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HS&DR Evidence Synthesis Centre Topic Report

Workplace-based interventions to promote healthy lifestyles in the NHS workforce: a rapid scoping and evidence map

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Important

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Abstract

Background: The health and wellbeing of staff working in the NHS is a significant issue for UK healthcare. We sought to identify research relevant to the promotion of healthy lifestyles amongst NHS staff on behalf of NHS England.

Objective(s): To map existing reviews on workplace based interventions to promote health and wellbeing, and assess the scope for further evidence synthesis work.

Design: Rapid and responsive scoping search and evidence map.

Participants: Adult employees in any occupational setting and in any role.

Interventions: Any intervention aimed at promoting or maintaining physical or mental health and wellbeing. Early intervention initiatives, and those addressing violence against staff, workplace bullying, or harassment, were also included.

Main outcome measures: Any outcome related to the effectiveness, cost effectiveness or implementation of interventions.

Data sources: A scoping search was conducted of nine databases to identify systematic reviews on health and wellbeing at work. Searches were limited by publication date (2000 to January/February 2019).

Review methods: The title and abstracts of over 8,241 records were screened and a total of 408 potentially relevant publications were identified. Information on key characteristics were extracted from the titles and abstracts of all potentially relevant publications. Descriptive statistics (counts and percentages) for key characteristics were generated and data from reviews and 'reviews of reviews' used to produce the evidence map.

Results: Evidence related to a broad range of physical and mental health issues was identified across 12 'reviews of reviews' and 312 other reviews, including 16 Cochrane reviews. There also exists National Institute for Health and Care Excellence (NICE) guidance addressing multiple issues of potential relevance. A large number of reviews focused on mental health, changing lifestyle behaviour such as physical activity, or on general workplace

health/health promotion. Most of the reviews that focused on health care staff only addressed mental health issues, and stress/burnout in particular.

Limitations: The scoping search process was extensive and clearly effective at identifying relevant publications, but the strategy used may not have identified every potentially relevant review. Owing to the large number of potentially relevant reviews identified from the scoping search, it was necessary to produce the evidence map using information from the titles and abstracts of reviews only.

Conclusions

It is doubtful that further evidence synthesis work at this stage would generate substantial new knowledge, particularly within the context of the NHS Health and Wellbeing Framework published in 2018. Additional synthesis work may be useful if it addressed an identifiable need and it was possible to identify one of the following:

- A specific and focused research question arising from the current evidence map. It may then be appropriate to focus on a smaller number of reviews only, and provide a more thorough and critical assessment of the available evidence.

- A specific gap in the literature, i.e. an issue not already addressed by existing reviews or guidance. It may then be possible to undertake further literature searching and conduct a new evidence review.

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List of Abbreviations

Abbreviation	Definition
HS&DR	Health Service and Delivery Research
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
RoRs	Reviews of Reviews
RMAs	Reviews and Meta-analyses
UK	United Kingdom

Plain English Summary

The health and wellbeing of staff working in the NHS is an important issue. We were asked by NHS England to identify research relevant to the promotion of healthy lifestyles amongst NHS staff. We looked for existing reviews of studies conducted in any workplace setting that examined the effects or value for money of different interventions or how they were viewed by staff or how they were delivered. We then produced a descriptive map of the available research evidence.

In total, we searched nine databases, checked over 8000 papers published since 2000 and found 408 potentially relevant reviews. As we found such a large number of potentially relevant reviews, it was necessary to produce the evidence map using information provided in the titles and abstracts of reviews only.

We found a large number of reviews focused on mental health, changing lifestyle behaviour such as physical activity, and on general workplace health/health promotion. Most of the reviews that focused just on health care staff, addressed mental health issues such as stress and burnout.

We do not believe that further synthesis work on this issue would be useful unless it addressed a clear need, and it was possible to identify either a focused research question or a specific gap in the literature. It may then be appropriate to focus on a smaller number of reviews and conduct a more detailed examination of the available evidence or, if necessary, undertake further literature searching and conduct a new evidence review.

Scientific Summary

Background

The health and wellbeing of staff working in the NHS is a significant and long standing issue for UK healthcare. Sickness absence amongst NHS staff is known to be higher than in other public sector organisations as well as those in the private sector. Poor staff health and wellbeing has significant financial implications and also potentially impacts on quality of care, patient outcomes and safety.

Research has indicated that musculoskeletal and mental health conditions are major causes of ill health and sickness absence amongst NHS staff. The level of violence, harassment and abuse experienced by staff from a number of different sources has also been identified as a key issue. Evidence indicates that poor mental wellbeing can negatively affect lifestyle behaviours, and vice versa. Notably, studies suggest that a large proportion of individuals working in the NHS do not meet public health guidance in relation to healthy lifestyle behaviours. This however is not solely the result of factors under the control of individuals. The negative influence that organisational level factors can have on the lifestyle behaviours of health care staff has been highlighted in past UK studies. This includes long working hours, inadequate break times and low staffing levels.

Over a number of years, there have been various initiatives to improve the health and wellbeing of NHS staff. For example, The NHS Health and Wellbeing Framework was introduced in 2018 to assist NHS providers in developing and implementing a staff health/wellbeing strategy. The framework has a key focus on promoting healthy lifestyles in addition to addressing mental health and musculoskeletal health.

In December 2018, the York Health Service and Delivery Research evidence synthesis centre was asked by NHS England to identify evidence relevant to the promotion of healthy lifestyles amongst NHS staff. For this piece of work, the term ‘NHS staff’ was conceptualised broadly as any individual working for the organisation in any post.

Objectives

To map existing reviews on workplace-based interventions to promote health and wellbeing, and assess the scope for further evidence synthesis work. It was not the purpose of this piece of work to extract, evaluate and synthesise findings from individual publications.

Methods

A scoping search was conducted of nine databases to identify systematic reviews on health and wellbeing at work. Results were limited by publication date (2000 to January/February 2019). No language or geographical limits were applied. The following databases were searched:

- Cochrane Database of Systematic Reviews (CDSR)
- Database of Abstracts of Review of Effects (DARE)
- HTA database
- Epistemonikos
- Health Evidence
- Database of promoting health effectiveness reviews (DoPHER)
- Prospero
- Medline
- Business Source Premier

Owing to the large number of potentially relevant publications identified, reviews were screened for inclusion in the evidence map based on information in the title and abstracts of records only. However, the full text of a number of 'reviews of reviews' (RoRs) identified during the selection process was retrieved in order to conduct a more detailed examination of these publications.

Records were selected for inclusion in the evidence map based on the following criteria:

Population: Adult employees (aged 18 years or over) in any occupational setting and in any role. Any reviews focusing solely on self-employed workers or including participants from other settings (e.g. school students) were not eligible for inclusion.

Interventions: Any intervention aimed at promoting or maintaining physical or mental health and wellbeing (however conceptualised). Interventions could also be focused on early intervention and reducing the incidence or symptoms of common mental health conditions

(stress, anxiety or depression) amongst staff. Reviews of interventions addressing violence against staff, workplace bullying, or harassment were also eligible for inclusion. Occupational health interventions and those aimed at returning employees to work after absence were considered beyond the scope of the review. Occupational health interventions were conceptualised as those with a predominate focus on promoting safer working environments and practices, and reducing injuries and workplace health risks.

Interventions could be either, or both: (i) individual level interventions, for example, initiatives focused on individual behaviour modification (ii) organisational level interventions aimed at modifying the workplace environment, culture, or ethos.

Outcomes: Any outcome related to the effectiveness of interventions. Relevant outcomes could include, (but not limited to): staff satisfaction; sickness absence; mental resilience; staff uptake of flu vaccination; lifestyle choices (smoking rates; alcohol consumption, physical activity levels, sedentary behaviour, dietary behaviour); coping skills; symptom reduction; levels of violence against staff, and levels of bullying. Reviews could also report on outcomes related to the implementation of initiatives.

Study design: Any form of evidence synthesis including: systematic reviews of effectiveness; systematic reviews of implementation; meta-analyses; qualitative reviews or realist reviews. Reviews could include primary studies of any design, or include other reviews (i.e. reviews of reviews).

The RoRs that were examined in greater detail also met the following additional study design criteria: authors (i) searched at least two sources, and (ii) reported inclusion/exclusion criteria.

Data on key characteristics were extracted from titles and abstracts only into a spreadsheet, including type of document; focus of the review; intervention type (where identifiable); population(s), and whether the review had a primary focus on effectiveness, costs/cost effectiveness, or implementation. Data from the spreadsheet were subsequently imported into the software package SPSS and descriptive statistics for key characteristics generated (counts and percentages). Data from the reviews and RoRs were used to produce a map and descriptive summary of the evidence. The mapping work was conducted to meet the requirements of NHS England, who were consulted at the start of the process to establish the

goals and scope of the work. Further consultation with NHS England and NIHR colleagues occurred via a teleconference following the submission of an interim report. The purpose of the teleconference was to discuss the interim results, conclusions, and scope for further evidence synthesis work. Owing to the rapid and responsive nature of the work, patient or public representatives were not asked to be involved.

Results

The title and abstracts of over 8,241 records were screened and a total of 408 potentially relevant publications identified. Evidence related to a broad range of physical and mental health issues was identified across 12 'reviews of reviews' and 312 other reviews, including 16 potentially relevant Cochrane reviews, published since 2000. There also exists National Institute for Health and Care Excellence (NICE) guidance addressing multiple issues of potential relevance (n=6). Existing reviews largely addressed effectiveness, but some focused primarily on cost effectiveness and implementation issues. A total of 78 protocols for reviews were also identified, 19 of which focused on healthcare staff only. Out of the 296 standard (non-Cochrane) reviews and meta-analyses (RMAs):

- 144 focused on aspects of lifestyle (n=78) or general health/health promotion (n=66).
- 94 focused on mental health
- 18 focused on work relations including violence and bullying
- 27 focused on other health related issues such as sleep/fatigue, and influenza vaccination amongst healthcare workers
- 13 focused on general work issues including absenteeism and presenteeism

In addition, 95 RMAs focused solely on individuals working in a health care setting. Most of these RMAs, addressed mental health issues rather than on lifestyle or general health/health promotion.

The 12 RoRs addressed workplace interventions targeting a range of physical and mental health issues. There was a considerable degree of heterogeneity between RoRs in terms of specific focus, interventions, and outcomes. Reviews focused predominately on evidence of effectiveness and little data were reported on intervention costs or implementation issues. Five of the twelve RoRs were over five years old and several RoRs, regardless of their publication date, included reviews from before 2000. This could have implications for the current relevance of some of the findings reported. The same issue could also apply to the

RMAs in the evidence map as some may have included primary studies that were conducted prior to 2000.

Conclusions

The review team is doubtful that further evidence synthesis work at this stage would provide NHS England colleagues with substantial new knowledge, particularly within the context of the new NHS Health and Wellbeing Framework. Additional synthesis work may be useful if it addressed an identifiable need and it was possible to identify one of the following:

- A specific and focused research question arising from the current evidence map. It may then be appropriate to focus on a smaller number of reviews only, and provide a more thorough and critical assessment of the available evidence.

- A specific gap in the literature, i.e. an issue not already addressed by existing reviews or guidance. It may then be possible to undertake further literature searching and conduct a new evidence review. For example, the limited number of reviews focused specifically on groups of healthcare based staff other than medics, nurses or medical/nursing students could indicate a potential research gap.

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1 Objectives

- To conduct a rapid scoping exercise to identify existing reviews on workplace-based interventions to promote health and wellbeing.
- To produce a descriptive map of the extent and nature of the available research evidence, and assess the scope for further evidence synthesis work.

2 Background

The health and wellbeing of staff working in the National Health Service (NHS) is a significant and long standing issue in UK healthcare. In 2019, NHS England reported that the NHS sickness absence rate (4%) is higher than in other public sector organisations (2.9%) and the private sector (1.9%); the cost of sickness absence by NHS staff has been estimated at £2.4bn.[1] In addition to having financial implications for the NHS through levels of sick absence, there is strong evidence linking staff health and wellbeing with quality of care, safety, and patient outcomes/experience.[2-5] More broadly, the NHS has a responsibility to protect the health of all its employees.[6] The NHS constitution makes a pledge to support staff in maintaining their health, wellbeing and safety.[7] Guidance produced by the Health and Safety Executive also addresses staff wellbeing, including work related stress (for example, HSE, 2017).[8]

Consistent with the situation in other occupational sectors, data reveal that musculoskeletal and mental health conditions are major causes of ill health and sickness absence amongst NHS staff. The Boorman review found that musculoskeletal disorders account for almost half of all sickness absence in the NHS.[9] Findings from the 2017 NHS staff survey revealed that 26% of respondents experienced musculoskeletal problems as a result of work activities in the previous twelve months.[10] A large proportion of musculoskeletal disorders cases result in long-term absence.[6]

Approximately a third of sickness absence in the NHS is the consequence of mental health issues.[11] The 2017 NHS staff survey found that 38% of all staff, and 49% of individuals working in ambulance trusts, had felt unwell due to work related stress in the last twelve months.[12] As a professional group, doctors experience high levels of mental health problems and have one of the highest suicide rates.[4] The existence of a bi-directional relationship

between mental and physical health is well recognised, and evidence suggests that poor mental wellbeing can negatively affect lifestyle behaviours. For example, a study conducted by the Nursing Standard of 3,500 nurses, midwives and healthcare assistants in the UK reported that workplace stress had a negative impact on the diet of 60% of respondents.[13]

Health professionals, and nurses in particular, have been encouraged to promote healthy lifestyle choices amongst patients.[14] Emphasis has been placed on staff taking responsibility for their own health and acting as a positive role model for engaging in healthy behaviours.[15] Notably, a number of recent UK studies found that a large proportion of healthcare staff do not themselves meet public health guidance in relation to healthy lifestyle behaviours including: consumption of fruit and vegetables;[16, 17] consumption of fats;[16] consumption of sugars;[16] physical activity;[16, 17] alcohol consumption.[17] For example, Mittal et al. reported that 83% of all staff did not eat the recommended five or more portions of fruit or vegetables per day.[16] Similarly, Schneider et al. found that 68% of nurses, 53% of other health care professionals and 82% of unregistered care workers (including nursing auxiliaries and assistants) did not eat five or more portions of fruit or vegetables daily. They also reported that 46% of nurses, 49% of other health care professionals and 44% of unregistered care workers did not meet physical activity guidelines.[17] These figures for physical activity are consistent with the proportion reported by Mittal et al. for all staff (44%).[16] In addition, the proportion of UK healthcare workers who reported being overweight or obese in four recent studies ranged from 44% to 69%.[14, 16, 18, 19]

Schneider et al. raised concerns about the potential impact of nurses' low personal adherence to public health guidance in relation to healthy lifestyles on their health promotion work with patients and its effectiveness.[17] Furthermore, Kyle et al. highlighted an increased risk of both musculoskeletal and mental health conditions from having excess body weight, which as highlighted earlier, are leading causes of ill health and sickness absence amongst NHS staff.[14]

The negative influence that organisational level factors can have on the lifestyle behaviours of health care staff has been highlighted in past UK studies. For example, 51% of the hospital staff who responded in the study by Mittal et al. indicated that long working hours impeded their ability to stay fit.[16] Furthermore, in the Nursing Standard study reported by Keogh, 79% of respondents indicated that eating a healthy meal whilst at work was made difficult by a

lack of breaks. Over half (56%) also reported that inadequate staff levels had a negative impact on their food choices.[13]

Findings from the 2017 NHS staff survey showed that 15% of all staff, and around a third (34%) of employees at ambulance trusts, had experienced physical violence from patients, relatives or the public in the previous twelve months. In addition, over a quarter of all staff (28%) and nearly half of the staff at ambulance trusts (47%) also suffered harassment, bullying or abuse from patients, relatives, or members of the public in the last twelve months. Just under a quarter of all staff (24%) experienced harassment, bullying or abuse from other members of staff.[12]

The importance of improving the health and wellbeing of NHS staff has repeatedly been recognised in government and NHS England publications published within the last ten years. The NHS Long Term Plan re-emphasises the key role that employers have in supporting staff to remain healthy, and provides a clear commitment to the continued promotion of positive physical and mental wellbeing amongst the NHS workforce. This includes reducing the level of violence and abuse experienced by staff.[1]

Over a number of years, there have been various initiatives to improve the health and wellbeing of NHS staff. On a national level, the NHS Healthy Workforce Programme was established in 2016 to identify best practice in relation to promoting staff health. The focus within the programme was on the implementation of employer led health and wellbeing initiatives as well as creating organisational practices and culture that are supportive of staff health.[11]

The NHS Health and Wellbeing Framework introduced in 2018 was informed by the findings and learning from the Healthy Workforce Programme.[20] The framework document includes guidance and actionable steps to enable all NHS providers to plan and implement a staff health and wellbeing strategy.[21] There is a focus within the framework on promoting healthy lifestyles in addition to addressing mental health and musculoskeletal health. Health and wellbeing interventions incorporated into the framework comprise prevention/self-management focused approaches (e.g. physical activity classes) and more targeted forms of support such as weight loss services, health checks, addiction support, counselling and physiotherapy. An accompanying diagnostic tool enables organisations to carry out self-assessment against the Health and Wellbeing Framework.[21]

The NHS Staff and Learners' mental wellbeing commission report published in 2019 by Health Education England reviewed evidence of good practice in relation to organisational policies within NHS organisations that had made mental health and wellbeing of staff and learners a priority.[22] A number of recommendations were made to improve support, including ensuring the provision of tailored in-house mental health support and signposting to clinical help.

A Commissioning for Quality and Innovation (CQUIN) payment was introduced in 2016 in order to provide financial incentives for NHS providers to support staff health and wellbeing. Payment is dependent on (i) the introduction of workplace health and wellbeing initiatives, with a particular focus on physical activity, and improving support for mental health and musculoskeletal issues (ii) encouraging healthier food choices (iii) increasing staff uptake of the influenza vaccination.[11]

The York Health Service and Delivery Research (HS&DR) evidence synthesis centre was asked by NHS England to identify evidence relevant to the promotion of healthy lifestyles amongst NHS staff. For this piece of work, the term 'NHS staff' was conceptualised broadly as any individual working for the organisation in any post.

3 Methods

3.1 Scoping and mapping of the evidence

This rapid scoping and mapping exercise was undertaken to provide a high-level overview of the available evidence from existing reviews and reviews of reviews (RoRs). The objective was to classify the evidence in terms of broad descriptive characteristics and it was not intended that the findings from the reviews or RoRs would be extracted, evaluated and synthesised.

Although we did not aim to conduct a full systematic review, aspects of systematic review research methodology were applied, wherever possible, to maintain the rigour, transparency and reproducibility of the mapping process.

3.2 Identification of evidence

Database searches were undertaken to identify systematic reviews about health and wellbeing at work. Results were limited by publication date (2000 to January/February 2019). No language or geographical limits were applied. The following databases were searched:

- Cochrane Database of Systematic Reviews (CDSR)
- Database of Abstracts of Review of Effects (DARE)
- HTA database
- Epistemonikos
- Health Evidence
- Database of promoting health effectiveness reviews (DoPHER)
- Prospero
- Medline
- Business Source Premier

The search strategies are provided in Appendix 1. Searches were limited to the year 2000 onwards to maximise the relevance of the evidence identified.

Once it became apparent that database searches had identified a large number of potentially relevant reviews, it was decided not to undertake supplementary searching of specific websites to identify any additional relevant publications or grey literature.

3.3 Selection procedure

A sample of title and abstracts were initially pilot screened by two reviewers independently and their decisions compared. On achieving at least 90% agreement, the remaining title and abstracts were screened against the selection criteria by one reviewer only. If there was uncertainty regarding the eligibility of any record, it was discussed with a second reviewer. Records without an abstract were screened on title only.

It had been intended that the full text of potentially relevant reviews would be retrieved and screened for inclusion, but due to the large number identified, this was not practical within the available timeframe. A pragmatic post protocol decision was taken to adjust the approach and select reviews for inclusion in the evidence map based on information in the title and abstracts of records only. However, the full text of all RoRs identified during the selection process was retrieved in order to conduct a more detailed examination of these publications.

3.4 Selection criteria

Records were screened for potential inclusion against the following selection criteria:

Population: Adult employees (aged 18 years or over) in any occupational setting and in any role. Any reviews focusing solely on self-employed workers or including participants from other settings (e.g. school students) were not eligible for inclusion.

Interventions: Any intervention aimed at promoting or maintaining physical or mental health and wellbeing (however conceptualised). Interventions could also be focused on early intervention and reducing the incidence or symptoms of common mental health conditions (stress, anxiety or depression) amongst staff. Reviews of interventions addressing violence against staff, workplace bullying, or harassment were also eligible for inclusion. Occupational health interventions and those aimed at returning employees to work after absence were considered beyond the scope of the review. Occupational health interventions were conceptualised as those with a predominate focus on promoting safer working environments and practices, and reducing injuries and workplace health risks.

Interventions could be either, or both: (i) individual level interventions, for example, initiatives focused on individual behaviour modification (ii) organisational level interventions aimed at modifying the workplace environment, culture, or ethos.

Outcomes: Any outcome related to the effectiveness of interventions. Relevant outcomes could include, (but not limited to): staff satisfaction; sickness absence; mental resilience; staff uptake of flu vaccination; lifestyle choices (smoking rates; alcohol consumption, physical activity levels, sedentary behaviour, dietary behaviour); coping skills; symptom reduction; levels of violence against staff, and levels of bullying. Reviews could also report on outcomes related to the implementation of initiatives.

Study design: Any form of evidence synthesis including: systematic reviews of effectiveness; systematic reviews of implementation; meta-analyses; qualitative reviews or realist reviews. Reviews could include primary studies of any design, or include other reviews (i.e. reviews of reviews).

All RoRs also met the following additional study design criteria: authors (i) searched at least two sources, and (ii) reported inclusion/exclusion criteria. One of the sources searched must

have been a named database. Other acceptable sources were: conducting internet searches; hand searching journals; citation searches; reference checking; contacting other authors.

It was stated in the protocol that all forms of evidence synthesis would have to meet the two criteria above to be included in the map. However, as the full text of reviews was not retrieved, this stipulation could not be implemented. In most cases, there was insufficient detail reported in title and abstracts alone to complete an assessment.

3.5 Data extraction

For each included review, data on key characteristics were extracted from titles and abstracts into a spreadsheet, including type of document, focus of the review, intervention type (where identifiable), population(s), and whether the review had a primary focus on effectiveness, costs/cost effectiveness, or implementation. A sample of reviews were extracted independently by two reviewers to ensure consistency of coding and decisions compared. Once there was a high level of agreement data extraction was conducted by one reviewer.

For the included RoRs, data on key characteristics were also extracted by one reviewer. In addition, comments by the RoR authors reflecting on the included evidence were noted. One reviewer checked to ensure that relevant reviews reported in the RoRs had been identified in the searches and included in the mapping of the evidence. Data extraction was not checked by a second reviewer, which represents another post-protocol change necessitated by the large number of relevant publications identified and limited time available.

3.6 Summary of post protocol changes

As indicated previously, it was necessary for the review team to make the following post protocol changes:

- No supplementary searching of specific websites was conducted to identify any additional relevant publications or grey literature
- Reviews and meta-analyses were selected for inclusion in the evidence map based on information in the title and abstracts only
- It was not possible to assess whether reviews and meta-analyses were conducted using a systematic methodology
- Data extraction was not checked by a second reviewer.

3.7 Synthesis

Data from the spreadsheet were imported into the software package SPSS [23] and descriptive statistics for key characteristics generated (counts and percentages). Data from the reviews and RoRs were then used to produce a map and descriptive summary of the evidence. This provided an overview of the extent and nature of the current evidence base relevant to promoting healthy lifestyles in NHS staff. Reviews and RoRs were grouped by topic focus (e.g. lifestyle behaviour, mental health, violence/bullying) and briefly described.

3.8 External Engagement

This mapping work was conducted for NHS England, who were consulted at the start and end of process. The research team initially received a very brief outline of the topic area of interest via NIHR. A teleconference with NHS England and NIHR colleagues was subsequently held to establish the goals and scope of the work. Based on this discussion, the research team produced a review protocol, conducted the mapping exercise and produced an interim report for NHS England.

Following the submission of the interim report, a second teleconference was held between the York research team, NHS England and NIHR in order to discuss the interim results, conclusions, and scope for further evidence synthesis work. During this teleconference, the York research team gave a presentation of key findings and answered any questions arising. On the basis of this discussion, no additional evidence synthesis work was requested from the research team. Three regional medical directors at NHS England were involved over the course of the work. Owing to the rapid and responsive nature of the work, patient or public representatives were not asked to be involved.

4 Results

In total, 9,622 search results were downloaded and imported into a reference management software package. After deduplication there was a total of 8241 unique records. In total, we identified 408 potentially relevant reviews of workplace based interventions focused on the health and wellbeing of staff. The flow of literature through the review is shown in Figure 1.

Figure 1: PRISMA flow chart

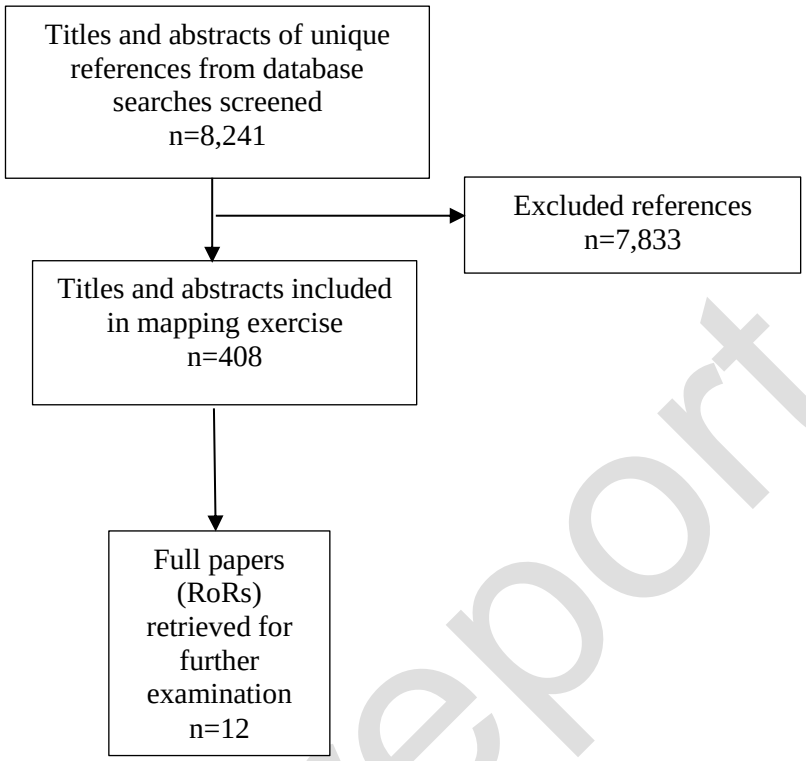
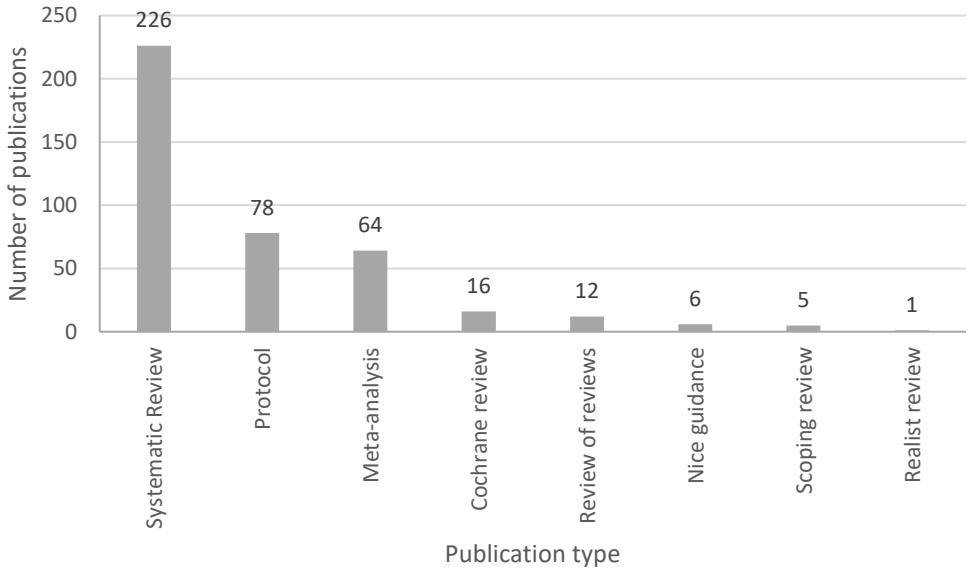


Figure 2 shows the different types of publications identified from the scoping searches of key databases.

Figure 2: Type of publication (n=408)



Results are presented below by the following categories of publication type: 'Reviews of reviews'; Cochrane reviews; NICE guidance; a merged grouping of systematic reviews, scoping reviews, realist reviews and meta-analyses, which has been labelled as 'Reviews and meta-analyses' (RMAs); and protocols.

4.1 'Reviews of reviews'

It can be seen from Figure 2 that there is a sizeable number of existing 'reviews of reviews' (n=12). These have examined the effectiveness of workplace interventions targeting both physical and mental health. Two reviews addressed interventions focused on employees in the health sector.[24, 25] The primary topic addressed in each of the 12 'reviews of reviews' is outlined below:

General health and lifestyles/mixed physical and mental health

- health promotion and primary prevention, including interventions focused on stress, physical activity, nutrition and smoking;[26]
- smoking cessation;[27]
- 'healthy lifestyles' focused on physical activity, healthy weight and good nutrition;[28]
- 'workplace health programmes' for improving both physical and mental health. This review addressed implementation issues as well as effectiveness;[29]
- organisational level interventions in the 'health sector' to improve health;[24]
- physical activity;[30]
- dietary change.[31]

Mental health

- stress management with a particular emphasis on preventing common mental health disorders (anxiety and depression);[32]
- mental health including stress management and the prevention of psychological disorders;[33]
- common mental disorders (depression and anxiety);[34]
- interventions to prevent mental health problems and absenteeism;[35]
- physician burnout (including medical students and residents).[25]

A more detailed description of the 12 reviews of reviews is provided in the section entitled 'Review of reviews: Full text scoping'.

4.2 Cochrane reviews

Out of the 16 Cochrane reviews identified, [36-51] eight were targeted at general health, physical health or lifestyle behaviour. This included reviews related to improving physical activity through the use of pedometers, decreasing sitting time at work, sex risk behaviour and preventing HIV infection, and smoking cessation. The latter review examined the effectiveness, costs and cost effectiveness of smoking cessation interventions. Strategies to improve the implementation of workplace-based policies/practices aimed at lifestyle behaviours (diet, physical activity, obesity, tobacco use and alcohol use) have also been examined in a Cochrane review. The effectiveness and cost-effectiveness of such strategies were also assessed as secondary outcomes.

Four Cochrane reviews examined the effectiveness of interventions to prevent or reduce workplace stress/burnout, two of which were focused on healthcare workers.[46, 50] One other review that was also focused on the wellbeing of healthcare personnel, reported on the psychological effects of making changes to the physical workplace environment, although only one primary study met the authors' inclusion criteria.[49] One Cochrane review on the prevention of workplace bullying was identified. In addition, there are Cochrane reviews of interventions addressing sleepiness and sleep disorders amongst shift workers; the effects of flexible working interventions on the health and wellbeing of employees and their families; breastfeeding support at work; alertness and mood in daytime workers; and absenteeism amongst workers with inflammatory arthritis.

4.3 NICE guidance

The National Institute for Health and Care Excellence (NICE) has produced evidence based guidance on a number of workplace health issues including the promotion of mental wellbeing,[52] physical activity,[53] and encouraging employees to stop smoking.[54]

4.4 'Reviews and meta-analyses' (RMAs)

Workplace settings

In total, 296 reviews (systematic reviews/scoping/realist reviews) and meta-analyses were identified, which focused on primary studies with 23 different groups of workers. For a full list of all 23 population groups/workplace settings in the 296 reviews and meta-analyses (RMAs), see Appendix 2, Table 13. The largest proportion of RMAs had a focus on generic 'workplace' interventions, and did not state a specific target group of workers (n=155, 52%).

There were 31 RMAs focused on primary studies with nurses of all types, and a similar number were focused on 'healthcare' workers (n=28). A further 36 RMAs had a specific focus on other groups of healthcare workers, and these are shown in Table 1. Out of the 296 RMAs identified, a total of 95 (32%) focused on individuals working in a healthcare setting in some capacity. Amongst RMAs not focused on healthcare, the groups of workers most frequently studied were individuals who work shifts (n=9), those based in offices (n=7) and female workers (n=7).

Table 1: Healthcare focused reviews and meta-analyses (n=95)

Staff groups	Number of RMAs
Nurses	31
'Healthcare' staff	28
Staff working in mental health care	8
Medical students	7
Doctors	7
Nurses/nursing students	4
Nursing students	3
Emergency medical service personnel	3
Midwives/obstetricians/midwives	2
Doctors/medical students	1
Healthcare students/professionals	1

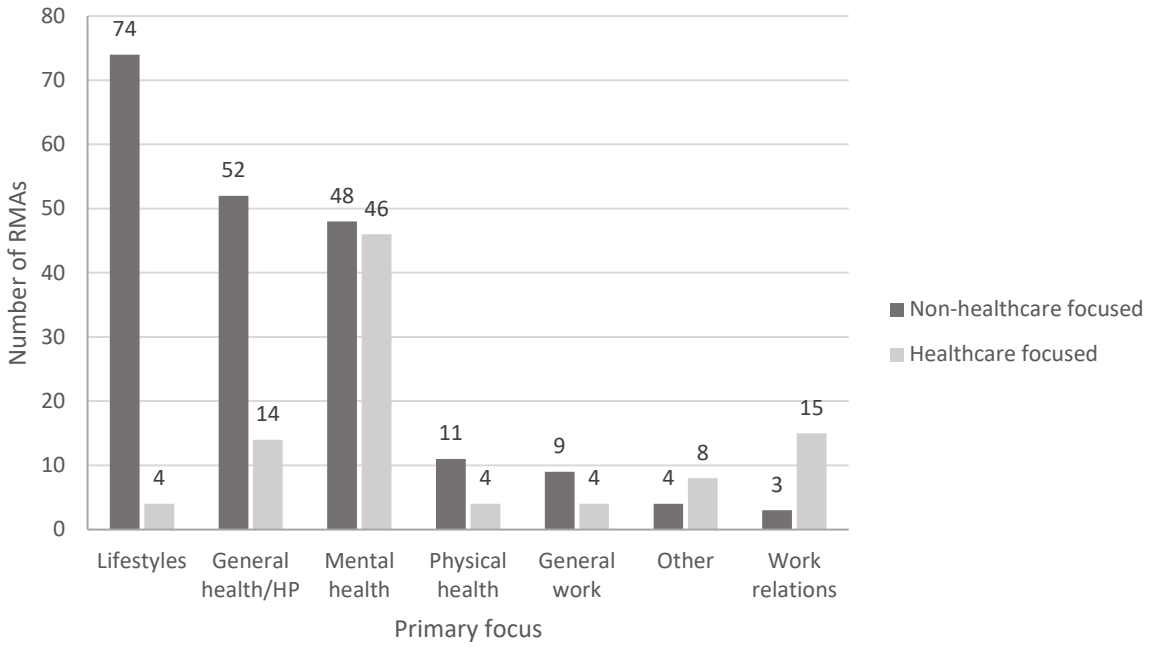
Health focus of reviews and meta-analyses

The primary health focus of each review or meta-analysis was categorised into seven broad groupings: lifestyles; general health/health promotion; mental health; physical health; work relationships; general work; and 'other' health related interventions. As the grouping of RMAs was based on information in titles and abstracts only, it should not be considered a definitive categorisation of health focus. It is also important to recognise that there is potentially considerable overlap between some of the groups depending on the specific aims of interventions, and particularly the general health/health promotion and lifestyles categories.

Figure 3 shows the primary health focus of the 296 identified reviews and meta-analyses. In order to retain pertinent information, RMAs have been separated into those that had a specific focus on healthcare settings (healthcare focused) and ones that did not (non-healthcare focused). However, it should be recognised that some of the RMAs without a healthcare focus could, depending on the inclusion criteria applied, have also potentially included

primary studies conducted with staff in healthcare settings. A full bibliographic list for the 296 RMAs by primary health focus and setting is provided in Appendix 3.

Figure 3: Primary focus of reviews and meta-analyses (n=296)



4.4.1 Lifestyles

In total, 78 out of the 296 reviews and meta-analyses addressed lifestyles and lifestyle behaviour, of which four were focused on staff in healthcare settings. As Table 2 reveals, the largest proportion of the non-health care focused RMAs addressed physical activity, sedentary behaviour or sitting time (n=29). Five RMAs included interventions that examined both physical activity and/or dietary behaviour/nutrition. It can also be seen from Table 2 that a total of 22 non-health care focused RMAs were on obesity/weight status (n=11), general diet/nutrition (n=7), fruit and vegetable consumption (n=3) or dietary behaviours and adiposity (n=1). A further nine RMAs addressed smoking cessation or employees smoking behaviour. The four RMAs related to health care staff were focused on physical activity and/or dietary behaviour (n=2), weight status (n=1) and dietary behaviour (n=1). Of these four RMAs, two were focused on nurses and two on a broad grouping of 'healthcare' staff.

Table 2: Health focus of reviews and meta-analyses related to lifestyles (n=78)

Health focus	Number of RMAs	
	Non-healthcare focused	Healthcare focused
Physical activity/sedentary/sitting time	29	0
Obesity/weight	11	1
Smoking cessation	9	0
Diet/nutrition	7	1
Physical activity/diet/nutrition	5	2
Alcohol	3	0
Fruit/veg consumption	3	0
Diabetes	2	0
Substance use	2	0
Dietary behaviours/adiposity	1	0
Physical activity/diet/weight	1	0
Substance use & HIV risk behaviours	1	0
Total	74	4

In terms of interventions, it was possible to determine from information provided in the abstracts that at least 12 of the non-healthcare focused RMAs had included both individual and organisational level interventions. These addressed weight status (n=5); physical activity, sedentary behaviour or sitting time (n=3); alcohol (n=1); smoking (n=1), physical activity/diet/weight (n=1) and diet/nutrition (n=1). It was not possible to make a similar determination for the four RMAs conducted in healthcare settings.

Eight lifestyle RMAs (seven non-healthcare focused and one healthcare focused) examined organisational level interventions or policies only. The one healthcare based review was commissioned by Public Health England to examine the evidence on environmental (choice architecture) interventions to increase the purchase and consumption of healthier food and drinks by NHS staff.[55]

Interventions evaluated in six other RMAs (all non-healthcare focused) were aimed at reducing sedentary behaviour in office workers through desk based changes such as the use of active workstations, and cycle and treadmill desks.

Amongst the 74 non healthcare focused RMAs, one had a primary focus on the costs and financial return of worksite programmes aimed at improving various lifestyle behaviours rather than effectiveness. Furthermore, four other RMAs (addressing physical activity and smoking) focused primarily on implementation and process related issues.

4.4.2 General health/health promotion

The scoping searches identified 66 RMAs that were concerned with general health promotion or interventions to promote the health and wellbeing of workers in broad terms. Of this total, 14 had a specific focus on health care staff.

The most common intervention type identified amongst the 52 non-healthcare focused RMAs was various forms of 'workplace health promotion programmes' (n=18). Other specific types of intervention that were also identified included:

- Alterations to the jobs or work patterns of employees. For example, changing shift patterns, task restructuring, increasing employee control, and job redesign (n=5)
- organisational level interventions including improving the social or psychosocial work environment (n=4)
- digital/technology based interventions (n=2)
- mentoring, training or support (n=2)

One of the 14 RMAs of general health promotion in healthcare settings was commissioned by the Department of Health and Social Care in the UK and examined whole-system approaches to improving the health and wellbeing of healthcare workers [56].

Where a specific intervention type could be determined, three out of the other thirteen healthcare focused RMAs addressed alterations to jobs or work patterns. Other RMAs examined clinical supervision; mentoring, training and support; Schwartz Center Rounds; exercise interventions to promote both physical and mental health; and health promotion programmes to improve behavioural health risk factors. Table 3 provides details of the specific groups of staff that were the target population in the fourteen healthcare focused RMAs.

RMAs of general health/wellbeing were largely focused on effectiveness outcomes, but several had a primary aim of evaluating the costs and economic impact of worksite health promotion programmes. One RMA focused solely on process issues and the factors that influence the implementation of workplace health promotion interventions. Similarly, one RMA focused on healthcare staff examined barriers to promoting the health and wellbeing of Brazilian health care workers.

Table 3: Type of staff in healthcare specific reviews and meta-analyses with a general health/health promotion focus (n=14)

Staff groups	Number of RMAs
Nurses	7
Healthcare workers	3
Medical students	2
Doctors	1
Mental health care workers	1

4.4.3 Mental health issues

In total, 94 reviews and meta-analyses had a focus on mental health issues. Notably, almost half of all RMAs focused on healthcare staff were related to mental health (n=46, 49%). The largest proportion of RMAs (38/94) comprised primary studies that were aimed at improving psychological health or wellbeing outcomes (non-healthcare, n=23; healthcare focused, n=15). The remaining 56 RMAs had a primary focus on more specific mental health issues, and these are shown in Table 4. The majority of the 56 RMAs concerned interventions targeting stress and/or burnout amongst workers (n=39). Stress and burnout related interventions was a particular focus of RMAs in healthcare settings (26/31). In addition, nine of the RMAs on stress and/or burnout were based on primary studies with nurses.

Table 4: Specific mental health focus of reviews and meta-analyses (n=56)

Focus	Number of RMAs	
	Non-healthcare focused	Healthcare focused
Stress	8	11
Burnout	5	12
Compassion fatigue/ secondary traumatic stress/ vicarious traumatization	0	2
Stress/burnout	0	2
Compassion fatigue	1	1
Coping/resilience	0	1
Depression	6	1
Stress/burnout/depression/suicide	0	1
Anxiety	1	0
Depression/anxiety	1	0
PTSD	1	0
Suicide prevention	2	0
Total	25	31

It is likely that a number of the issues in Table 4 were also outcomes of interest in at least some of the 38 broad RMAs of mental health interventions in the workplace. Consequently, the table potentially underestimate the frequency with which issues have been addressed in RMAs.

Eleven mental health related RMAs had an identifiable focus on mindfulness/meditation based interventions (healthcare focused, n=6; non healthcare focused, n=5). Four addressed digital or web based interventions including apps. In addition, two RMAs examined the effectiveness of physical activity interventions to improve mental health outcomes. It was further possible from the abstracts to determine that 19 other RMAs included both individual and organisational level interventions. In terms of outcomes, nearly all RMAs synthesised evidence in relation to the effectiveness of interventions. However, one had a primary focus on the financial return and cost effectiveness of mental health interventions in the workplace, and another examined process related outcomes in workplace stress management intervention studies. Finally, one review reviewed workplace guidelines to prevent, detect and manage mental health issues.

4.4.4 Physical health issues

Fifteen RMAs addressed a number of other issues related to the physical health of the workforce, and these are shown in Table 5. The largest number (8/15) were focused on issues around fatigue, sleep, sleepiness, insomnia and alertness, particularly amongst shift workers. Interventions included: changing shift patterns and length; napping; restorative breaks; fatigue training, and other non-pharmacological measures. Three RMAs had a specific focus on reducing cardiovascular risk, one of which evaluated lifestyle targeted interventions. Another addressed internet based cardiovascular wellness and prevention programmes.

Table 5: Physical health issues (n=15)

Focus	**Number of RMAs**	
	Non-healthcare focused	Healthcare focused
Sleep/fatigue	4	4
Cardiovascular risk	3	0
Cervical cancer screening	1	0
Headaches	1	0
Hearing difficulties	1	0
HIV/Tuberculosis	1	0
Total	11	4

4.4.5 Work relations

Eighteen RMAs were related to violence, bullying or other unacceptable behaviour in the workplace. Fifteen RMAs were focused on healthcare settings, 12 of which addressed violence/aggression prevention or management. The other three healthcare focused RMAs addressed bullying, violence and/or incivility. Approximately half (n=8) involved interventions conducted with nursing staff, and two focused solely on nurses working in emergency departments. Some of the healthcare focused RMAs evaluated specific forms of interventions including de-escalation techniques training and aggression management programmes. The prevention of bullying, incivility or unprofessional behaviour was the focus of three RMAs of non-healthcare settings.

4.4.6 General work issues

Table 6 shows the primary focus of thirteen RMAs that addressed general work issues. It can be seen that an equal number of RMAs were related to sickness absence (n=4) and absenteeism (n=4), and a further two had a focus on presenteeism. Three of these eleven RMAs examined the role of physical activity in reducing sickness absence, absenteeism or presenteeism. Two healthcare focused RMAs synthesised evidence on the effectiveness of interventions and strategies to support student wellbeing during their transition to qualified nurses.

Table 6: General work issues (n=13)

Focus	**Number of RMAs**	
	Non-healthcare focused	Healthcare focused
Sickness absence	3	1
Absenteeism	3	1
Transition to work	0	2
Presenteeism	1	0
Presenteeism & mental health	1	0
Work ability	1	0
Total	9	4

4.4.7 Other health related issues

Four RMAs of workplace interventions aimed to promote or support breastfeeding. Eight RMAs were also identified that addressed influenza vaccination amongst healthcare workers. Five examined interventions to improve vaccination uptake, and two focused on implementation issues. This included exploring factors that may influence the success of strategies to increase uptake, as well as the views, and experiences of healthcare staff. One other review investigated both barriers to healthcare staff getting vaccinated and components of effective programmes.

4.5 Review protocols

The scoping searches identified 78 protocols for reviews, 19 of which had a healthcare focus and 59 that did not. A bibliographic list of all 78 protocols is provided in Appendix 3. As Table 7 details, approximately 83% were published on Prospero or elsewhere from 2016 (65/78) onwards.

Table 7: Protocols by year of publication (n=78)

	Number of protocols	
	Non-healthcare focused	Healthcare focused
2009	0	1
2010	1	0
2013	0	3
2014	2	0
2015	3	3
2016	8	3
2017	19	4
2018	25	5
2019	1	0
Total	59	19

The two protocols from 2014 were registered on Prospero, and the records indicate that both have been completed. One examined environmental interventions for changing the eating behaviours of employees, and the other evaluated the effectiveness of height adjustable desks for decreasing sedentary behaviour amongst office workers. Both these reviews were included in the current evidence map. The status of reviews related to the other eleven protocols published between 2009 and 2015 is unclear.

The status of reviews based on the more recent protocols published since the end of 2015 is also currently unknown. Nonetheless, the focus of the 65 protocols (53 non-healthcare

focused and 12 healthcare focused) that were published in the last three years (2016 to 2019) is shown in Table 8.

Approximately half of the non-healthcare focused protocols were related to general health and wellbeing or lifestyle related behaviours, such as physical activity, sedentary behaviour, sitting time, dietary behaviour and alcohol consumption. These protocols have targeted effectiveness, financial outcomes or process related outcomes including:

- digital (Mhealth) interventions to promote physical activity and reduce sedentary behaviour
- return on investment for workplace chronic disease prevention programmes
- factors influencing the implementation of interventions to improve workplace health and wellbeing

The largest number of healthcare focused protocols (6/12) were on the prevention of violence or bullying/harassment. Two protocols published recently (2018) focused on the effectiveness of general health and lifestyle interventions. One aimed to synthesise evidence on the effectiveness of interventions to improve the health and wellbeing of hospital staff, with a specific focus on nutrition, physical activity, stress and musculoskeletal interventions. The other was targeted at improving the health risk of nurses using behavioural and/or educational interventions. Finally, two other healthcare related protocols were published in 2018, which addressed the following issues:

- health, well-being and support interventions for UK ambulance service personnel
- use of technology to provide social or emotional support to nurses

Table 8: Focus of review protocols published 2016-2019 (n=65)

Focus	Number of protocols	
	Non-healthcare focused	Healthcare focused
General health/health promotion	14	4
Mental health & wellbeing	12	2
Physical activity/sedentary/sitting	10	0
Cardiovascular health	4	0
Alcohol	2	0
Breastfeeding	2	0
Absenteeism & presenteeism	1	0
Depression (prevention)	1	0
Dietary behaviour	1	0
Musculoskeletal problems	1	0
Physical activity/diet/sleep	1	0
Resilience	1	0
Self-confidence	1	0
Sleep/fatigue	1	0
Work/life balance	1	0
Violence/aggression	0	5
Violence/harassment/bullying	0	1
Total	53	12

4.6 Review of reviews: Full text scoping

The full texts of all 12 'reviews of reviews' were retrieved and key characteristics examined in greater depth.[24-35] Reviews were published between 2009 and 2019, seven of which were published since 2016. There was variation between the RoRs in terms of focus, interventions and outcomes, therefore the RoRs have been described individually below. Table 9 shows the main focus of the reviews.

Table 9: Focus of the included reviews of reviews (n=12)

Focus	Number of RoRs	
	Non-healthcare focused	Healthcare focused
Lifestyle	3	0
General health/health promotion	3	1
Mental health	4	1
Total	10	2

Workplace settings

Only two RoRs explicitly stated they had a healthcare focus. One RoR evaluated interventions to improve mental health by reducing physician burnout.[25] The other evaluated interventions that facilitate sustainable jobs and have a positive impact on the health of workers in health sector workplaces. However, the included RMAs evaluated interventions in a range of workplace settings, only some of which were in the health sector.[24]

The remaining RoRs reported little information on workplace setting. Some did incorporate reviews and meta-analyses (RMAs) that included staff in the health sector, however, other workplace settings were included and findings were not reported separately.

Health focus of reviews of reviews

4.6.1 Lifestyles

Three RoRs addressed lifestyles and lifestyle behaviours but each evaluated different interventions.[27, 30, 31] None of the RoRs were explicitly set in a healthcare sector. The RoRs were published from 2013 to 2019 and included RMAs published from 1994 to 2017. The main focus of the RoRs are listed in Table 10.

Table 10: Lifestyle focused interventions (n=3)

Focus	Number of RoRs	
	Non-healthcare focused	Healthcare focused
Dietary change	1	0
Physical activity	1	0
Smoking cessation	1	0
Total	3	0

Schliemann (2019)[31]

The most recent RoR, published in 2019, included 21 RMAs and evaluated the effectiveness of dietary workplace interventions.[31] However, authors reported that only one component of a workplace intervention had to be dietary, and therefore RMAs also reported other components which were largely general wellness programmes (e.g. physical activity, smoking cessation, alcohol use). As well as reporting effects on dietary behaviour such as fruit and vegetable consumption, some environmental aspects (e.g. catering policies, healthy choices, labelling healthy options) were reported together with economic outcomes (e.g. absenteeism, productivity and healthcare costs). In their discussion section, authors reported a

lack of consistency across the results due to variation of the RMAs and the included primary studies. They noted many of the outcomes were self-reported rather than objectively measured and there were a lack of process evaluations.

Jirathananuwat (2017)[30]

One RoR published in 2017 included 11 RMAs[30] and aimed to categorise interventions into factors that could optimise improvements in physical activity in the workplace. The factors were classified as: enabling (e.g. information, self-motivation, program training), pre-disposing (e.g. instrument resources such as pedometers), reinforcing (e.g. incentives, social support), policy regulatory (e.g. organisational action), and environmental development (e.g. break rooms, signage). The interventions addressed multiple health behaviours of which promoting physical activity was just one part; others included diet, stress management, weight control and smoking cessation. Workplaces included health service, government, industry, factory, educational and private sectors, but results were not reported separately for the health service settings.

Fishwick (2013)[27]

A RoR evaluating smoking cessation was published in 2013 and included six RMAs.[27] The journal article also included a summary of a systematic review of relevant published qualitative literature, two case studies and findings from an expert focus group. Interventions included workplace cessation programmes (including behavioural, self-help and pharmacological) as well as legislative smoking bans. Specific workplace settings were not described by the RoR authors. Outcomes included rates of cessation, abstinence, quit rates and costs.

4.6.2 General health/health promotion

Four RoRs had a more general health focus[24, 26, 28, 29] one of which evaluated interventions aimed at improving the health of health sector employees, although RMAs in a non-healthcare setting were also included.[24] RoRs were published between 2010 and 2016 and included RMAs published between 1997 and 2014. The main focus of the RoRs are listed in Table 11.

Table 11: Interventions focused on general health/health promotion (n=4)

Focus	Number of RoRs	
	Non-healthcare focused	Healthcare focused
Workplace health programmes for both physical and mental health	1	0
Organisational level to improve health	0	1
"Healthy lifestyles" (physical activity, weight and nutrition)	1	0
Health promotion and primary prevention	1	
Total	3	1

Brunton (2016)[29]

The Department of Health (UK) commissioned a report published in 2016 to understand whether workplace health programmes are effective for improving health and business outcomes and to identify characteristics that potentially influence their success.[29] As well as a RoRs, the authors also included research on stakeholders' views and experiences and a summary of key workplace health policy documents. Although the RoR identified a large number of RMAs (n=106), the authors chose to only include those providing pooled effects sizes (n=24). Interventions were multi-component including education, exercise, counselling, screening, change to company regulations or policy, and risk assessments. Health related outcomes included body mass index, diabetes risk, stress, and physical activity. Business outcomes included absenteeism and related costs, healthcare costs, and productivity. The RoR authors did not report details of the types of workplace included in the RMAs. They did report that interventions differed across varying types of workplace making it difficult to judge the applicability of interventions to other settings. They also commented that physical activity interventions predominated and there was little data on other public health topics. Costs were rarely evaluated; and few RMAs reported on follow-up of interventions therefore making it difficult to assess the sustainability of the interventions.

Haby (2016)[24]

One RoR published in 2016 (containing 14 RMAs) evaluated interventions to facilitate sustainable jobs and promote the health of workers in health sector workplaces.[24] However the included RMAs evaluated interventions in a range of workplace settings, only some of which were in the health sector. Interventions included flexible work arrangements, compressed working week, and task restructuring. Reported outcomes varied widely between RMAs and included disease incidence and prevalence, health service use, and health and

socio-economic inequalities. Authors commented that interventions were not well described, which made it difficult to fully understand important factors such as delivery of the intervention and whether it was supported by employees or managers.

Schröer (2014)[28]

A RoR published in 2014 included 15 RMAs and evaluated interventions promoting healthy lifestyles, preventing disease and reducing health care costs.[28] Physical activity and/or dietary interventions at the individual and/or organisational level were assessed. Details of workplaces and employees were not described in the RoR. Outcomes of interest were weight, physical activity and nutritional, together with some limited economic data. The authors reported a lack of consistency in the findings, and noted that few outcomes were evaluated long term.

Goldgruber (2010)[26]

A RoR conducted in 2010 with 17 RMAs focused on the effectiveness of workplace health promotion and primary prevention interventions.[26] The authors did not report details of workplace settings. The interventions targeted stress reduction, physical activity and nutrition, organisational development, smoking cessation, as well as ergonomics and back pain. Multiple outcomes were reported including psychosocial, physical and mental health, and economic indicators.

4.6.3 Mental Health

Five RoRs focused on mental health, [25, 32-35] one of which evaluated interventions aimed at healthcare staff.[25] RoRs were published between 2009 and 2016 and included RMAs published between 1996 and 2016. The main focus of the RoR are listed in Table 12.

Table 12: Mental health focused interventions (n=5)

Focus	Number of RoRs	
	Non-healthcare focused	Healthcare focused
Physician burnout (including medical students, residents & fellows)	0	1
Common mental health disorders (anxiety & depression)	1	0
Prevention of mental health problems & absenteeism	1	0
Mental health including stress management & prevention of psychological disorders	1	0
Stress management	1	0
Total	4	1

Kalani (2018)[25]

Reductions in physician burnout was the focus of one RoR published in 2018 with four RMAs.[25] Participants included medical students, interns, physicians, residents, and fellows. One of the three RMAs also included nurses. Most of the interventions were at an individual level including counselling, support groups, and mindfulness. Organisational level interventions included duty standards, shift work staffing and change in workload. The authors commented there were conflicting findings across RMAs at both individual and organisational level. It was suggested by the review authors that this could be due to primary studies including different groups of physicians or other mediating or moderating factors that were not investigated. Sample sizes were also reported to be small in some primary studies, and interventions differed across reviews.

Joyce (2016)[34]

Workplace interventions for common mental health disorders were the focus of a RoR published in 2016 containing 20 RMAs.[34] Interventions were aimed at primary, secondary and tertiary prevention, but details of workplace settings were not reported. Primary prevention interventions aimed to reduce the onset of a condition as well as reducing the impact of related risk factors. For example, through increasing employee control, physical activity and workplace health promotion. Secondary prevention interventions aimed to identify early symptoms and risk factors to reduce progression and included screening, counselling, stress management programmes and post-trauma debriefing. Tertiary prevention interventions aimed to provide therapy and rehabilitation to those formally diagnosed with a

mental health condition and included cognitive behaviour therapy, exposure therapy and medication. Outcomes included changes in physical activity, symptom reduction and occupational (e.g. sickness absence). The authors commented that few RMAs explored the impact of interventions on work-related aspects such as absenteeism and presenteeism.

Wagner (2016)[35]

A RoR also published in 2016 and including 14 RMAs aimed to determine the level of evidence supporting mental health interventions relating to work outcomes such as absenteeism, productivity and cost.[35] Workplace settings varied widely where reported. Interventions also varied and many were multicomponent. Others included cognitive behavioural therapy, exercise, and injury prevention.

Dalbro (2013)[33]

Workplace interventions for employees' mental health was the subject of a RoR published in 2013 in Norwegian with an English summary.[33] Only three RMAs were included. Employees included healthcare workers, law enforcement officers as well as "all employees" in workplace settings. Interventions included stress management, mental image training, and flexible working. Outcomes were stress, mental strain, self-image, quality of sleep and alertness. The RoR authors commented that no outcomes were reported for productivity, absence, sick-leave, costs or adverse events.

Bhui (2012)[32]

A synthesis of evidence on the effectiveness of different workplace stress management interventions was the focus of a RoR published in 2012 and included 23 RMAs.[32] Interventions varied and included those at the individual (e.g. stress management, cognitive behavioural therapy, relaxation, mindfulness) and organisational level (e.g. wellness programmes, support groups, problem solving committees, work redesign). However, details of workplaces were not reported by the RoR authors. Outcomes were anxiety, depression, and absenteeism. Authors reported that interventions differed in their components, mode of delivery and whether they targeted individuals or organisations. This made it difficult to compare benefits from any single intervention across a number of primary studies both within a RMA and across RMAs. Furthermore, outcomes of anxiety and depression were measured in different ways and there was not always clarity within RMAs as to which outcomes were included in meta-analyses. It was also reported that although many RMAs appeared to be

reviewing the same evidence, they did not all identify the same primary studies and therefore did not always reach the same conclusions.

Further details about the characteristics of the 12 RoRs are provided in Appendix 4, Table 14.

5 Discussion and conclusions

5.1 Summary of process

This evidence map provides a descriptive overview of the extent and nature of the available research evidence relevant to the promotion of healthy lifestyles amongst NHS staff. It was conducted to meet the requirements of NHS England, who were consulted at the start and end of the mapping process. It was not the aim of this piece of work to extract, evaluate and synthesise findings from individual publications.

In total, the title and abstracts of over 8,000 records were screened and 408 potentially relevant publications identified. Such a large number of potentially relevant reviews meant that it was necessary to map reviews based on details provided in titles and abstracts rather than on the full text of publications.

5.2 Summary of key findings

Workplace interventions targeting health and wellbeing, including the promotion of healthy lifestyle behaviours, have been reviewed extensively in the literature. Existing reviews have largely addressed effectiveness, but some have focused primarily on cost-effectiveness and/or implementation.

Evidence related to a broad range of physical and mental health issues was identified across 12 ‘reviews of reviews’ (RoRs) and 312 other reviews, including 16 potentially relevant Cochrane reviews, published since 2000. Cochrane reviews are systematic reviews which are recognised to be methodologically rigorous and have high standards of reporting. Furthermore, there exists NICE guidance addressing multiple issues of potential relevance. NICE public health guidance is developed through a rigorous process and is based on the best available evidence in relation to effectiveness and cost effectiveness.[57] In addition to published reviews of all types, reviews of reviews, and NICE guidance, protocols for a further 65 potentially relevant reviews were published between 2016 and 2019.

In terms of the health issues addressed in publications, some differences were identified between reviews that had a specific focus on healthcare settings (healthcare focused) and ones that did not (non-healthcare focused). In total, 144 reviews and/or meta-analyses (RMAs) addressed aspects of lifestyle or general health/health promotion. Out of the 144 RMAs, most (n=126, 88%) were non-healthcare focused. Furthermore, approximately 63% of all non-healthcare RMAs addressed lifestyle and general health/health promotion (n=126/201). In comparison, lifestyle and general health/health promotion reviews/meta-analyses constituted a relatively small proportion of all healthcare focused RMAs (19%, n=18/95). The largest proportion of healthcare focused RMAs addressed mental health issues (46/95), and stress and burnout in particular (26/46).

Physical activity, sedentary behaviour or sitting time was the issue most commonly addressed in lifestyle focused RMAs. In total, 37 RMAs were identified that addressed physical activity/sedentary behaviour/sitting time either as the sole focus of a review or in combination with other issues such as diet and nutrition. Multiple RMAs also examined the effectiveness of physical activity interventions to improve broader outcomes including those related to mental health, sickness absence and presenteeism.

Sixty seven out of the 95 healthcare focused RMAs involved a specific group of workers. However, the roles and settings examined were quite limited in scope, and nearly all RMAs were focused on nurses of various types, nursing students, doctors, medical students or staff working in mental health settings.

On a general level, it is unclear to what extent findings from reviews of studies conducted in non-healthcare settings or other countries, are generalisable to the NHS workforce. There could be factors specific to UK healthcare settings that impact on the ability of staff to adopt healthier behaviours, which limit the generalisability of findings from existing reviews. For example, differing organisational structures and practices, or the working conditions of staff. Most reviews are likely to have synthesised international evidence, and some may have drawn conclusions which are broadly generalisable across countries. Others could have taken local context into consideration when interpreting findings from primary studies.

Several publications identified in the scoping searches were commissioned by agencies in the UK. One RoR and one other review were commissioned by the Department of Health and Social Care.[29, 56] A third review was conducted on behalf of Public Health England.[55] The

RoR by Brunton et al.[29] examined workplace health programmes for improving health and business outcomes in any occupational setting. In contrast, the two reviews by Al-Khudairy et al.[55] and Brand et al.[56] included approaches to promoting health or health related behaviour amongst healthcare staff. The study by Al-Khudairy et al. evaluated environmental level interventions to promote healthier food and drink choices. Brand et al. reviewed interventions to improve the health of healthcare workers that adopted a whole system approach. A considerable number of other reviews have also evaluated organisational level interventions, or a combination of both individual and organisational level interventions. Evidence on the effectiveness of interventions that integrate workplace health promotion and occupational health and safety activities has also been evaluated. For example, integrated 'Total Worker Health' programmes.

Multiple reviews were identified that focused on the same broad health issue, and in the case of physical activity, obesity and stress/burnout in particular, a large number of potentially relevant reviews and meta-analyses were mapped. It is possible therefore that there was considerable overlap in the primary studies included across RMAs (i.e. the same primary studies being included in multiple RMAs), which increases the potential for bias. If an in depth synthesis were to be conducted on a subset of the evidence, it would be important to assess the extent of overlap in primary studies included across reviews.

A more in depth examination was conducted of the 12 RoRs. These focused predominately on evidence of effectiveness, with little information reported on costs or the delivery of interventions. Review questions, inclusion criteria and included publications differed across RoRs. There was also variation within individual RoRs in terms of interventions assessed, outcomes and length of follow up (most were short term). It is worth noting that five of the twelve RoRs were over five years old (at the time of inclusion), and several RoRs, regardless of their publication date, included reviews from before 2000. This could have implications for the current relevance of some of the findings reported. The same issue could also apply to the RMAs in the evidence map as some may have included primary studies that were conducted prior to 2000.

5.3 Limitations of the scoping and mapping review

A pragmatic search strategy was developed for this mapping exercise, which was designed to identify key reviews related to the promotion of health and wellbeing in all types of workplace settings. It involved searching six databases with a primary focus on indexing evidence reviews. A more focused search of two other databases was also conducted specifically to identify additional reviews of interventions in healthcare settings only. Whilst the search process was extensive and clearly effective at identifying relevant publications, the strategy used may not have identified every potentially relevant review. However, this is not a significant concern given the very large number of publications that were identified. Any reviews that the searches failed to capture would not have impacted significantly on the broad results of this evidence map.

Including publications in the evidence map based only on information in titles and abstracts should be recognised as a limitation. Without examining the full text of publications, it was not possible to verify that all reviews met the inclusion criteria. It also prevented a definitive determination being made about the health focus of reviews, and little detail was reported in title and abstracts about the specific type of intervention being examined. In addition, some of the reviews included in the map may not have been conducted in a systematic way. For example, a proportion may have been non-systematic literature review style publications, which are potentially at a high risk of bias and have poorer reliability.

5.4 Implications for additional synthesis work

The current mapping exercise was conducted on behalf of NHS England shortly after the introduction in 2018 of the NHS Health and Wellbeing Framework. The framework exists to enable NHS providers to develop a staff health/wellbeing strategy, and it has a key focus on promoting both healthy lifestyles and positive mental health. The framework was the product of a multi-organisation collaboration and incorporated *"best practice, research and insights"*.[21]

In addition, NICE has produced evidence based public health guidance on a number of relevant issues. These were not examined in depth for the mapping exercise, but the guidance documents are appropriate for all employers, including the NHS. NICE routinely reviews its guidance and produces updates as required. Information provided on the NICE website indicates, for example, that:

- The guidance on workplace smoking cessation was last checked in 2014 and no major evidence that would affect the recommendations was identified.[54]

- The guidance on promoting physical activity in the workplace was last checked in January 2019. It was assessed as still largely being relevant, but an update is being planned for 2021 to incorporate evidence on sit-stand desks.[58]

- The guidance on mental wellbeing at work was last checked in March 2018, and NICE is planning to update some recommendations in order to incorporate new evidence around certain issues including: the effectiveness of educational and wellbeing interventions at an organisational level; the effectiveness of specific interventions such as mindfulness, cognitive behavioural therapy and stress management.[59]

The review team is doubtful that further evidence synthesis work at this stage would be of value to NHS England and add substantially to the existing knowledge base. Additional synthesis work may be useful if it addressed an identifiable need, and it was possible to identify one of the following:

- A specific and focused research question arising from the current evidence map. It may then be appropriate to focus on a smaller number of reviews only, and provide a more thorough and critical assessment of the available evidence.

- A specific gap in the literature, i.e. an issue not addressed by existing reviews or guidance. It may then be possible to undertake further literature searching and conduct a new evidence review. For example, the limited number of reviews focused specifically on groups of healthcare staff other than medics, nurses or medical/nursing students could indicate a potential research gap.

Conducting a 'meta-review' of evidence would not be appropriate as there was a considerable degree of heterogeneity between 'reviews of reviews', for example, in terms of focus and interventions.

6 Acknowledgements

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7 Contributions of authors

Gary Raine (Research Fellow, Evidence Synthesis) drafted the protocol and carried out study selection, data extraction, and write up of the report. Sian Thomas (Research Fellow, Evidence Synthesis) carried out study selection, data extraction, and write up of the report. Mark Rodgers (Research Fellow, Evidence Synthesis) contributed to the write up of the report. Kath Wright (Information Specialist) conducted all searching, wrote the search sections of the report and commented on the draft report. Alison Eastwood (Professor, Research) oversaw the project, contributed advice and expertise and commented on all drafts of the report. All authors commented on the protocol.

8 Data sharing

All data requests should be submitted to the corresponding author for consideration. Access to available anonymised data may be granted following review.

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10 Appendices

10.1 Appendix 1: Search strategy

The search strategies used for the literature search are reproduced below

- **Cochrane Database of Systematic Reviews (CDSR)**
  Via the Cochrane Library
  Search date 29th January 2019
  Records retrieved 76

  ID Search
  #1 MeSH descriptor: [Workplace] explode all trees
  #2 (workplace*):ti,ab,kw OR (worksite*):ti,ab,kw (Word variations have been searched)
  #3 MeSH descriptor: [Occupational Health] explode all trees
  #4 ((work* or employment) near/6 "health promot*"):ti,ab,kw (Word variations have been searched)
  #5 MeSH descriptor: [Health Promotion] explode all trees
  #6 MeSH descriptor: [Work] explode all trees
  #7 MeSH descriptor: [Employment] explode all trees
  #8 #5 and (#6 or #7)
  #9 #1 or #2 or #3 or #4 or #7

- **Database of Abstracts of Review of Effects (DARE)**
  Via the Centre for Reviews & Dissemination website at
  https://www.crd.york.ac.uk/CRDWeb/HomePage.asp
  Search date 29th January 2019

- **HTA database**
  Via the Centre for Reviews & Dissemination website at
  https://www.crd.york.ac.uk/CRDWeb/HomePage.asp
  Search date 29th January 2019

DARE ((workplace):TI OR (worksite):TI) and ((Systematic review:ZDT and Bibliographic:ZPS) OR (Systematic review:ZDT and Abstract:ZPS)) FROM 2000 TO 2019 60 records

DARE ((work) AND (health promotion)) and ((Systematic review:ZDT and Bibliographic:ZPS) OR (Systematic review:ZDT and Abstract:ZPS)) FROM 2000 TO 2019 50 records

HTA (workplace):TI OR (worksite):TI IN HTA FROM 2000 TO 2019 3 records

HTA work):TI OR (health promotion):TI IN HTA FROM 2000 TO 2019 36 records

DARE & HTA MeSH Descriptor Workplace AND Mesh Descriptor Health Promotion 58 records

- **Epistemonikos**
  Via the website at https://www.epistemonikos.org/
  Search date 29th January 2019
  Records retrieved 392

  (advanced_title_en:(health promotion AND work) OR advanced_abstract_en:(health promotion AND work)) OR advanced_title_en:(workplace) OR advanced_title_en:(worksite) [Filters: protocol=no, classification=systematic-review, min_year=2000, max_year=2019]

  Additional searches were conducted on 14th February 2019 as described below

  Search one

  (title:((title:("Occupational health") OR abstract:("Occupational health"))) OR abstract:((title:("Occupational health") OR abstract:("Occupational health")))) AND (title:(doctor OR doctors OR clinician OR clinicians OR physician OR physicians OR nurse OR nurses OR dentist OR dentists) OR abstract:(doctor OR doctors OR clinician OR clinicians OR physician OR physicians OR nurse OR nurses OR dentist OR dentists)) 47 records

  Search two

  (title:(workers OR workplace OR workplaces OR worksite OR worksites OR employment OR employees OR "job satisfaction") OR abstract:(workers OR workplace OR workplaces OR worksite OR worksites OR employment OR employees OR "job satisfaction")) 97 records

  Restricted to 2000 to 2019, Broad synthesis category

  Search three

(title:(workers OR workplace OR workplaces OR worksite OR worksites OR employment OR employees OR "job satisfaction") OR abstract:(workers OR workplace OR workplaces OR worksite OR worksites OR employment OR employees OR "job satisfaction")) 4206 records

Restricted to 2000 to 2019, Broad synthesis category

- **Health Evidence**
  Via the website at https://www.healthevidence.org/
  Search date 29th January 2019
  Records retrieved 159

#11	0	(workplace or worksite) AND Limit: Date = Published from 2019 to 2019
#10	17	(workplace or worksite) AND Limit: Date = Published from 2018 to 2018
#9	20	(workplace or worksite) AND Limit: Date = Published from 2017 to 2017
#8	14	(workplace or worksite) AND Limit: Date = Published from 2016 to 2016
#7	21	(workplace or worksite) AND Limit: Date = Published from 2015 to 2015
#6	22	(workplace or worksite) AND Limit: Date = Published from 2014 to 2014
#5	16	(workplace or worksite) AND Limit: Date = Published from 2013 to 2013
#4	22	(workplace or worksite) AND Limit: Date = Published from 2012 to 2012
#3	9	(workplace or worksite) AND Limit: Date = Published from 2011 to 2011
#2	18	(workplace or worksite) AND Limit: Date = Published from 2010 to 2010
#1	274	(workplace or worksite)

- **Database of promoting health effectiveness reviews (DoPHER)**
  Via the website at https://eppi.ioe.ac.uk/webdatabases4/Intro.aspx?ID=9
  Search date 29th January 2019
  Records retrieved 307

  Two search strategies were used

Search #	Search	No of hits
1	Freetext (Title): work	75
2	Freetext (Title): workplace	97
3	Freetext (Title): worksite	55
4	1 OR 2 OR 3	221

Search #	Search	No of hits
5	Freetext (All but Authors): workplace	117
6	Freetext (All but Authors): worksite	89
7	5 OR 6	246

- **MEDLINE**
  Via OVID
  Search date 7th February 2019
  Records retrieved 3063

Database: Ovid MEDLINE(R) ALL <1946 to February 05, 2019>
Search Strategy:
---
1 (NHS employees or NHS practitioners or NHS professionals or NHS staff or NHS workforce or NHS workers).ti,ab. (695)
2 (hospital employees or hospital practitioners or hospital professionals or hospital staff or hospital workforce or hospital workers).ti,ab. (7035)
3 (healthcare employees or healthcare practitioners or healthcare professionals or healthcare staff or healthcare workforce or healthcare workers).ti,ab. (26580)
4 (health care employees or health care practitioners or health care professionals or health care staff or health care workforce or health care workers).ti,ab. (33594)
5 (health employees or health practitioners or health professionals or health staff or health workforce or health workers).ti,ab. (62452)
6 (medical employees or medical practitioners or medical professionals or medical staff or medical workforce or medical workers).ti,ab. (21254)
7 (medical students or medical undergraduates).ti,ab. (32692)
8 (nurse$ or nursing or doctor$ or physician$ or midwi$).ti,ab. (853683)
9 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 (977641)
10 Mental Health/ or Anxiety/ or Occupational Stress/ or Burnout/ or Bullying/ (107669)
11 Lifestyle/ or Exercise/ or Diet/ or Obesity/ or Overweight/ (429256)
12 exp Substance-Related Disorders/ or Smoking/ or Alcoholism/ (386075)
13 Sick Leave/ or Absenteeeism/ or Occupational Health/ or Influenza Vaccines/ or Workplace Violence/ (57885)
14 10 or 11 or 12 or 13 (950112)
15 9 and 14 (51674)
16 ((wellbeing or well-being or wellness or health promot$ or health check$) adj3 (NHS employees or NHS practitioners or NHS professionals or NHS staff or NHS workforce or NHS workers)).ti,ab. (6)
17 ((wellbeing or well-being or wellness or health promot$ or health check$) adj3 (healthcare employees or healthcare practitioners or healthcare professionals or healthcare staff or healthcare workforce or healthcare workers)).ti,ab. (72)
18 ((wellbeing or well-being or wellness or health promot$ or health check$) adj3 (health care employees or health care practitioners or health care professionals or health care staff or health care workforce or health care workers)).ti,ab. (84)
19 ((wellbeing or well-being or wellness or health promot$ or health check$) adj3 (health employees or health practitioners or health professionals or health staff or health workforce or health workers)).ti,ab. (164)
20 ((wellbeing or well-being or wellness or health promot$ or health check$) adj3 (medical employees or medical practitioners or medical professionals or medical staff or medical workforce or medical workers)).ti,ab. (16)
21 ((wellbeing or well-being or wellness or health promot$ or health check$) adj3 (medical students or medical undergraduates)).ti,ab. (110)
22 ((wellbeing or well-being or wellness or health promot$ or health check$) adj3 (nurse$ or nursing or doctor$ or physician$ or midwi$)).ti,ab. (2048)
23 ((wellbeing or well-being or wellness or health promot$ or health check$) adj3 (hospital employees or hospital practitioners or hospital professionals or hospital staff or hospital workforce or hospital workers)).ti,ab. (20)
24 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 (2505)
25 (sick$ adj3 (leave or absence) adj3 (NHS employees or NHS practitioners or NHS professionals or NHS staff or NHS workforce or NHS workers)).ti,ab. (4)

26 (sick$ adj3 (leave or absence) adj3 (healthcare employees or healthcare practitioners or healthcare professionals or healthcare staff or healthcare workforce or healthcare workers)).ti,ab. (14)
27 (sick$ adj3 (leave or absence) adj3 (health care employees or health care practitioners or health care professionals or health care staff or health care workforce or health care workers)).ti,ab. (13)
28 (sick$ adj3 (leave or absence) adj3 (health employees or health practitioners or health professionals or health staff or health workforce or health workers)).ti,ab. (5)
29 (sick$ adj3 (leave or absence) adj3 (medical employees or medical practitioners or medical professionals or medical staff or medical workforce or medical workers)).ti,ab. (1)
30 (sick$ adj3 (leave or absence) adj3 (medical students or medical undergraduates)).ti,ab. (0)
31 (sick$ adj3 (leave or absence) adj3 (nurse$ or nursing or doctor$ or physician$ or midwi$)).ti,ab. (155)
32 (sick$ adj3 (leave or absence) adj3 (hospital employees or hospital practitioners or hospital professionals or hospital staff or hospital workforce or hospital workers)).ti,ab. (10)
33 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 (197)
34 ((flu vaccinat$ or influenza vaccinat$) adj3 (NHS employees or NHS practitioners or NHS professionals or NHS staff or NHS workforce or NHS workers)).ti,ab. (3)
35 ((flu vaccinat$ or influenza vaccinat$) adj3 (healthcare employees or healthcare practitioners or healthcare professionals or healthcare staff or healthcare workforce or healthcare workers)).ti,ab. (186)
36 ((flu vaccinat$ or influenza vaccinat$) adj3 (health care employees or health care practitioners or health care professionals or health care staff or health care workforce or health care workers)).ti,ab. (151)
37 ((flu vaccinat$ or influenza vaccinat$) adj3 (health employees or health practitioners or health professionals or health staff or health workforce or health workers)).ti,ab. (20)
38 ((flu vaccinat$ or influenza vaccinat$) adj3 (medical employees or medical practitioners or medical professionals or medical staff or medical workforce or medical workers)).ti,ab. (7)
39 ((flu vaccinat$ or influenza vaccinat$) adj3 (medical students or medical undergraduates)).ti,ab. (14)
40 ((flu vaccinat$ or influenza vaccinat$) adj3 (nurse$ or nursing or doctor$ or physician$ or midwi$)).ti,ab. (173)
41 ((flu vaccinat$ or influenza vaccinat$) adj3 (hospital employees or hospital practitioners or hospital professionals or hospital staff or hospital workforce or hospital workers)).ti,ab. (13)
42 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 (550)
43 ((anxiety or depressed or depression or mental health or stress or burnout or bullying or harass$ or violence or violent$) adj3 (NHS employees or NHS practitioners or NHS professionals or NHS staff or NHS workforce or NHS workers)).ti,ab. (15)
44 ((anxiety or depressed or depression or mental health or stress or burnout or bullying or harass$ or violence or violent$) adj3 (healthcare employees or healthcare practitioners or healthcare professionals or healthcare staff or healthcare workforce or healthcare workers)).ti,ab. (287)
45 ((anxiety or depressed or depression or mental health or stress or burnout or bullying or harass$ or violence or violent$) adj3 (health care employees or health care practitioners or health care professionals or health care staff or health care workforce or health care workers)).ti,ab. (611)
46 ((anxiety or depressed or depression or mental health or stress or burnout or bullying or harass$ or violence or violent$) adj3 (health employees or health practitioners or health professionals or health staff or health workforce or health workers)).ti,ab. (6280)

47 ((anxiety or depressed or depression or mental health or stress or burnout or bullying or harass$ or violence or violent$) adj3 (medical employees or medical practitioners or medical professionals or medical staff or medical workforce or medical workers)).ti,ab. (178)
48 ((anxiety or depressed or depression or mental health or stress or burnout or bullying or harass$ or violence or violent$) adj3 (medical students or medical undergraduates)).ti,ab. (608)
49 ((anxiety or depressed or depression or mental health or stress or burnout or bullying or harass$ or violence or violent$) adj3 (nurse$ or nursing or doctor$ or physician$ or midwi$)).ti,ab. (12284)
50 ((anxiety or depressed or depression or mental health or stress or burnout or bullying or harass$ or violence or violent$) adj3 (hospital employees or hospital practitioners or hospital professionals or hospital staff or hospital workforce or hospital workers)).ti,ab. (76)
51 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 (19671)
52 ((healthy eating or diet or nutrition or obesity or overweight or exercise or physical activity or sedentary behavi$ or lifestyle) adj3 (NHS employees or NHS practitioners or NHS professionals or NHS staff or NHS workforce or NHS workers)).ti,ab. (5)
53 ((healthy eating or diet or nutrition or obesity or overweight or exercise or physical activity or sedentary behavi$ or lifestyle) adj3 (healthcare employees or healthcare practitioners or healthcare professionals or healthcare staff or healthcare workforce or healthcare workers)).ti,ab. (120)
54 ((healthy eating or diet or nutrition or obesity or overweight or exercise or physical activity or sedentary behavi$ or lifestyle) adj3 (health care employees or health care practitioners or health care professionals or health care staff or health care workforce or health care workers)).ti,ab. (130)
55 ((healthy eating or diet or nutrition or obesity or overweight or exercise or physical activity or sedentary behavi$ or lifestyle) adj3 (health employees or health practitioners or health professionals or health staff or health workforce or health workers)).ti,ab. (359)
56 ((healthy eating or diet or nutrition or obesity or overweight or exercise or physical activity or sedentary behavi$ or lifestyle) adj3 (medical employees or medical practitioners or medical professionals or medical staff or medical workforce or medical workers)).ti,ab. (36)
57 ((healthy eating or diet or nutrition or obesity or overweight or exercise or physical activity or sedentary behavi$ or lifestyle) adj3 (medical students or medical undergraduates)).ti,ab. (208)
58 ((healthy eating or diet or nutrition or obesity or overweight or exercise or physical activity or sedentary behavi$ or lifestyle) adj3 (nurse$ or nursing or doctor$ or physician$ or midwi$)).ti,ab. (3065)
59 ((healthy eating or diet or nutrition or obesity or overweight or exercise or physical activity or sedentary behavi$ or lifestyle) adj3 (hospital employees or hospital practitioners or hospital professionals or hospital staff or hospital workforce or hospital workers)).ti,ab. (21)
60 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 (3887)
61 ((smoking or tobacco or alcoholism or alcohol abus$ or alcohol addict$ or alcohol drink$ or alcohol misus$ or drug abus$ or drug addict$ or drug misus$) adj3 (NHS employees or NHS practitioners or NHS professionals or NHS staff or NHS workforce or NHS workers)).ti,ab. (0)
62 ((smoking or tobacco or alcoholism or alcohol abus$ or alcohol addict$ or alcohol drink$ or alcohol misus$ or drug abus$ or drug addict$ or drug misus$) adj3 (healthcare employees or healthcare practitioners or healthcare professionals or healthcare staff or healthcare workforce or healthcare workers)).ti,ab. (46)
63 ((smoking or tobacco or alcoholism or alcohol abus$ or alcohol addict$ or alcohol drink$ or alcohol misus$ or drug abus$ or drug addict$ or drug misus$) adj3 (health care employees or health care practitioners or health care professionals or health care staff or health care workforce or health care workers)).ti,ab. (105)

64 ((smoking or tobacco or alcoholism or alcohol abus$ or alcohol addict$ or alcohol drink$ or alcohol misus$ or drug abus$ or drug addict$ or drug misus$) adj3 (health employees or health practitioners or health professionals or health staff or health workforce or health workers)).ti,ab. (241)
65 ((smoking or tobacco or alcoholism or alcohol abus$ or alcohol addict$ or alcohol drink$ or alcohol misus$ or drug abus$ or drug addict$ or drug misus$) adj3 (medical employees or medical practitioners or medical professionals or medical staff or medical workforce or medical workers)).ti,ab. (31)
66 ((smoking or tobacco or alcoholism or alcohol abus$ or alcohol addict$ or alcohol drink$ or alcohol misus$ or drug abus$ or drug addict$ or drug misus$) adj3 (medical students or medical undergraduates)).ti,ab. (247)
67 ((smoking or tobacco or alcoholism or alcohol abus$ or alcohol addict$ or alcohol drink$ or alcohol misus$ or drug abus$ or drug addict$ or drug misus$) adj3 (nurse$ or nursing or doctor$ or physician$ or midwi$)).ti,ab. (2040)
68 ((smoking or tobacco or alcoholism or alcohol abus$ or alcohol addict$ or alcohol drink$ or alcohol misus$ or drug abus$ or drug addict$ or drug misus$) adj3 (hospital employees or hospital practitioners or hospital professionals or hospital staff or hospital workforce or hospital workers)).ti,ab. (48)
69 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 (2654)
70 *Health Personnel/ (23667)
71 (wellbeing or well-being or wellness or health promot$ or health check$).ti. (27028)
72 (anxiety or depressed or depression or mental health or stress or burnout or bullying or harass$ or violence or violent$).ti. (418265)
73 (healthy eating or diet or nutrition or exercise or physical activity or sedentary behavi$ or lifestyle or obesity or overweight).ti. (338587)
74 (alcoholism or alcohol abus$ or alcohol addict$ or alcohol drink$ or alcohol misus$ or drug abus$ or drug addict$ or drug misus$ or smoking or tobacco).ti. (117867)
75 (sick$ leave or sick$ absence or absenteeism or flu vaccinat$ or influenza vaccinat$).ti. (7982)
76 (back adj2 pain).ti. (17183)
77 71 or 72 or 73 or 74 or 75 or 76 (909277)
78 70 and 77 (2526)
79 15 or 24 or 33 or 42 or 51 or 60 or 69 or 78 (74491)
80 (systematic$ adj2 review$).ti,ab. (146640)
81 meta-analysis as topic/ (16702)
82 meta-analytic$.ti,ab. (6342)
83 meta-analysis.ti,ab,pt. (145685)
84 metanalysis.ti,ab. (181)
85 metaanalysis.ti,ab. (1491)
86 meta analysis.ti,ab. (120969)
87 meta-synthesis.ti,ab. (704)
88 metasynthesis.ti,ab. (272)
89 meta synthesis.ti,ab. (704)
90 meta-regression.ti,ab. (6211)
91 metaregression.ti,ab. (564)
92 meta regression.ti,ab. (6211)
93 (synthes$ adj3 literature).ti,ab. (2860)
94 (synthes$ adj3 evidence).ti,ab. (8651)
95 integrative review.ti,ab. (2383)
96 data synthesis.ti,ab. (10216)
97 (research synthesis or narrative synthesis).ti,ab. (2374)
98 (systematic study or systematic studies).ti,ab. (10981)
99 (systematic comparison$ or systematic overview$).ti,ab. (3005)

100 evidence based review.ti,ab. (1852)
101 comprehensive review.ti,ab. (12741)
102 critical review.ti,ab. (14551)
103 quantitative review.ti,ab. (629)
104 structured review.ti,ab. (740)
105 realist review.ti,ab. (239)
106 realist synthesis.ti,ab. (166)
107 pooled analysis.ti,ab. (7300)
108 or/80-107 (303757)
109 review.pt. (2477929)
110 medline.ab. (100321)
111 pubmed.ab. (90896)
112 cochrane.ab. (67385)
113 embase.ab. (72406)
114 cinahl.ab. (22305)
115 psyc?lit.ab. (913)
116 psyc?info.ab. (27151)
117 (literature adj3 search$).ab. (51438)
118 (database$ adj3 search$).ab. (50418)
119 (bibliographic adj3 search$).ab. (2221)
120 (electronic adj3 search$).ab. (18711)
121 (electronic adj3 database$).ab. (24199)
122 (computeri?ed adj3 search$).ab. (3365)
123 (internet adj3 search$).ab. (2894)
124 included studies.ab. (18879)
125 (inclusion adj3 studies).ab. (13809)
126 inclusion criteria.ab. (72125)
127 selection criteria.ab. (27992)
128 predefined criteria.ab. (1770)
129 predetermined criteria.ab. (970)
130 (assess$ adj3 (quality or validity)).ab. (69431)
131 (select$ adj3 (study or studies)).ab. (59357)
132 (data adj3 extract$).ab. (53494)
133 extracted data.ab. (12362)
134 (data adj2 abstracted).ab. (4848)
135 (data adj3 abstraction).ab. (1489)
136 published intervention$.ab. (157)
137 ((study or studies) adj2 evaluat$).ab. (166265)
138 (intervention$ adj2 evaluat$).ab. (9967)
139 confidence interval$.ab. (365701)
140 heterogeneity.ab. (146219)
141 pooled.ab. (77750)
142 pooling.ab. (11003)
143 odds ratio$.ab. (239017)
144 (Jadad or coding).ab. (167100)
145 or/110-144 (1284446)
146 109 and 145 (222997)
147 review.ti. (413989)
148 147 and 145 (116759)
149 (review$ adj4 (papers or trials or studies or evidence or intervention$ or evaluation$)).ti,ab. (166288)
150 108 or 146 or 148 or 149 (506309)
151 letter.pt. (1015413)

152 editorial.pt. (481572)
153 comment.pt. (752482)
154 151 or 152 or 153 (1694614)
155 150 not 154 (494494)
156 exp animals/ not humans/ (4544871)
157 155 not 156 (481921)
158 79 and 157 (3336)
159 limit 158 to yr="2000 -Current" (3063)

- **Business Source Premier**
  Via EBSCO
  Search date 7th February 2019
  Records retrieved 711

#	Query	Results
S19	S6 OR S8 OR S10 OR S12 OR S14 OR S16 OR S18	714
S18	S1 AND S4 AND S17	44
S17	TX "back pain"	7,819
S16	S1 AND S4 AND S15	119
S15	TX smoking or tobacco or alcoholism or "alcohol abus*" or "alcohol addict*" or "alcohol drink*" or "alcohol misus*" or "drug abus*" or "drug addict*" or "drug misus*"	443,257
S14	S1 AND S4 AND S13	310
S13	TX "healthy eating" or diet or nutrition or obesity or overweight or exercise or "physical activity" or "sedentary behavi*" or lifestyle	797,679
S12	S1 AND S4 AND S11	661
S11	TX anxiety or depressed or depression or "mental health" or stress or burnout or bullying or harass* or violence or violent*	979,468
S10	S1 AND S4 AND S9	6
S9	TX "flu vaccinat*" or "influenza vaccinat*"	3,366
S8	S1 AND S4 AND S7	114
S7	TX (sick* N3 (leave or absence)) OR TX absenteeism	39,270
S6	S1 AND S4 AND S5	295
S5	TX (wellbeing or well-being or wellness or "health promot*" or "health check*")	243,733
S4	S2 OR S3	62,535
S3	TI (“NHS employees” or “NHS practitioners” or “NHS professionals” or “NHS staff” or “NHS workforce” or “NHS workers”) OR TI (“hospital employees” or	34,129

	“hospital practitioners” or “hospital professionals” or “hospital staff” or “hospital workforce” or “hospital workers”) OR TI (“healthcare employees” or “healthcare practitioners” or “healthcare professionals” or “healthcare staff” or “healthcare workforce” or “healthcare workers”) OR TI (“health care employees” or “health care practitioners” or “health care professionals” or “health care staff” or “health care workforce” or “health care workers”) OR TI (“health employees” or “health practitioners” or “health professionals” or “health staff” or “health workforce” or “health workers”) OR TI (“medical employees” or “medical practitioners” or “medical professionals” or “medical staff” or “medical workforce” or “medical workers”) OR TI (“medical students” or “medical undergraduates”) OR TI (“nurse* or nursing or doctor* or physician* or midwi*)	
S2	DE "MEDICAL personnel" OR DE "DENTAL personnel" OR DE "ENGLISH language -- Conversation & phrase books (for medical personnel)" OR DE "HEALTH practitioners" OR DE "HEALTH services administrators" OR DE "HOSPITAL personnel" OR DE "MENTAL health personnel" OR DE "NURSES" OR DE "PHYSICIANS" OR DE "PODIATRISTS"	37,984
S1	TI "systematic review" OR TI meta-analysis OR TX (review N3 (research or comprehensive or integrated or structured or realist or evidence)) OR TX (synthesis N3 (research or comprehensive or integrated or structured or realist or evidence)) OR TI (review AND (research or comprehensive or integrated or structured or realist or evidence))	136,990

Prospero

Via website at https://www.crd.york.ac.uk/prospero/
Search date 30th January 2019
Records retrieved 357

ID	Search terms	
#1	(employees AND (health OR wellbeing)): TI, KW, RQ, SM	21
#2	(employees AND (health OR well-being)): TI, KW, RQ, SM	21
#3	(staff AND (health OR wellbeing)): TI, KW, RQ, SM	92
#4	(staff AND (health OR well-being)): TI, KW, RQ, SM	95
#5	(employment AND (health OR wellbeing)): TI, KW, RQ, SM	32
#6	(employment AND (health OR well-being)): TI, KW, RQ, SM	31
#7	(workplace): TI, KW, RQ, SM	168
#8	(worksite): TI, KW, RQ, SM	9
#9	MeSH DESCRIPTOR workplace EXPLODE ALL TREES	148
#10	MeSH DESCRIPTOR Occupational Health EXPLODE ALL TREES	67
#11	#10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1	357

10.2 Appendix 2: List of population groups/workplace settings

Table 13: Full list of all population groups/workplace settings in reviews and meta-analyses

	Number of reviews
Workplace	155
Nurses[1]	31
'Healthcare' staff	28
Shift workers	9
Mental health care	8
Medical students	7
Office based workers	7
Women	7
Doctors	7
Other[2]	6
Nurses/Nursing students	4
Employees with conditions	3
Emergency Medical Services	3
Male	3
Managers/supervisors	3
Nursing students	3
Older workers	3
Public sector[3]	3
Midwives/obstetricians/midwives	2
Doctors/medical students	1
University and college staff	1
Workers (Latin American)	1
Healthcare students & professionals	1

[1] Nurses including:
Acute mental health/psychiatric nurses
Emergency department nurses
Primary care nurses
Mental health nurses
Oncology and palliative care nurses
Nurse leaders
Nurses in acute care wards
Nurses (caring for patients with sickle cell disease)
Oncology nurses
Newly qualified nurses

[2]Other:
Animal care professionals
Manufacturing workers

Military and maritime workplaces
Maritime workers and train drivers
Various including police, transport, and general
Low wage workers

[3]**Public sector workers:**
Fire fighters, ambulance, police and military personnel
Emergency and protective services employees
Emergency Service

10.3 Appendix 3: Reviews and meta-analyses, and protocols included in the evidence map

Lifestyles

Non-healthcare focused (n=74)

1. Abraham C, Graham-Rowe E. Are worksite interventions effective in increasing physical activity? A systematic review and meta-analysis. *Health Psychol Rev* 2009;**3**.

2. Albertsen K, Borg V, Oldenburg B. A systematic review of the impact of work environment on smoking cessation, relapse and amount smoked. *Prev Med* 2006;**43**:291-305.

3. Allan J, Querstret D, Banas K, de Bruin M. Environmental interventions for altering eating behaviours of employees in the workplace: A systematic review. *Obes Rev* 2016;**18**:214-26.

4. Anderson LM, Quinn TA, Glanz K, Ramirez G, Kahwati LC, Johnson DB, *et al.* The effectiveness of worksite nutrition and physical activity interventions for controlling employee overweight and obesity: A systematic review. *Am J Prev Med* 2009;**37**:340-57.

5. Archer WR, Batan MC, Buchanan LR, Soler RE, Ramsey DC, Kirchhofer A, *et al.* Promising practices for the prevention and control of obesity in the worksite. *Am J Health Promot* 2011;**25**:e12-26.

6. Ausburn T, LaCoursiere S, Crouter S, McKay T. Review of worksite weight management programs. *Workplace Health Saf* 2014;**62**:122-6.

7. Barbato DL, Sancini A, Caciari T, Rosati MV, Tomei G, Tomei F. [Dietary intervention programs in the workplace: An effective prevention strategy]. *G Ital Med Lav Ergon* 2011;**32**:100-3.

8. Becker I, Wallmann-Sperlich B, Rupp R, Bucksch J. [Workplace interventions to reduce sedentary behavior: A systematic review]. *Gesundheitswesen* 2017. 10.1055/s-0043-112746

9. Bell K, McCullough L, DeVries K, Greaves L, Jategaonkar N. *NICE Rapid review. Workplace policies and interventions for smoking cessation*: British Columbia Centre of Excellence for Women's Health; 2006.

10. Bell K, Richardson L, McCullough L, Greaves L. *Workplace interventions to promote smoking cessation*. British Columbia Center of Excellence for Women's Health; 2006.

11. Benedict MA, Arterburn D. Worksite-based weight loss programs: A systematic review of recent literature. *Am J Health Promot* 2008;**22**:408-16.

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13. Brown S, Garcia A, Zuniga J, Lewis K. Effectiveness of workplace diabetes prevention programs: A systematic review of the evidence. *Patient Educ Couns* 2018:10.1016/j.pec.2018.01.001.

14. Burnhams NH, Musekiwa A, Parry C, London L. A systematic review of evidence-based workplace prevention programmes that address substance abuse and HIV risk behaviours. *Afr J Drug Alcohol Stud* 2013;**12**.

15. Cairns JM, Bambra C, Hillier-Brown FC, Moore HJ, Summerbell CD. Weighing up the evidence: A systematic review of the effectiveness of workplace interventions to tackle socio-economic inequalities in obesity. *J Public Health (Oxford, England)* 2015;**37**:659-70.

16. Cao C, Liu Y, Zhu W, Ma J. Effect of active workstation on energy expenditure and job performance: A systematic review and meta-analysis. *J Phys Act Health* 2016;**13**:562-71.

17. Carroll C, Rick J, Leaviss J, Fishwick D, Booth A. A qualitative evidence synthesis of employees' views of workplace smoking reduction or cessation interventions. *BMC Public Health* 2013;**13**:1095.

18. Chau JY, der Ploeg HP, Van Uffelen JG, Wong J, Riphagen I, Healy GN, *et al.* Are workplace interventions to reduce sitting effective? A systematic review. *Prev Med* 2010;**51**:352-6.

19. Chu AH, Ng SH, Tan CS, Win AM, Koh D, Müller-Riemenschneider F. A systematic review and meta-analysis of workplace intervention strategies to reduce sedentary time in white-collar workers. *Obesity reviews* 2016;**17**:467-81.

20. Commissaris DA, Huysmans MA, Mathiassen SE, Srinivasan D, Koppes LL, Hendriksen IJ. Interventions to reduce sedentary behavior and increase physical activity during productive work: A systematic review. *Scand J Work Environ Health* 2016;**42**:181-91.

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Health care focused (n=4)

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General health/Health Promotion

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Physical health

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Health care focused (n=4)

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Work relations

Non-health care focused (n=3)

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Health care focused (n=15)

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General work issues

Non-health care focused (n=9)

1. Amlani NM, Munir F. Does physical activity have an impact on sickness absence? A review. *Sports medicine (Auckland, NZ)* 2014;**44**:887-907.

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Health care focused (n=4)

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Other health related issues

Non-health care focused (n=4)

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Health care focused (n=8)

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Review protocols

Non-health care focused (n=59)

1. Aboagye E, Kwak L, Grimani A. The impact of worksite nutrition and physical activity interventions on productivity, work performance and work ability: A systematic review. 2017.

2. Anthony L. Identifying work-life balance interventions for the public sector: A systematic review. 2018.

3. Backhaus T. Mental health promotion in workplace settings: A systematic literature review of economic evaluation studies. 2016.

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5. Bailey C, Hill B, Hills A, Venn A, Teede H, Skouteris H, *et al.* Preconception, pregnancy and postpartum health and well-being interventions in the workplace: A systematic review. 2018.

6. Berkman L, Kubzansky L, Kelly EL, Sianoja M, Johnson S. An exploration of workplace interventions intended to improve the psychosocial, job-related, eudaimonic, and/or work-family well-being of workers 18 and over: protocol for a systematic review. 2018.

7. Brakenridge C, Healy G, Dunstan D, Owen N, Lawler S. Factors perceived to influence workplace sitting time: thematic synthesis of qualitative findings. 2017.

8. Brierley M, Smith L, Bailey D, Chater A. Effectiveness of sedentary behaviour workplace interventions on cardiometabolic risk markers: A systematic review. 2017.

9. Buckingham S, Williams AJ, Morrissey K, Price L, Harrison J. Mobile health interventions to promote physical activity and reduce sedentary behaviour in the workplace: A systematic review. 2017.

10. Burn N, Maguire N, Weston K, Weston M, Atkinson G. Workplace exercise interventions: A systematic review and meta-analysis. 2017.

11. Burrell J, Baker F, Allen C. Resilience factors in employees: A systematic review of the capacities and strategies that employees use to strengthen their resilience in the workplace. 2018.

12. Court A. The effects of exposure to natural light in the workplace on the health and productivity of office workers: A systematic review protocol. *JBI Library of Systematic Reviews* 2010;**8**:1-18.

13. Czuba K, Oliver F, Vandal A, Kayes N. Workplace interventions to improve work-related psychosocial outcomes and reduce turnover of support workers in residential aged care: A systematic review. 2017.

14. Dagnan D, Eastlake L, Jackson I. Systematic review of staff based interventions and support systems to improve the well-being of staff that provide care to people with intellectual disabilities. 2016.

15. Daniels K, Hogg M, Nayani R, Tregaskis O, Watson D. Factors influencing the implementation of workplace health and wellbeing interventions. 2019.

16. Engelen L, Chau J, Jeyapalan D, Mackey M. Systematic review of the state of the art of the physical and mental effects of activity based working. 2016.

17. Engelen L, Ochs K. Active design and healthy behaviour and wellbeing: A systematic review. 2016.

18. Fereday R, Bosworth C, Charalampous M. How effective are workplace mindfulness-based interventions (MBIs) at improving common mental disorders and reducing absenteeism? 2018.

19. Foster H. Lactation in the workplace: A systematic review of worksite-based policies, programs to improve breastfeeding outcomes of working women. 2017.

20. Grande AJ, Fuga M, Ayres NO. Chair massage for adults in the workplace: systematic review. 2017.

21. Gray K, Springer A, Taylor W, VonVille H. Increasing physical activity in the workplace: A systematic review. 2017.

22. Grimani A, MacGillivray S, Newnam S. The impact of workplace mental health interventions on work-related outcomes: A systematic review. 2018.

23. Hadley S, Spencer L, Tudor-Edwards R. Global review of the cost-benefit and or cost-effectiveness of mental health interventions in the workplace. 2018.

24. Hengel KO, Coenen P, Robroek S, Boot C, Lenthe FV, Van der Beek, A, *et al.* Socioeconomic differences in reach, compliance and effectiveness of lifestyle interventions among workers: protocol for an individual participant meta-analysis and the separate equity-specific re-analysis of each study 2018.

25. Krishnamoorthy Y, Eliyas SK, Sarveswaran G, Sakthivel M. The effectiveness of workplace interventions for reducing alcohol consumption: A systematic review and meta-analysis. 2018.

26. Kuehnl A, Rehfuess E, Elm Ev, Nowak D, Glaser J. Human resource management training of supervisors for improving health and well-being of employees. 2015.

27. Kwan SC, Imai H, Sakamoto R. A systematic review on the effects of active commuting on cardiovascular health. 2018.

28. Lee A. Efficacy of mobile apps in improving psychological well-being in the workplace: A systematic review. 2017.

29. Lock M, Dollman J, Post D, Eston R, Parfitt G. Efficacy of theory-driven workplace physical activity interventions: A systematic literature review. 2017.

30. Loitz CC, Potter RJ, Walker JL, McLeod NC, Johnston NJ. The effectiveness of workplace interventions to increase physical activity and decrease sedentary behaviour in adults: protocol for a systematic review. *Systematic reviews* 2015;**4**:178.

31. Lyssenko L, Hahn C, Kleindienst N, Bohus M, Ostermann M, Vonderlin R. A systematic review of mindfulness-based interventions in occupational settings. 2015.

32. Merida MJ, Saldaña MR, Abellan MV, Monroy AM, Cordero RDD, Luque RM, *et al.* Effectiveness of workplace health promotion in workers' health: Systematic review and meta-analysis. 2018.

33. Merom D, Gebel K, Sweeting J, Stanaway F, Ding D, Mumu S. Physical activity worksite interventions delivered to older employees: A systematic review, 2018.

34. Micklitz K, Wong G, Howick J. Workplace mindfulness-based programs for mental health: A realist review. 2018.

35. Moreno-Peral P, Bellón JÁ. Effectiveness of psychological and/or educational interventions to prevent depression at work place: A systematic review and meta analysis. 2017.

36. Muir S, Silva S, Woldegiorgis M, Rider H, Meyer D, Jayawardana M. Predictors of engagement and successful outcomes in workplace health and exercise programs targeting physical activity: A systematic review. 2017.

37. Mulchandani R, Chandrasekaran AM, Goenka S, Agrawal A, Panniyammakal J, Prabhakaran D, *et al.* Effect of workplace physical activity interventions on the cardio-metabolic health of working adults: systematic review and meta-analysis. 2018.

38. Murawski B, Hodder R, Hope K, Reilly K, Jackson R, Sutherland R, *et al.* The effectiveness of interventions on improving the dietary, physical activity and sleep behaviours of school and childcare staff: A systematic review of the evidence. 2018.

39. Murtagh MJ, Yarker J, Lewis R. To explore the prevalence, effectiveness and impact of self-confidence training interventions in the workplace. A systematic review. 2018.

40. Neez E, De Wilt E, Pentafragka E, Chan A. Costs and benefits of workplace wellness programs in Europe: A systematic review. 2018.

41. Nielsen MB, Christensen JR. A systematic review of exercise adherence workplace interventions. 2016.

42. Oliver M. A systematic review of psychological, wellbeing or emotional benefits of interventions in office-centred workplaces which take place away from the desk during designated break times. 2017.

43. Parry SP, Coenen P, O'Sullivan PB, Maher CG, Straker LM. Workplace interventions for increasing standing or walking for preventing musculoskeletal symptoms in sedentary workers. *Cochrane Database of Systematic Reviews* 2017.

44. Pham CT, Nguyen TV, Phung TD, Cordia C. Constraints and barriers to implementing workplace health promotion programs in low-and middle-income countries. 2017.

45. Querstret D, Bruin Md, Allan J, Banas K. Environmental interventions for altering eating behaviours of employees in the workplace: A systematic review and meta-analysis. 2014.

46. Rivera MP, Tew G, McDaid C. Height-adjustable workstations to reduce sedentary behaviour in office-based workers. 2014.

47. Ryde G, Gorely T. A realist review of workplace sedentary behaviour interventions. 2016.

48. Sands C, Aguiar E, Tudor-Locke C. Best practices for using wearable technologies to promote workplace physical activity: A systematic review. 2018.

49. Sköld MB, Tork MB, Schlünssen V, Andersen LL. Psychosocial effects of workplace exercise: Protocol for a systematic review. 2018.

50. Smith SA, Lake AA, Summerbell C, Araujo-Soares V, Hillier-Brown F. The effectiveness of workplace dietary interventions: Protocol for a systematic review and meta-analysis. *Systematic reviews* 2016;**5**:20.

51. Smoktunowicz E, Rogala A, Cieslak R, Benight CC, Yeager C, Michalak N, *et al.* Effectiveness of web- and mobile-based interventions for stress, job burnout, and depression in the workplace setting: systematic review with meta-analysis. 2017.

52. Solà R, Tarro L, Llauradó E, Hermoso P, Ulldemolins G. Workplace interventions for improving production, employee performance, presenteeism, and absenteeism. 2018.

53. Souza F, Rezende J, Lima D, Santos AC. Effects of labor gymnastics on workers' health: A systematic review protocol. 2017.

54. Tang X, Patterson P, Reidlinger D, Bishop J, MacKenzie-Shalders K. Workplace interventions for supporting breastfeeding: A systematic review. 2018.

55. Thompson A, Pearce G, Grunfeld B, Grant C, Thøgersen-Ntoumani C, Hands A, *et al.* Which objectively measured interventions designed to disrupt sitting time and increase physical activity in the workplace are effective in the medium to long term?: A meta-analysis. 2018.

56. Ulloa A, Robbins R, Vieira D. Sleep interventions in the workplace: implications for public health and policy. 2016.

57. Wanjau M, Zapata-Diomedi B, Veerman L. Health promotion at the workplace setting: A systematic review of effectiveness and sustainability of current practice in Sub-Saharan African countries. 2018.

58. Watterson J, Gabbe B, Dietze P, Romero L, Rosenfeld JV. Workplace intervention programs for decreasing alcohol use in Military personnel. 2017.

59. Westenhöfer J, Buchcik J, Borutta J. Mental health promotion at the workplace. 2018.

Health care focused (n=19)

1. Blake H, Batt M, Khunti K. Effectiveness of lifestyle health promotion interventions for nurses: A systematic review 2018.

2. Bolton K, Fraser P, Worley V. Describing interventions aimed to improve health of staff in a hospital setting: A systematic review. 2018.

3. Botha E, Gwin T, Purpora C. The effectiveness of mindfulness based programs in reducing stress experienced by nurses in adult hospital settings: A systematic review of quantitative evidence protocol. *JBI Database Of Systematic Reviews And Implementation Reports* 2015;**13**:21-9.

4. Clark L, Fida R, Skinner J, Murdoch J, Rees N, Williams J, *et al.* The health, well-being and support interventions for UK ambulance service personnel: A systematic evidence map 1998-2018. 2018.

5. Cooper A, Ferreira N, Slesser M. A systematic review of interventions to improve the wellbeing of staff employed in forensic settings. 2016.

6. Hills DJ, Ross HM, Pich J, Hill AT, Dalsbø TK, Riahi S, *et al.* Education and training for preventing and minimising workplace aggression directed toward healthcare workers. *Cochrane Database of Systematic Reviews* 2015.

7. Iqbal S, Fearns N, Gillanders D. The impact of training in nursing or care homes on stress and burnout in healthcare workers: A systematic review. 2013.

8. Irving JA, Dobkin PL, Park J. Cultivating mindfulness in health care professionals: A review of empirical studies of mindfulness-based stress reduction (MBSR). *Complementary Therapies in Clinical Practice* 2009;**15**:61-6.

9. Lamothe J. Social support in the context of workplace violence: A systematic review. 2016.

10. Leonard G, Smith S, Cupples M, Tully M. A systematic review of the effectiveness of physical activity interventions in health care professionals. 2013.

11. Murray M, Murray L, Donnelly M. Systematic review protocol of interventions to improve the psychological well-being of general practitioners. *Systematic reviews* 2015;**4**:117.

12. Okubo CVC, Martins JT. Effectiveness of interventions in reducing occupational violence between health workers: systematic review and meta-analysis. 2018.

13. Siemieniuk R, Coleman B, Al-Den A, Shafinaz S, Bornstein S, Goodliffe L, *et al*. Program factors associated with success in vaccinating healthcare workers against influenza. 2013.

14. Spelten E, Thomas B, O'Meara PF, Maguire BJ, FitzGerald D, Begg SJ. Organisational interventions for preventing and minimising aggression directed toward healthcare workers by patients and patient advocates. *Cochrane Database of Systematic Reviews* 2017. 10.1002/14651858.Cd012662

15. Strauss C, Cavanagh K, Jones F, Strohmaier S, Mundy T, O'Hanlon P. A systematic review and meta-analysis of randomised controlled trials of mindfulness-based interventions for healthcare staff. 2016.

16. Webster N, Oyebode J, Jenkins C, Smythe A. Using technology to support the social and emotional wellbeing of nurses: A scoping review protocol. *J Adv Nurs* 2018;**26**:26.

17. Xiong P, Yin M, Sui X, Hall B. Intervention after workplace violence among healthcare workers: A systematic review. 2017.

18. Yip KK. Effectiveness of workplace violence preventive intervention among psychiatric nurses: A systematic review. 2017.

19. Zucal G, Legere L, Jacob G. Violence, harassment, and bullying: prevention and management in healthcare workplaces, second edition. 2017.

10.4 Appendix 4: Characteristics of reviews of reviews

Table 14: Key characteristics of RoRs

First author, year Country of publication Title Aim/objective	Number of included reviews Country and year of publication of included reviews	Review designs Designs of primary studies	Population	Interventions	Outcomes	Review authors' commennts on evidence
Lifestyles						
Schliemann, 2019,[31] UK The effectiveness of dietary workplace interventions: a systematic review of systematic reviews To summarise findings of systematic reviews that distinctively report dietary intervention components and its effects on diet-, health-related and economic-related outcomes in the workplace setting	N=21 Described as American or Western Europe 1996 to 2017	Systematic reviews including 3 that were also meta-analyses Not explicitly reported but appears to include RCTs, non-RCTs, and uncontrolled studies	Adults	Workplace interventions of which one component had to be dietary. Other interventions included general wellness programes e.g. physical activity, smoking, alcohol use. Most interventions targeted multiple health behaviours of which diet was one	Dietary behaviour (e.g. fruit/veg intake), weight loss, environmental aspects, economic related (e.g. absenteeism, productivity, health care costs)	Only 4 reviews were diet only, others were general workplace wellness programs focussing on multiple health behaviours Lack of consistency across results due to heterogeneity of reviews (and included studies) Environmental interventions should also be included Many outcomes were self report; there was a lack of process evaluations Improvements in diet could be linked to dietary interventions but conclusion for health and economic measures limited Recommendations that interventions and messages

						should be tailored to the study population and adapted to the requirements of each workplace to increase effectiveness. Should have longer term evaluations
Jirathananuwat, 2017,[30] Thailand/USA Promoting physical activity in the workplace: a systematic meta-review To classify and describe interventions to promote physical activity in the workplace	N=11 NR 2009 to 2014	Systematic reviews, meta-analyses, systematic reviews including meta-analyses Unclear but could include RCTs, quasi-experimental, or observational studies	Workplaces included health service, government, company/ workplace/ industry, factory, educational institution, private sector	Interventions aimed to change multiple behaviours and included nutrition/dietary programs, stress (mental health) management programs; weight control programs; and smoking cessation programs	Review aim was to classify rather than evaluate: sought to identify intervention factors including enabling (e.g. information delivery, self motivation or program training), pre-disposing (e.g. instrument resources such as pedometers), reinforcing (e.g. incentive, social support), policy regulatory (e.g. egorganisational action) and environmental development (e.g. break rooms, signage)	Interventions aimed to change multiple behaviours so were not exclusively focussed on physical activity
Fishwick, 2013,[27] UK Smoking cessation in the workplace for employees' mental health	N=6 NR 1994 to 2010	Systematic review and/or meta-analysis Unclear but included controlled studies, and some evauating cost effectiveness	Workplace	Legislative smoking bans; workplace cessation programmes including behavioural interventions, self help, pharmacological; non-workplace cessation programmes	Rates of cessation, abstinence, quit; also costs	Findings on cost-effectiveness were mixed

General health promotion						
Brunton, 2016,[29] UK Developing evidence-informed, employer-led workplace health To understand whether workplace health programmes (WHPs) are effective for improving health and business outcomes, and to identify the characteristics of WHPs that are thought to influence their success	N=24 (gave pooled effect size. Overall 106 reviews identified but only those with a pooled effect size were included in the synthesis) International (countries not stated) 2001 to 2013	Systematic reviews Trials and outcome evaluations	Workplace	Multicomponent, education, exercise, counselling, screening, medical/assistance devices, access to resources, changes to company regulations or policy, risk assessment and participatory research	Health including mental health, stress, weight management Financial/business including absenteeism and related costs; healthcare costs, job satisfaction, job stress, productivity	Interventions differed across varying types of workplace making it difficult to judge the generalisability of interventions to other settings Physical activity and mental health interventions predominated, while other public health topics, such as healthy eating, cancer prevention and cardiovascular risk reduction were rarely seen There is very little evaluation of costs across studies There was a lack of follow-up in interventions, which limits the amount of information available concerning the sustainability of workplace health interventions
Haby, 2016,[24] Mexico/Brazil Interventions that facilitate sustainable jobs and have a positive impact on workers' health: an	N=14 Described as developed or developing. Included mainly "developed countries" 1997 to 2014	Systematic reviews RCTs (individuals or clusters); quasi-RCTs; controlled before-and-after studies; interrupted time series; and	Health sector workplace	Occupational health and safety; precarious employment/production system rationalization (e.g. downsizing; temporary work); flexible work arrangements; shift work-organizational level; task restructuring;	Various including disease incidence, prevalence, and burden; mortality; morbidity; symptoms and signs of disease; health service use; quality of care; health-related costs; and health inequalities, including by gender, age,	To be included systematic reviews had to report health outcomes, precluding reviews that only reported changes in environmental, economic, or peace and security outcomes Interventions were poorly described making it difficult to understand how

overview of systematic reviews To identify interventions that facilitate sustainable jobs and have a positive impact on the health of workers in health sector workplaces		analytic observational studies (cohort, case-control, and cross-sectional studies) Economic evaluations were eligible but none were found		employee participation-organizational level; professional nursing practice; paying for performance to improve the delivery of health interventions; in-work tax credits for families	socio-economic status, area of residence, etc	interventions were implemented and whether managers were supportive of the interventions
Schroer, 2013,[28] Germany Evidence-based lifestyle interventions in the workplace - an overview To summarize the effectiveness of different workplace health interventions for promoting healthy lifestyle, preventing diseases and reducing health care costs	N=15 Australia, Belgium, Denmark, France, Netherlands, USA, UK 2007 to 2012	Systematic reviews Experimental (including RCTs) and non-experimental designs were included	Workplace	Physical activity and/or dietary interventions at individual and/or organisational levels	Weight, physical activity and nutritional outcomes and some economic data	There was a lack of consistency in findings Some reviews mentioned poor quality primary studies Short term outcomes Few employee characteristics reported Many outcomes were self reported
Goldgruber, 2009,[26] Germany Effectiveness of workplace health promotion and primary prevention interventions: a review	N=17 (incl 2 Cochrane reviews, 1 on occupational health; 1 smoking cessation)	Systematic reviews and/or meta-analyses Multiple including RCTs, experiment and and non-experimental	Workplace	Stress, physical activity and nutrition; organizational development; smoking, and ergonomics and back pain	Multiple (mainly individual) psychosocial, health (physical and mental); Economic (absenteeism); ergonomic; health risk indicators	One of the challenges with multi-modal interventions is that it is not obvious which components in what frequency should be applied

Effectiveness of health promotion and primary prevention interventions in the workplace	Australia, Finland, Netherlands, Norway, USA, UK 2004 to 2008					
Mental health						
Kalani, 2018,[25] Iran Interventions for physician burnout: a systematic review of systematic reviews To evaluate interventions to reduce physician burnouts	N=4 NR 2008 to 2016	Reviews and systematic reviews Experimental (including RCTs) and non-experimental designs were included	Medical students, interns, physicians, residents, and fellows. One review also includes nurses	Most were individual level (e.g. counselling, support groups, mindfulness) Organisational level interventions included pass/fail grading; duty standards, shift working staffing; change in workload	Reduction in burnout	Conflicting findings across reviews for individual and organisational level interventions. This may be due to individual primary studies including different groups of physicians but being considered as one group by a review, or other mediating or moderating factors not investigated Sample sizes were limited in some of the primary studies included in reviews Differing interventions across reviews
Joyce, 2016,[34] Australia/Norway Workplace interventions for common mental disorders: a systematic meta-review	N=20 (includes 6 Cochrane reviews) Australia, Canada, Finland, Netherlands, USA, UK	Described as reviews Unclear	Workplace	Primary prevention interventions included increasing employee control, physical activity and workplace health promotion. Secondary prevention interventions included screening, counselling, stress	Multiple including employee control, increasing physical activity, symptom reduction	In most of the included reviews "the impact the interventions had on work-related aspects such as absenteeism, presenteeism and productivity remained relatively unexplored"

To evaluate the effectiveness of workplace mental health interventions	2001 to 2012			management programmes and post-trauma debriefing. Tertiary prevention interventions included cognitive behavioural therapy, exposure therapy and medication		
Wagner, 2016,[35] Canada Mental health interventions in the workplace and work outcomes: a best-evidence synthesis of systematic reviews To determine the level of evidence supporting mental health interventions as valuable to work outcomes	N=14 NR 2001 to 2002	Systematic reviews NR	Workplace	Multiple including multicompoment interventions, therapy, cognitive behavioural therapy, exercise, injury prevention	Absenteeism, productivity and cost	Broad range of interventions from being handed a pamphlet to therapy Variation in populations, interventions and outcomes
Dalsbo, 2013,[33] Norway Workplace-based interventions for employees' mental health To systematically review the research about the effects of	N=3 (all are Cochrane reviews) 2009 to 2010	Systematic reviews RCTs, non-RCTs, controlled before and after	In the included reviews were: healthcare workers; law enforcement officers as well as "all employees" in workplace settings	Stress management, mental image training, flexible working	Stress, mental strain, self image, quality of sleep, alertness	Reviews did not include outcomes such as function, productivity, absence, disability, sick leave, costs and adverse events

workplace-based interventions						
Bhui, 2012,[32] UK A synthesis of the evidence for managing stress at work: a review of the reviews reporting on anxiety, depression, and absenteeism To identify the key findings and gaps in the literature on the effectiveness of different stress management interventions for preventing anxiety and depression as the main cause of absenteeism	N=23 NR 1996 to 2011	Systematic reviews NR	Workplace	Individual including stress management, cognitive behavioural therapy, relaxation, massage, personal skills training, mindfulness Organisational including comprehensive wellness programmes, support groups, problem solving committees, work redesign	Anxiety, depression, and anxiety; absenteeism	Interventions differed by their components, mode of delivery and whether they targeted individuals or organisations making it difficult for all of the reviews to compare benefits from any single intervention across a number of studies There were many different outcome measures for assessing anxiety and depression, and many proxy measures of mental health, sometimes without clarity about which outcomes were used in the meta-analyses Although many reviews appeared to be reviewing the same evidence, the reviews did not all identify the same primary studies, and therefore did not always reach the same conclusions

Abbreviations: RCT = Randomised Controlled Trial.