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[Intervention Protocol]

Financial incentives for decreasing and preventing obesity in workers

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ABSTRACT

Objectives

This is a protocol for a Cochrane Review (intervention). The objectives are as follows:

1. Decreasing obesity

To evaluate the effectiveness of financial incentives compared to no financial incentive for decreasing obesity in workers.

2. Preventing obesity

To evaluate the effectiveness of financial incentives compared to no financial incentive in preventing obesity in workers.

BACKGROUND

Description of the condition

Obesity, defined as having a body mass index (BMI) above 30, is recognised as one of the most important global health issues in the 21st century (Abalain-Castela 2018). Obesity is a risk factor for cardiovascular disease, leading to 3.4 million deaths and 3.8% of the total lost years of healthy life in 2010 (Lim 2012). Excess body weight is one of the most well-known risk factors for non-communicable diseases, particularly for hypertension (Lakoski 2011); heart disease (Wilson 2002; Freedman 2001); stroke (Suk 2003); sleep apnoea (Liu 2017); metabolic syndrome (Lloyd 2012); diabetes (Freedman 2001); osteoarthritis (Niu 2009); and cancers (Abdullah 2010; Freedman 2001; Kaaks 2002; Frezza 2006). Since obesity has the highest prevalence in people aged 40 to 60 years (Ogden 2012); and the workforce in developed countries is ageing (Hedge 2006), obesity is becoming a pressing health issue in many workplaces.

Obesity can lead to adverse health outcomes for individual workers, such as injuries and disabilities (Hertz 2004; Pollack 2007; Shuford 2010). Overweight workers can also experience reduced work-related capacity (Atkinson 2008), decreased work productivity (Rodbard 2009), absenteeism (Poston 2011), and an increased need for compensation (Kuehl 2012; Østbye 2007). All of these factors can negatively impact companies and society (ABS 2009; Atkinson 2008). As the prevalence of obesity has increased, it is now one of the greatest workplace health problems in many countries (Hertz 2004; Kuehl 2012; Pollack 2007; Poston 2011; Østbye 2007).

Description of the intervention

Obesity can be controlled through economic and psychosocial interventions (such as the use of incentives) that support personal behaviour change or the maintenance of a healthy lifestyle (Teixeira 2012). In the workplace, an incentive-based approach is often designed and investigated by policymakers or organisational decision-makers with the intention of motivating a healthy lifestyle among employees (Jochelson 2007). Recent research has evaluated the use of incentives for decreasing and preventing obesity in a range of populations (Jay 2019; Patel 2018; Shin 2017). Studies have also evaluated the effectiveness of financial incentives for changing different types of unhealthy behaviour within working populations, such as decreasing sedentary behaviour (Barte 2017), and preventing occupational injuries (Miller 2013).

Financial and economic incentives can take many forms; for example, cash payments, coupons, credits, lottery draws, direct gifts, and services (Fishburn 1990). These can be further classified according to when and if the incentive is given. 'Direct gifts' are incentives that are always received, 'credits' are incentives given only for achieving a specific outcome, and 'lottery draws' are incentives that a person may not receive i.e. they have a less than 100% chance of receiving (Fishburn 1990). Financial incentives may be in the form of financial rewards or financial constraints (negative incentives) that may also affect individual behaviours, for example, penalizing individuals for not achieving physical activity levels (Jochelson 2007), or they could be a mixture of incentive types (Paloyo 2014).

Current data suggest that an economic incentive can act as an external stimulus that enhances personal motivation to undertake

or maintain healthy behaviours that lead to weight loss or prevent weight gain (Burns 2012; Cawley 2013; Jeffery 2012). While evidence suggests that, in general, financial incentives are effective in reducing or preventing weight gain and that larger incentives are more effective (Jeffery 2012; Paul-Ebhohimhen 2008), there is little evidence of long-term effects when such incentives stop (Jeffery 2012; Paloyo 2014; Paul-Ebhohimhen 2008; Wall 2006).

How the intervention might work

In order to lose weight and ultimately maintain their ideal weight, people need to adopt sustainable and long-term lifestyle changes and behaviours, such as being physically active and following a healthy diet (Burns 2012; Cawley 2013; Jeffery 2012). As weight loss is a gradual process, motivating people during the time delay between a change in behaviour and achievement of the final, desired weight-loss outcome is a major challenge for weight-management program developers (Barlow 2016; Tate 2015). Researchers have used incentive-based approaches to increase people's motivation to sustain weight-loss, and thereby attain or maintain a healthy weight (Jay 2019; Patel 2018; Shin 2017). The continued use of financial incentives, however, can lead to a perceived reduction in the value of these benefits in an individual's mind, which may make it difficult for a weight-loss program to succeed in the long-term (Burns 2012; Jeffery 2012).

One theoretical basis for using incentives to facilitate weight-loss is operant learning theory, which is mainly associated with Skinner's work (Skinner 1945; Skinner 1990). This theory focuses on interactions between behaviour and the environment over time. Operant learning theory suggests that the use of rewards (such as incentives) can positively reinforce the likelihood of a behaviour (such as weight loss). The theory may also explain the impact of negative financial incentives through negative reinforcement; i.e. a person is encouraged to undertake weight-loss producing behaviours in order to avoid a negative/adverse economic consequence.

Economic-behavioural theory further develops ideas from operant learning theory, and proposes that financial and economic triggers can impact a person's behaviour (Camerer 1999; Hursh 1984). The theory states that people tend to behave in ways that maximise their economic return (reward), and that the accumulation of those returns can have a multiplicative influence on their behaviour.

The Theory of Planned Behavior (TPB) is a widely-used model for predicting health-related behaviour intentions and behaviour change itself (Ajzen 2002; Ajzen 2011; Ravis 2003). The TPB maintains that the intention to perform a behaviour is the most important factor in behavioural performance, although perceived behavioural control (i.e. confidence in one's ability to execute a new behaviour) can also directly influence behaviour. In turn, the intention is influenced by one's attitude towards the behaviour (i.e. the perception of how beneficial or costly the new behaviour will be), as well as the perception of the subjective norm for the behaviour (i.e. what the individual perceives that others would want the individual to do) and perceived behavioural control (Ajzen 1991; Ajzen 2011). A recent meta-analysis determined that the TPB accounted for 44.3% of the variance in intentions across a variety of health-related behaviours (McEachan 2011).

Financial incentive interventions provide immediate or long-term external rewards for participation in health and wellness

behaviours (Giles 2014). These may increase the motivation of individuals to change their behaviour through profits and economic benefits (positive reinforcement) or avoiding adverse financial consequences (negative reinforcement). Although both operant learning and economic behaviour theories suggest that behaviour change can be a simple process, it is known that there is a complex relationship between weight, weight-related behaviours, and motivation to change weight-related behaviours (Jeffery 2012). This means it is uncertain exactly how the use of rewards or financial penalties can support people in controlling their body weight.

The complexities of weight control arise from two factors: 1) that change in body weight is the result of the accumulation of many different behaviours over time, rather than the result of a single behaviour (Gillison 2015); and 2) that weight modification is inherently slow (Teixeira 2015). Financial rewards can be seen by employees as not motivating or unfair or disengaging; they may substantially add to the employer's outgoings, leading to increased pension costs or pay level constraints (Cotton 2012). Thus, there is a need to investigate a) if incentives impact weight-loss in the workplace, b) the effect of financial rewards and penalties c) the short- and long-term effectiveness of incentives.

Why it is important to do this review

Existing systematic reviews have established that incentive-based approaches can successfully promote health-related behaviour change outside the workplace (Carrasco 2018; Dugré 2018; Mitchell 2019; Rowhani-Farid 2017).

Although there are several original research studies on the effects of financial incentives on decreasing or preventing obesity in workers (e.g. increased physical activity (Barte 2017); weight loss (Paul-Ebhohimhen 2008)), there is no comprehensive systematic review employing a rigorous methodology that confirms the overall impact of financial incentives on weight reduction in workers. It is, therefore, important to undertake such a review to help inform decision-making by policymakers, employers, trade unions, occupational health professionals, public health professionals, and workers, by determining whether an incentive-based approach can reduce and prevent obesity within the workplace.

OBJECTIVES

1. Decreasing obesity

To evaluate the effectiveness of financial incentives compared to no financial incentive for decreasing obesity in workers.

2. Preventing obesity

To evaluate the effectiveness of financial incentives compared to no financial incentive in preventing obesity in workers.

METHODS

Criteria for considering studies for this review

Types of studies

We will include all eligible randomised controlled trials (RCTs) regardless of whether participants are assigned to groups individually or in clusters (cluster-RCTs), as well as controlled

before-after (CBA) studies. We will include studies reported as full text, those published as abstract only, and unpublished data.

Types of participants

We will include studies conducted with adult workers in any form of full or part-time employment. We will not include studies about children or workers under the age of 18 (as per the United Nations Convention on the Rights of the Child (UNCRC 1989)).

For our review question about decreasing obesity in the workplace

We will include obese workers (with a body mass index (BMI) of 30 or more).

For our review question about preventing obesity in the workplace

We will include any employees with a normal or overweight BMI (18.5 to 29.9).

Types of interventions

We will include and classify financial inducement in the form of positive, negative or mixed incentives (positive and negative): 'direct gifts' which are always received, 'credits/discredits' only awarded for a specific outcome, and 'lottery draws' or ballots where the chance of the incentive is less than 100%; these may be as cash payments or coupons.

We will also include interventions that are not listed here but aim to decrease or prevent obesity by employing a financial incentive.

We will include trials and CBA studies that compare the effectiveness of a financial incentive with no intervention, another active intervention, or an alternative financial incentive intervention.

Types of outcome measures

We will focus on BMI, which is the best criterion for measuring obesity (Steinberger 2005).

Primary outcomes

We will include changes in BMI as our main outcome measure.

For our review question about decreasing obesity in the workplace for obese workers

- Mean change in BMI
- Percentage of workers achieving a BMI of less than 30
- Percentage of workers achieving a BMI of less than 25

For our review question about preventing obesity in the workplace for normal BMI and overweight workers

- Percentage of workers with a BMI of 25 to 29.9 (i.e. overweight) who maintain their weight in this banding
- Percentage of workers with a BMI of 25 to 29.9 (i.e. overweight) whose BMI becomes less than 25
- Percentage of workers with a BMI of 18 to 25 (i.e. normal BMI) who do not increase their BMI in this banding

Secondary outcomes

We will also report on the following other, secondary, outcomes.

- Mean weight loss (kg), if this cannot be transformed into BMI
- Participant satisfaction
- Quality of life
- Adverse events/unintended consequences
- Costs

Those secondary outcomes will not be used as inclusion criteria.

Search methods for identification of studies

Electronic searches

We will search the following electronic databases from their inception to identify reports of relevant clinical trials:

- The Cochrane Workplace specialised register;
- The Cochrane Central Register of Controlled Trials (CENTRAL);
- Ovid MEDLINE ([Appendix 1](#));
- Ovid Embase ([Appendix 2](#));
- Web of Science ([Appendix 3](#)).

We will devise the search strategy in Ovid MEDLINE and then adapt it to the other databases. We will combine our key search terms and synonyms derived from our systematic review aim with the Cochrane Highly Sensitive Search Strategy for identifying RCTs ([Lefebvre 2019](#)) for MEDLINE and Embase searches. We will not restrict our search by any particular language, date of publication, or geographical study setting.

In addition, we will search the following trials registries for ongoing and published studies:

- ClinicalTrials.gov (www.clinicaltrials.gov);
- World Health Organisation International Clinical Trials Registry Platform (ICTRP) (www.who.int/clinical-trials-registry-platform);
- EU Clinical Trials Register (www.clinicaltrialsregister.eu/).
- PsycINFO (ProQuest);
- NIOSHTIC (OSH-UPDATE);
- NIOSHTIC-2 (OSH-UPDATE);
- HSELINE (OSH-UPDATE);
- CISDOC (OSH-UPDATE).

Searching other resources

We will use a snowballing technique to identify any studies that have been missed by our search strategy. This will involve searching the reference lists of our included studies and any relevant systematic reviews or literature reviews that we identify through our searches.

When required, we will contact the authors of screened papers or abstracts for more information about ongoing trials.

Moreover, we will search for unpublished data on Grey literature (e.g. Google Scholar), and websites related to workers' health or public health guidelines at national and international levels, noting any financial incentive programs to reduce or prevent obesity

among workers (e.g. www.ilo.org; www.inshpo.org; www.ituc-csi.org; www.employment-studies.co.uk).

Data collection and analysis

Selection of studies

We will conduct the selection of eligible studies in two stages with the review management program [Covidence](#). First, two review authors (MHE and MK) will independently screen titles and abstracts of all the potentially relevant studies we find with our systematic search, to exclude studies that clearly do not fulfil the criteria for inclusion. The same authors will code them as 'include' (eligible or potentially eligible) or 'exclude'. At this stage, we will exclude all references that clearly do not fulfil our inclusion criteria or that meet our exclusion criteria.

In the second stage, we will retrieve the full-text study reports or publications for all references that we included at the first stage, and one review author (MHE) will assess the full text and identify studies for inclusion. Other authors (MK, PA) will do part of the same assessment independently, so that all full-text reports are assessed independently by two authors. We will resolve any disagreement through discussion or, if required, we will consult a third review author (JC) for making a final decision. At this stage, we will include all references that definitely fulfil our inclusion criteria.

We will record reasons for exclusion of the ineligible full-text studies that we assessed, so that we can report these in a 'Characteristics of excluded studies' table. We will identify and exclude duplicates and collate multiple reports of the same study, so that each study rather than each report is the unit of interest in the review. We will record the selection process in sufficient detail to complete a PRISMA study flow diagram ([Moher 2009](#)).

Should our systematic searches identify studies conducted by authors of this Cochrane Review, we will avoid conflict of interest by ensuring that review authors not involved with that study make all the decisions concerning its inclusion or exclusion.

Data extraction and management

We will provide a descriptive summary of included studies according to comparators and outcomes. One author (MHE) will extract study characteristics, and two authors (MHE and MK) will extract study data independently. We will use an electronic version of our extraction form in [Covidence](#). We will call on a third reviewer (JC) to resolve any disagreement that occurs during data extraction. In addition, we will contact the study authors for missing information. We will only include studies with duplicate publications once; when appropriate, we will maximally extract data by combining non-duplicated data from publications of a study into one data extraction form. One author (SJ) will then enter data into [RevMan Web 2019](#).

Our data extraction form will include the following information.

1. Methods: study design, total duration of the study, study location, study setting, withdrawals, and date of the study.
2. Participants: number; mean age or age range; sex/gender; shift work; employment type, i.e. temporary or permanent, governmental or self-employment jobs; type of workplace, i.e. sector, size; inclusion criteria, and exclusion criteria.

3. Interventions: description of the intervention, comparison, duration, intensity, the content of both intervention and control condition, and co-interventions.
4. Outcomes: description of primary and secondary outcomes specified and collected, and time points at which reported.
5. Notes: funding for the trial, and notable conflicts of interest of trial authors.

We will double-check that data are entered correctly by comparing the data presented in the systematic review with the study reports. A second review author (MK) will spot-check study characteristics for accuracy against the trial report. Should we decide to include studies published in one or more languages in which our author team is not proficient, we will arrange for a native speaker or someone sufficiently qualified in each foreign language to fill in a data extraction form for us.

Assessment of risk of bias in included studies

Two review authors (DY and PA) will independently assess the risk of bias for each study using the criteria outlined in the *Cochrane Handbook for Systematic Interventions Reviews* (Higgins 2011). Should there be any disagreement between these review authors, we will call on a third author (SJ or JC) to make a final judgment.

For non-randomised studies such as controlled before-after (CBA) studies, we will use the 'Risk Of Bias In Non-randomized Studies of Interventions' (ROBINS-I) tool, following the guide in the *Cochrane Handbook* (Sterne 2019). The potential confounders are: the type of job, socioeconomic status, involvement in another health program, gender, age, ethnicity and comorbidity.

For randomised studies, we will assess the risk of bias according to the following 5 domains.

- Bias arising from the randomization process
- Bias due to deviations from intended interventions
- Bias due to missing outcome data
- Bias in measurement of the outcome
- Bias in selection of the reported results

For cluster-randomised trials we will consider the additional domain of 'Bias arising from identification or recruitment of individual participants within clusters'.

We will judge each potential source of bias as high, low, or some concerns and provide a quote from the study report together with a justification for our judgement in the Risk of bias table. We will summarise the 'Risk of bias' judgements across different studies for each of the domains listed. Where information on the risk of bias relates to unpublished data or correspondence with a researcher, we will note this in the risk of bias table.

The overall risk of bias at the study level

We will make explicit judgments about whether studies are at high risk of bias, according to the criteria given in the *Cochrane Handbook for Systematic Interventions Reviews* (Higgins 2011). With reference to the biases above, we will assess the likely magnitude and direction of the bias and whether we considered it as likely to impact on the findings.

Assessment of bias in conducting the systematic review

We will conduct the review according to this published protocol and report any deviations from it in the 'Differences between protocol and review' section of the systematic review.

Measures of treatment effect

SJ will enter the outcome data for each study into the data tables in *RevMan Web 2019* to calculate the treatment effects. We will use risk ratios for dichotomous outcomes, and mean differences or standardised mean differences for continuous outcomes, or other types of data as reported by the authors of the studies. SJ will conduct all data analysis.

If studies only report effect estimates and their 95% confidence intervals or standard errors, we will enter these data into *RevMan Web 2019* using the generic inverse variance method. We will ensure that higher scores for continuous outcomes have the same meaning for the particular outcome, explain the direction to the reader, and report where the directions are reversed if this is necessary. If we cannot enter a study's results in either of these ways, we will describe them in the 'Characteristics of included studies' table, or enter the data into Additional tables.

Unit of analysis issues

We expect to include studies where randomisation has been by the participant (worker/employee) or by the workplace/workplace unit (cluster-RCTs).

For studies that employ a cluster-randomised design and that report sufficient data to be included in the meta-analysis but do not make an allowance for the design effect, we will calculate the design effect based on a fairly large assumed intracluster correlation of 0.10. We base this assumption of 0.10 on it being a realistic estimate for studies about implementation research (Campbell 2001). We will follow the methods stated in the *Cochrane Handbook for Systematic Reviews of Interventions* for the calculations (Higgins 2019).

When cross-over trials report continuous outcomes but the study authors have not reported a paired analysis, we will perform a paired analysis based on a reported or imputed correlation between the outcomes of the intervention and the control condition, as advised in Chapter 23 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2021). For dichotomous outcomes, we will adjust the confidence intervals for the paired analysis according to Elbourne 2002.

Where a single trial reports multiple trial arms, we will include only the relevant arms. If we need to combine two relevant comparisons in the same meta-analysis, we will halve the control group to avoid double-counting.

Dealing with missing data

We will contact investigators or study sponsors in order to verify key study characteristics and obtain missing numerical outcome data where possible (e.g. when a study is identified as abstract only). Where this is not possible, and the missing data are thought to introduce serious bias, we will use a sensitivity analysis to explore the impact of including such studies in the overall assessment of results.

If numerical outcome data such as standard deviations or correlation coefficients are missing, and we cannot obtain these from the study authors, we will calculate them from other available statistics such as P values, according to the methods described in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2019).

Assessment of heterogeneity

We anticipate encountering workplace or study heterogeneity, which may influence the appropriateness of combining our results (Deeks 2019). We will assess statistical heterogeneity by visual inspection of the forest plots. In addition, we will evaluate statistical heterogeneity in our included studies using Tau², the I² statistic, and the Chi² test. We will regard heterogeneity as substantial if I² is greater than 50% and either Tau² is greater than zero, or there is a low P value (less than 0.10) in the Chi² test for heterogeneity (Higgins 2019).

Methodological heterogeneity may arise from: study design, type of participants included, types of interventions included, definition of outcomes of interest, or methods of measuring outcomes (Deeks 2019). We will not combine results from studies with different study designs. We will consider all participants as similar enough to be combined. We will consider negative and positive financial incentives as too different to be combined. We will consider no intervention or alternative interventions as different. We will not combine different outcomes. We will consider the length of follow-up since starting the financial incentives program: 6 months, 12 months or 24 months as different and not combine them.

Assessment of reporting biases

We will endeavour to include data from all trials on all prespecified outcomes, obtained from secondary publications or the trial investigators if unpublished. If there are ten or more studies in the meta-analysis, we will investigate reporting biases (such as publication bias) using funnel plots (Page 2019). We will make a visual assessment of funnel plot asymmetry; if it looks asymmetrical, we will perform exploratory analyses to investigate possible causes.

Data synthesis

We will pool data from studies we judge to be clinically homogeneous, as defined in the section [Assessment of heterogeneity](#), using [RevMan Web 2019](#). If more than one study provides usable data in any single comparison, we will perform a meta-analysis. We will use a random-effects model because we believe that the type of intervention and study designs included will always lead to heterogeneity. When I² is higher than 75%, we will not pool the results of studies in a meta-analysis. If studies are found suitable to be pooled and heterogeneity is identified (above 40%), we will investigate this using subgroup analyses.

Subgroup analysis and investigation of heterogeneity

We plan to carry out the following subgroup analyses to reveal effects that might explain any heterogeneity.

- Gender: studies with mainly male versus studies with mainly female participants
- Time schedule: studies with participants working part-time versus those with full-time work

- Age: younger than 40 years versus older than 40 years of age
- Work schedule: shift work versus no shift work
- Type of employment sector: office workers versus workers with physical heavy work
- Positive versus negative incentives
- Duration of follow-up (6 months versus 12 months and 24 months)

We plan to assess subgroup differences by interaction tests available within [RevMan Web 2019](#). We will report the results of subgroup analyses quoting the Chi² statistic and P value, and the interaction test I² value.

Sensitivity analysis

We will perform sensitivity analyses to assess the robustness of our conclusions. This will involve issues where we made assumptions suitable for sensitivity analysis identified during the review process, for example:

1. excluding studies with a high risk of bias;
2. excluding studies with missing data.

Reaching conclusions

We will base our conclusions only on findings from the quantitative or narrative synthesis of included studies for this review. We will avoid making recommendations for practice based on more than just the evidence, such as values and available resources. Our implications for research will suggest priorities for future research and outline what the remaining uncertainties are in the area.

Summary of findings and assessment of the certainty of the evidence

We will create summary of findings tables for only the main comparisons that are of most interest to decision-makers (direct gift group versus group with no intervention). We will report all outcomes for these comparisons. We will use the five GRADE considerations (study limitations, consistency of effect, imprecision, indirectness, and publication bias) to assess the certainty of the body of evidence as it relates to the studies that contribute data to the meta-analyses for the prespecified outcomes (Schünemann 2013). We will use methods and recommendations described in Chapter 14 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2019), and construct the table using [GRADEpro GDT](#). We will justify all decisions to downgrade or upgrade the quality of studies using footnotes.

If needed, because of the inclusion of non-randomised studies, we will compile an additional table showing all our GRADE decisions about the certainty of evidence and the justifications for these.

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APPENDICES
Appendix 1. Ovid MEDLINE Search Strategy

Ovid MEDLINE(R) < 1946 to June Week 5 2020 >		Search Date: 6 July 2020
#	Searches	Results
1	exp financial support/ or exp economics/ or employee incentive plans/	601288
2	ec.fs.	422520
3	(incentive? or financial* or payment? or income or monetary).ab,kf,ti.	209436
4	((award* or reward* or payor disincentive* or penalty or penalties or voucher*) adj4 (cash or money or monies or monetary or financ* or economic* or fiscal or re-imbusement* or reimbursement* or reinforcement* or tangible* or lump-sum* or lump sum* or material* or individual*)).ab,kf,ti.	4627
5	((Competition* or contest or contests or raffle* or lottery or lotteries or prize* or award*) adj4 (cash or money or monies or monetary or financ* or economic* or tangible or lump sum* or lump-sum* or material* or individual* or external or personal or target* or direct* or intervention*)).ab,kf,ti.	3655
6	(subsidy or subsidies).ab,kf,ti.	3839
7	((contingent or cash) adj1 payment*).ab,kf,ti.	146

(Continued)

8	(Deposit contract or deposit contracts or deposit contracting).ab,kf,ti.	19
9	(subsid* adj4 (physical activity or physical activities or physically active or exercise)).ab,kf,ti.	37
10	((economic* or financial or money or monetary or cash) adj4 (assist* or support* or supplement* or transfer*)).ab,kf,ti.	9525
11	(employee incentive plan or employee incentive plans).ab,kf,ti.	7
12	(employee* adj4 (incentive* or rebate* or remuneration* or bonus* or reimburse*)).ab,kf,ti.	201
13	"lb. challenge".ab,kf,ti.	2
14	or/1-13	865366
15	exp Occupations/ or Workload/ or exp Work/ or Workplace/ or exp Occupational Diseases/ or Rehabilitation, Vocational/ or Occupational Health/ or Sick Leave/ or Absenteeism/ or workers' compensation/ or exp Employment/ or exp Occupational Exposure/	355428
16	(worka* or worke* or workg* or worki* or workl* or workp* or worksite or work capacity or work disabilit* or work abilit* or at work or work exposure or work related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or employment or unemployed or unemployment or work status or industries or industrial sector or repetitive work or veteran? or compan*).ab,kf,ti.	1696629
17	exp health promotion/ or exp insurance/	257229
18	(insur* or program? or health promotion).ab,kf,ti.	659949
19	or/15-18	2526637
20	Obesity/ or Overweight/ or Body Mass Index/ or Body Weight/ or Ideal Body Weight/ or Adiposity/ or Weight Loss/ or Weight Gain/ or Body-Weight Trajectory/ or Weight Reductions Programs/ or obesity management/ or exp Diet/ or feeding behavior/	722769
21	(obese or obesity or overweight or body mass index or bmi or body weight or adiposity or weight loss or weight gain or (weight adj2 reduc*) or nutritional intervention? or (health and (behavio?r adj2 chang*))).ab,kf,ti.	632378
22	20 or 21	1026721
23	pc.fs.	1281534
24	(prevention or prevent).ab,kf,ti.	814025
25	(health promotion or health education).mp.	158772
26	(health behavio?r or (chang* adj2 behavio?r*)).ab,kf,ti.	49112

(Continued)

27	((weight or overweight or obese or obesity) adj2 (study or program?)).mp.	11579
28	or/23-27	1929944
29	and/14,19,22,28	5930

Appendix 2. Ovid EMBASE Classic+EMBASE Search Strategy

Ovid Embase Classic + Embase < 1947 to 24 June 2020> Search date: 25 June 2020		
#	Searches	Results
1	financial management/ or funding/ or economics/ or reimbursement/	408136
2	(incentive? or financial* or payment? or income or monetary).ab,kw,ti.	324049
3	((award* or reward* or payor disincentive* or penalty or penalties or voucher*) adj4 (cash or money or monies or monetary or financ* or economic* or fiscal or re-imburement* or reimbursement* or reinforcement* or tangible* or lump-sum* or lump sum* or material* or individual*)).ab,kw,ti.	7171
4	((Competition* or contest or contests or raffle* or lottery or lotteries or prize* or award*) adj4 (cash or money or monies or monetary or financ* or economic* or tangible or lump sum* or lump-sum* or material* or individual* or external or personal or target* or direct* or intervention*)).ab,kw,ti.	4850
5	(subsidy or subsidies).ab,kw,ti.	5515
6	((contingent or cash) adj1 payment*).ab,kw,ti.	203
7	(Deposit contract or deposit contracts or deposit contracting).ab,kw,ti.	29
8	(subsid* adj4 (physical activity or physical activities or physically active or exercise)).ab,kw,ti.	54
9	((economic* or financial or money or monetary or cash) adj4 (assist* or support* or supplement* or transfer*)).ab,kw,ti.	16403
10	(employee incentive plan or employee incentive plans).ab,kw,ti.	15
11	(employee* adj4 (incentive* or rebate* or remuneration* or bonus* or reimburse*)).ab,kw,ti.	281
12	"lb. challenge".ab,kw,ti.	3
13	or/1-12	689126
14	Occupation/ or Workload/ or exp Work/ or exp Occupational Disease/ or exp Occupational Health/ or medical Leave/ or workman compensation/ or exp Employment/	730439
15	(worka* or worke* or workg* or worki* or workl* or workp* or worksite or work capacity or work disabilit* or work abilit* or at work or work exposure or work	3317668

(Continued)

	related or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or vocational reintegration or employment or unemployed or unemployment or work status or industries or industrial sector or repetitive work or veteran? or compan*).ab,k-w,ti.	
16	exp insurance/	344899
17	insurance.ab,kw,ti.	125788
18	or/14-17	3940874
19	Obesity/ or exp body weight management/ or Body Mass/ or Body Weight/ or Ideal Body Weight/ or body Weight Loss/ or Weight Gain/ or "weight trajectory (body weight)"/ or exp Diet/ or feeding behavior/	1404843
20	(obese or obesity or overweight or body mass index or bmi or body weight or adiposity or weight loss or weight gain or (weight adj2 reduc*) or nutritional intervention? or (health and (behavio?r adj2 chang*))).ab,kw,ti.	1138043
21	19 or 20	1760050
22	health promotion/ or health education/	186926
23	(health education or health promotion).ab,kw,ti.	77224
24	(prevention or prevent).ab,kw,ti.	1284364
25	(health behavio?r or (chang* adj2 behavio?r*)).ab,kw,ti.	75962
26	((weight or overweight or obese or obesity) adj2 (study or program?)).mp.	20775
27	or/22-26	1533999
28	and/13,18,21,27	3183

Appendix 3. Web of Science Core Collection Search Strategy

Web of Science Core Collection 1945 to Present		Search Date: 20 July 2020
#	Searches	Results
1	TS=("financial support" OR "economics" OR "employee incentive plans")	178,154
2	TI=(incentive? or financial* or payment? or income or monetary) OR AB=(incentive? or financial* or payment? or income or monetary)	665,277
3	TI=((award* or reward* or payor disincentive* or penalty or penalties or voucher*) AND (cash or money or monies or monetary or financ* or economic* or fiscal or re-imbursement* or reimbursement* or reinforcement* or tangible* or lump-sum* or lump sum* or material* or individual*)) OR AB=((award*	48,550

(Continued)

	or reward* or payor disincentive* or penalty or penalties or voucher*) AND (cash or money or monies or monetary or financ* or economic* or fiscal or re-imbursement* or reimbursement* or reinforcement* or tangible* or lump-sum* or lump sum* or material* or individual*)	
4	TI=((Competition* or contest or contests or raffle* or lottery or lotter- ies or prize* or award*) AND (cash or money or monies or monetary or fi- nanc* or economic* or tangible or lump sum* or lump-sum* or material* or in- dividual* or external or personal or target* or direct* or intervention*)) OR AB=((Competition* or contest or contests or raffle* or lottery or lotteries or prize* or award*) AND (cash or money or monies or monetary or financ* or economic* or tangible or lump sum* or lump-sum* or material* or individ- ual* or external or personal or target* or direct* or intervention*))	114,479
5	TI=(subsidy or subsidies) OR AB=(subsidy or subsidies)	26,369
6	TI=((contingent or cash) AND (payment*)) OR AB=((contingent or cash) AND (payment*))	3377
7	TI=(Deposit contract or deposit contracts or deposit contracting) OR AB=(Deposit contract or deposit contracts or deposit contracting)	704
8	TI=(subsid* NEAR/4 physical activity or subsid* NEAR/4 physical activi- ties or subsid* NEAR/4 physically active or subsid* NEAR/4 exercise) OR AB=(subsid* NEAR/4 physical activity or subsid* NEAR/4 physical activities or subsid* NEAR/4 physically active or subsid* NEAR/4 exercise)	80
9	TI=(economic* NEAR/4 assist* or financial NEAR/4 assist* or money NEAR/4 support* or monetary NEAR/4 support* or cash NEAR/4 assist* or cash NEAR/4 support or cash NEAR/4 supplement* or cash NEAR/4 trans- fer*) OR AB= (economic* NEAR/4 assist* or financial NEAR/4 assist* or money NEAR/4 support* or monetary NEAR/4 support* or cash NEAR/4 assist* or cash NEAR/4 support or cash NEAR/4 supplement* or cash NEAR/4 transfer*)	8,727
10	TI=(employee incentive plan or employee incentive plans) OR AB=(em- ployee incentive plan or employee incentive plans)	368
11	TI=(employee* NEAR/4 incentive* or employee* NEAR/4 rebate* or em- ployee* NEAR/4 remuneration* or employee* NEAR/4 bonus* or employ- ee* NEAR/4 reimburse*) OR AB=(employee* NEAR/4 incentive* or employ- ee* NEAR/4 rebate* or employee* NEAR/4 remuneration* or employee* NEAR/4 bonus* or employee* NEAR/4 reimburse*)	978
12	TI=("lb. challenge") OR AB=("lb. challenge")	3
13	#12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1	962,684
14	TS=("occupations" or "workload" or "work" or "workplace" or "occupa- tional diseases" or "vocational rehabilitation" or "occupational health" or "sick leave" or "absenteeism" or "workers' compensation" or "employ- ment" or "occupational exposure")	3,460,978
15	TI=(worka* or worke* or workg* or worki* or workl* or workp* or work- site or work capacity or work disabilit* or work abilit* or "at work" or "work exposure" or "work related" or workers or job* or employee or staff or personnel or occupation or occupations or occupational or out- door work* or day shift* or night shift* or shift work* or vocational re- habilitation or sick leave or absenteeism or sickness absen* or absente*	5,904,503

(Continued)

or presente* or "return to work" or "vocational reintegration" or employment or unemployed or unemployment or work status or industries or "industrial sector" or "repetitive work" or veteran? or compan*) OR AB=(worka* or worke* or workg* or worki* or workl* or workp* or work-site or work capacity or work disabilit* or work abilit* or "at work" or "work exposure" or "work related" or workers or job* or employee or staff or personnel or occupation or occupations or occupational or outdoor work* or day shift* or night shift* or shift work* or vocational rehabilitation or sick leave or absenteeism or sickness absen* or absente* or presente* or "return to work" or "vocational reintegration" or employment or unemployed or unemployment or work status or industries or "industrial sector" or "repetitive work" or veteran? or compan*)

16	TS=("health promotion" or "insurance")	161,472
17	TI=(insur* or program? or health promotion) OR AB=(insur* or program? or health promotion)	667,445
18	#17 OR #16 OR #15 OR #14	8,597,202
19	TS=("obesity" or "overweight" or "body mass index" or "body weight" or "ideal body weight" or "adiposity" or "weight loss" or "weight gain" or "body weight trajectory" or "weight reductions programs" or "obesity management" or "diet" or "feeding behavior")	1,136,382
20	TI=(obese or obesity or overweight or body mass index or bmi or body weight or adiposity or weight loss or weight gain or weight NEAR/2 reduc* or nutritional intervention? or health behavior?r NEAR/2 chang*) OR AB=(obese or obesity or overweight or body mass index or bmi or body weight or adiposity or weight loss or weight gain or weight NEAR/2 reduc* or nutritional intervention? or health behavior?r NEAR/2 chang*)	942,498
21	#20 OR #19	1,351,026
22	TI=(prevention or prevent) OR AB=(prevention or prevent)	1,476,278
23	TS=("health promotion" or "health education")	68,363
24	TI=(health behavior?r NEAR/2 chang* or chang* NEAR/2 behavior?r*) OR AB=(health behavior?r NEAR/2 chang* or chang* NEAR/2 behavior?r*)	28,704
25	TI=(weight NEAR/2 study or weight NEAR/2 program? or overweight NEAR/2 study or overweight NEAR/2 program? or obese NEAR/2 study or obese NEAR/2 program? or obesity NEAR/2 study or obesity NEAR/2 program?) OR AB=(weight NEAR/2 study or weight NEAR/2 program? or overweight NEAR/2 study or overweight NEAR/2 program? or obese NEAR/2 study or obese NEAR/2 program? or obesity NEAR/2 study or obesity NEAR/2 program?)	35,856
26	#25 OR #24 OR #23 OR #22	1,586,807
27	#26 AND #21 AND #18 AND #13	2342

CONTRIBUTIONS OF AUTHORS

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Designing the protocol: all authors

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DECLARATIONS OF INTEREST

None

SOURCES OF SUPPORT

Internal sources

- No sources of support provided

External sources

- No sources of support provided

NOTES

Parts of the methods section and [Appendix 1](#) of this protocol are based on a standard template established by the Cochrane Work Review Group.