers
2.5	Are the estimates of relative 'treatment' effects from the best available source?	Yes	Large RCT
2.6	Are all important and relevant costs included?	Yes	All costs appear to have

			been included according the selected perspective
2.7	Are the estimates of resource use from the best available source?	Partly	Obtained from a survey with potential limitations (mainly missing data and retrospective measures)
2.8	Are the unit costs of resources from the best available source?	Yes	Standard Finnish sources
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Yes	A probabilistic sensitivity analysis was conducted by means of bootstrapping
2.11	Is there any potential conflict of interest?	No	Authors declared no conflict of interest
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Minor limitations	
Other comments:		The analysis was based on a well-conducted RCT although cost data were obtained from a survey with potentially serious limitations which were addressed with appropriate statistical techniques	

Study identification:	Squires *et al.* (2012)	
Guidance topic:	Workplace health: support for employees with disabilities and long-term conditions	
Checklist completed by:	Alex Filby & Gabriella Giunta	
Applicability		
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies	Yes/No/Partly/ Unclear/N.A.	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Yes	Hypothetical population of employed men and women who had been on sick leave for between 1 week and 6 months with musculoskeletal disorders over a lifetime.
1.2 Are the interventions appropriate for the topic being evaluated?	Yes	Workplace intervention, physical activity and education intervention(not relevant to this guideline), physical activity, education and workplace visit intervention. However the authors stated that limited descriptions of these interventions were provided within the original effectiveness studies
1.3 Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Yes	UK/NHS
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes	NHS and PSS and societal (employer)
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes	
1.6 Are both costs and health effects discounted appropriately?	No/See comment	Although the report does not state if discounting was applied or not, a NICE report of the same model states that it was applied.
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	Yes	
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	A wide range of costs and outcomes were considered
Overall judgement: directly applicable/partially applicable/not applicable There is no need to complete section 2 of the checklist if the study is considered 'not applicable'	Directly applicable	
Other comments:		

Quality		
Section 2: Study limitations (the level of methodological quality). This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].	Yes/No/Partly/ Unclear/N.A.	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Yes	
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Yes	Lifetime time horizon
2.3 Are all important and relevant health outcomes included?	Yes	
2.4 Are the estimates of baseline health outcomes from the best available source?	Yes	There are uncertainties in the published data but the best available was used.
2.5 Are the estimates of relative 'treatment' effects from the best available source?	Yes	Based on a systematic literature review. There are uncertainties in the data but the best available was used
2.6 Are all important and relevant costs included?	Yes	
2.7 Are the estimates of resource use from the best available source?	Partly	Literature and expert opinion. Some data sources were reported, but not for all items
2.8 Are the unit costs of resources from the best available source?	Partly	PSSRU, DWP, CIPD, HMRC, literature. Resource use and costs not reported separately. Not clear what exchange rate is used in converting literature costs or if costs have been inflated.
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10 Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Partly	The authors report it was not possible to incorporate structural uncertainties into PSA (without providing misleading results) so this was not undertaken. Univariate sensitivity analysis undertaken.
2.11 Is there any potential conflict of interest?	No	
2.12 **Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Minor limitations	
Other comments:		

Study identification:	Van Oostrom *et al.* (2010)	
Guidance topic:	Workplace health: support for employees with disabilities and long-term conditions	
Checklist completed by:	Alex Filby & Marco Barbieri	
Applicability		
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies	Yes/No/Partly/ Unclear/N.A.	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Partly	Employees with distress, sick listed for 2 to 8 weeks (not clear if this is chronic)
1.2 Are the interventions appropriate for the topic being evaluated??	Yes	Referred to a return to work coordinator
1.3 Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Netherlands. All companies must have contract with an occupational health service or employers can arrange OH activities themselves
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes	Societal perspective and employer perspective
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes	
1.6 Are both costs and health effects discounted appropriately?	N/A	Costs over 12 months
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	Yes	The EQ-5D questionnaire was used
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	A wide range of costs and outcomes were considered
Overall judgement: directly applicable/partially applicable/not applicable. There is no need to complete section 2 of the checklist if the study is considered 'not applicable'	Partially applicable	The study fails to meet 1 or more applicability criteria, and this could change the conclusions about cost effectiveness
Other comments:		
Quality		
Section 2: Study limitations (the level of methodological quality). This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].	Yes/No/Partly/ Unclear/N.A.	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Partly	Cost study
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Partly	1 year. Only 1 year time horizon, long term effects not considered (acknowledged as a limitation)
2.3 Are all important and relevant health outcomes included?	Yes	
2.4 Are the estimates of baseline health outcomes from the best available source?	Yes	Patient questionnaire EQ-5D
2.5 Are the estimates of relative 'treatment' effects from the best available source?	Yes	Pragmatic RCT
2.6 Are all important and relevant costs included?	Yes	All costs appear to have been included in the societal perspective except for the cost of adaptations at workplace

2.7	Are the estimates of resource use from the best available source?	Partly	RCT. Medical records and self-reported measures
2.8	Are the unit costs of resources from the best available source?	Yes	Dutch Manual for Costing, Dutch Central Organization for Health Care Charges, Royal Dutch Society for Pharmacy
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	Partly	ICER and NMB presented. Issues with interpreting the ICER.
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Partly	PSA. Only one univariate SA. No justification for 1,000 iterations. Distributions are not provided.
2.11	Is there any potential conflict of interest?	No	
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Very serious limitations	The study fails to meet 1 or more quality criteria but this is unlikely to change the conclusions about cost effectiveness
Other comments:			

Study identification:	Bernaards *et al.* 2011		
Guidance topic:	Lifestyle physical activity intervention in addition to a work style intervention on recovery from neck and upper limb symptoms and pain reduction in computer workers		
Checklist completed by:	Gabriella Giunta		
Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated??	Yes	The eligible population was clearly described
1.2	Are the interventions appropriate for the topic being evaluated??	Yes	Work-style intervention plus lifestyle physical activity.
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	The study was carried out in the Netherlands. All companies must have contract with an occupational health service or employers can arrange OH activities themselves
1.4	Was/were the perspective(s) clearly stated and what were they?	Yes	The employer's perspective was adopted
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	Partly	The analysis focused on selected health effects
1.6	Are both costs and health effects discounted appropriately?	N/A	Discounting was not relevant given the one-year horizon of the analysis
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	The benefit measures were recovery and pain reduction. Not applicable to employer perspective
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	No	The analysis was restricted to the perspective of the employer
Overall judgement: directly applicable/partially applicable/not applicable There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Partially applicable	Analysis restricted to employer perspective in the Netherlands. 'Usual care' may be different to that given in the UK.
Other comments:			
Quality			
Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].		Yes/No/Partly/ Unclear/N.A.	Comments
2.1	Does the model structure adequately reflect the nature of the topic under evaluation?	N/A	No modelling was used. Cost study.
2.2	Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Partly	Time horizon could be longer to ensure all relevant outcomes are captured.
2.3	Are all important and relevant health outcomes included?	Partly	Some relevant outcomes may have not been included. QOL not

			considered.
2.4	Are the estimates of baseline health outcomes from the best available source?	Yes	RCT
2.5	Are the estimates of relative 'treatment' effects from the best available source?	Yes	RCT
2.6	Are all important and relevant costs included?	Partly	A restricted perspective was adopted
2.7	Are the estimates of resource use from the best available source?	Yes	Bottom-up costing from intervention costs
2.8	Are the unit costs of resources from the best available source?	Yes	
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Yes	Appropriate sensitivity analyses were carried out
2.11	Is there any potential conflict of interest?	Unclear	
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Minor limitations	
Other comments:			

Study identification:	Hlobil *et al.* (2007)		
Guidance topic:	Workplace health: support for employees with disabilities and long-term conditions		
Checklist completed by:	Alex Filby & Gabriella Giunta		
Applicability			
Section 1: Applicability (relevance to specific topic review question(s) and the NICE reference case[a]) This checklist should be used first to filter out irrelevant studies		Yes/No/Partly/ Unclear/N.A.	Comments
1.1	Is the study population appropriate for the topic being evaluated??	Yes	Sick-listed workers with LBP (reported in primary trial)
1.2	Are the interventions appropriate for the topic being evaluated??	Yes	Graded activity intervention (physical exercise and CBT)
1.3	Is the healthcare system in which the study was conducted sufficiently similar to the current UK context?	Partly	Netherlands. All companies must have contract with an occupational health service or employers can arrange OH activities themselves
1.4	Was/were the perspective(s) clearly stated and what were they?	Yes	Employer perspective
1.5	Are all direct health effects on individuals included, and are all other effects included where they are material?	Partly	Health effects relevant to employer were included
1.6	Are both costs and health effects discounted appropriately?	Unclear	Annual time horizon and three year time horizon/ Sensitivity analysis undertaken for a longer time horizon and no mention of discounting
1.7	Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	Not applicable to employer perspective
1.8	Are costs and outcomes from other sectors fully and appropriately measured and valued?	No	Employer perspective. No NHS costs
Overall judgement: directly applicable/partially applicable/not applicable There is no need to complete section 2 of the checklist if the study is considered 'not applicable'		Partially applicable	Only employer perspective from Netherlands including health care costs not paid for by UK employers so not relevant to the UK.PHAC requested this t be included
Other comments:			
Quality			
Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the clinical guideline[b].		Yes/No/Partly/ Unclear/N.A.	Comments
2.1	Does the model structure adequately reflect the nature of the topic under evaluation?	Partly	Just cost analysis
2.2	Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Partly	Three year time horizon
2.3	Are all important and relevant health outcomes included?	Partly	Employer perspective. QOL not considered
2.4	Are the estimates of baseline health outcomes from the best available source?	N/A	Employer perspective. Health outcomes are not considered

2.5	Are the estimates of relative 'treatment' effects from the best available source?	Yes	RCT
2.6	Are all important and relevant costs included?	Yes	Costs are consistent with the perspective adopted
2.7	Are the estimates of resource use from the best available source?	Partly	Retrospective data on resource consumption were taken from patient diaries
2.8	Are the unit costs of resources from the best available source?	Yes	Tariff publication, but unit costs not provided.
2.9	Is an appropriate incremental analysis presented or can it be calculated from the data?	No	No health outcomes
2.10	Are all important parameters, whose values are uncertain, subjected to appropriate sensitivity analysis?	Partly	Some sensitivity analysis undertaken
2.11	Is there any potential conflict of interest?	Not reported	
2.12	**Overall assessment:** minor limitations/potentially serious limitations/very serious limitations	Potentially serious limitations	Only costs considered.
Other comments:			