

**Working for health? Evidence from systematic reviews on the effects on health and health inequalities of organisational changes to the psychosocial work environment.**

Bambra, C.,<sup>1</sup> Gibson, M.,<sup>2</sup> Sowden, A.J.,<sup>3</sup> Wright K.,<sup>3</sup> Whitehead, M.,<sup>4</sup> Petticrew, M.<sup>5</sup>

<sup>1</sup> Department of Geography, Durham University

<sup>2</sup> MRC Social and Public Health Sciences Unit, Glasgow

<sup>3</sup> Centre for Reviews and Dissemination, University of York

<sup>4</sup> Division of Public Health, University of Liverpool

<sup>5</sup> Public and Environment Health Research Unit, London School of Hygiene and Tropical Medicine

Corresponding author: Clare Bambra, Department of Geography, Wolfson Research Institute, Durham University Queen's Campus, Stockton on Tees, TS17 6BH.

Email: [clare.bambra@durham.ac.uk](mailto:clare.bambra@durham.ac.uk)

Sources of Support: Department of Health Policy Research Programme (Public Health Research Consortium)

Word count: 3605 main text (excluding references, figures and tables), 165 abstract.

Figures and tables may also be produced in electronic format only.

Conflicts of interest: The authors declare that there are no conflicts of interest.

## **Abstract**

**Objective:** To map the health effects of interventions which aim to alter the psychosocial work environment, with a particular focus on differential impacts by socio-economic status, gender, ethnicity, or age.

**Methods:** A systematic approach was used to identify, appraise and summarise existing systematic reviews (umbrella review) that examined the health effects of changes to the psychosocial work environment. Electronic databases, websites, and bibliographies, were searched from 2000-2007. Experts were also contacted. Identified reviews were critically appraised and the results summarised taking into account methodological quality. The review was conducted in the UK between October 2006 and December 2007.

**Results:** Seven systematic reviews were identified. Changes to the psychosocial work environment were found to have important and generally beneficial effects on health. Importantly, five reviews suggested that organisational level psychosocial workplace interventions may have the potential to reduce health inequalities amongst employees.

**Conclusion:** Policy makers should consider organisational level changes to the psychosocial work environment when seeking to improve the health of the working age population.

Abstract: 165 words

## **Keywords**

1. Systematic review
2. Psychosocial
3. Work environment
4. Health inequalities
5. Interventions

## INTRODUCTION

The work environment has long been acknowledged as an important determinant of health and health inequalities. In the past, dangerous physical working conditions were a major cause of ill-health in the working age population and, because of the steep social gradient in physical working conditions, of social inequalities in health (Marmot et al., 1999). In recent times in high-income countries, however, the physical work environment has been improved immensely and may now play a lesser role as a determinant of working age population health in general and social inequalities in health in particular (Marmot et al., 1999). The psychosocial work environment, however, has become more prominent as a determinant of health (Benach et al., 2007; Black, 2008; Department for Work and Pensions, 2005; Department of Health, 2004; United States Department of Health and Human Services, 2002), and it exhibits a strong social gradient which influences inequalities in health amongst employees (Marmot et al., 1999; Marmot et al., 1991).

One of the most influential theoretical models describing the relationship between the psychosocial work environment, health and inequalities in health is the 'demand control (support)' model. This hypothesis states that the physical and mental health of employees are negatively associated with job demands and positively associated with control and social support in the workplace. Epidemiological research, especially from the Whitehall studies, has been generally supportive of the hypothesis suggesting a relationship between the psychosocial work environment, work related stress and health status. Specifically, high strain jobs (high demand combined with low control) are associated with adverse health outcomes, including increased risk of heart disease, (Bosma et al., 1997; Karasek et al., 1981; Kuper & Marmot, 2003) musculoskeletal pain, (Bongers et al., 1993) poor mental health, (Stansfeld S, 1999) and sickness absence. (North et al., 1996) High strain jobs are concentrated amongst lower socio-economic groups and thus, the psychosocial work environment is considered an important influence on health inequalities amongst the working population. (Marmot, 2005; Marmot et al., 1997; Marmot et al., 1999; Marmot et al., 1991).

The effort-reward imbalance model focuses on other aspects of the psychosocial work environment, specifically the social reciprocity which is at the heart of the work contract: certain tasks or obligations are performed in exchange for equitable rewards. (Marmot et al., 1999) Rewards include money, esteem, terms and conditions, career opportunities, job security. The effort-reward imbalance model focuses on the adverse health effects of when these rewards are not perceived to be equitable, so called high effort - low reward situations. (Siegrist, 1996) This has led to analysis of the health and psychosocial aspects of other aspects of the organisation of work such as working hours, flexibility, job security and so forth (Benach et al., 2007).

Various interventions have been developed, based on the relationship between the psychosocial work environment and health. The focus of these interventions varies from the individual employee by, for example, implementing interventions (such as counselling) which help individuals “cope” with a stressful psychosocial work environment, to the organisation by, for example, increasing the participation of employees in organisational decision making (e.g. participatory staff meetings) (Karasek, 1992). Similarly, interventions focusing on the wider psychosocial organisation of work, target individuals and how they manage precarious employment or shift work, or focus on more upstream organisational changes such as reduced working hours or the right to flexible working (Benach et al., 2007). This article focuses on the health effects of organisational interventions only.

Although much of the psychosocial work environment research base is observational and available only in primary studies, there is a growing quasi-experimental literature which examines the effects of organisational interventions, some of which has been synthesised in systematic reviews. Much of this review level evidence lies outside the traditional boundaries of public health research, for example in the human resources, management, economics or nursing literature. It is therefore under-used in public health policy. Umbrella reviews are an increasingly common way of identifying, appraising, and synthesising such systematic reviews (Bialy et al., 2006; Egan et al., 2008; Main et al., 2008; Morrison et al., 2003) and making them suitable for a new audience - in this case public health researchers, practitioners and policy makers (Wanless, 2004). In addition, umbrella reviews are able to present the overarching findings of such systematic reviews (Higgins & Green, 2008). This article therefore presents the results of an umbrella review of the health effects of organisational level changes to the psychosocial work environment. It has a special focus on differential impacts by socio-economic status. Additionally, it explores whether the effects of the interventions differed across other sub-groups specifically age, gender, and ethnicity.

## **METHODS**

Systematic methods were used to locate and evaluate published and unpublished systematic reviews of organisational level psychosocial work environment interventions. This umbrella review was part of a wider project funded by the English Department of Health, Policy Research Programme, via the Public Health Research Consortium (PHRC) on systematic reviews of interventions to address the social determinants of health. It was conducted by a UK based team between October 2006 and December 2007.

## Objectives

The objectives of this umbrella review were three-fold:

- (1) To identify what types of organisational level changes to the psychosocial work environment have been previously systematically reviewed, to describe what the systematic reviews concluded about health effects and to highlight what gaps there are in the existing review literature.
- (2) To assess to what extent existing systematic reviews have considered the impacts of such interventions on socio-economic inequalities health, what the reviews concluded, what gaps exist, and what this means for tackling socio-economic inequalities in health amongst the working age population.
- (3) To explore to what extent existing systematic reviews have considered the differential impacts of such interventions by age, gender, or ethnicity, what the reviews found, and what this might mean for future research.

## Search Strategy

Initially, the Centre for Reviews and Dissemination (CRD) Wider Public Health (WPH) database (a web based database of systematic reviews of public health and related interventions) was manually searched. This consists of evidence from systematic reviews relevant to public health policy and practice and covers the period from 2000 to 2002. To supplement this, the Cochrane Database of Systematic Reviews (CDSR) and the Database of Abstracts of Reviews of Effects (DARE) (both administrative and public databases <http://www.crd.york.ac.uk/crdweb/html/help.htm> covering nursing, economics, human resources and management journals) were searched electronically whilst the Campbell Collaboration Database and the Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre) database of health promotion and public health studies, were manually searched from January 2002 to April 2007. Electronic searches of the Criminal Justice Abstracts database (2000-2007) were also undertaken (as it is not covered by any of these databases of systematic reviews). Bibliographies, reference lists, and relevant websites were also searched. Experts were contacted and we hand searched four journals (*American Journal of Public Health*, *American Journal of Preventive Medicine*, *Journal of Epidemiology and Community Health*, *Social Science and Medicine*) from January 2002 to April 2007.

## Inclusion and exclusion criteria

Only reviews from 2000–2007 of adult participants (16+) or the general population in developed countries (North America, Europe, Australasia, Japan) were eligible for inclusion. All types of changes to the psychosocial work environment which focused on the organisational rather than just the individual level were included. Reviews of individual level interventions or changes to the physical environment were excluded.

In terms of outcomes, we were particularly interested in the impacts on inequalities in health or wellbeing (primarily by socio-economic status, but also in terms of age, gender or ethnicity) although we also addressed the overall health effect. Based on descriptive epidemiological studies of the relationship between the psychosocial work environment and various health and wellbeing indicators, (Marmot et al., 1999) a wide range of outcomes was considered relevant (Box 1).

#### **Box 1: Health and wellbeing outcomes of interest**

##### **Health**

- Changes in the prevalence of specific diseases (e.g. musculoskeletal disease or circulatory disease)
- General or indirect measures of physical or psychological health and wellbeing (such as GP visits or the General Health Questionnaire).
- Sickness absence rates
- Health behaviours (cigarette or alcohol consumption, physical activity)
- Injuries resulting from accidents.

##### **Wellbeing**

- Physical and mental wellbeing (such as tiredness, fatigue and sleep)
- Social impacts (work/life balance, quality of life, or time spent with family)
- Psychosocial outcomes (e.g. levels of job demand, control or support).

##### **Health Inequalities**

- Differences in health or wellbeing outcomes by socio-economic status (e.g. income, occupational class, education, employment grade)
- Differences in health or wellbeing outcomes by demographic characteristics (age, gender, ethnicity)

To be included, systematic reviews had to meet the two mandatory criteria of the Database of Abstracts of Reviews of Effects (DARE): that there is a defined review question and that an effort has been made to identify all the relevant literature ([www.crd.york.ac.uk/crdweb/](http://www.crd.york.ac.uk/crdweb/)). An identified review was classified as a systematic review when the review question was explicitly defined in terms of two or more criteria of, the interventions, participants, outcomes or study designs, and the literature search criteria (a minimum of one or more named databases needed to be searched, in conjunction with either reference checking, hand-searching, citation searching or contact with authors in the field) were adequately fulfilled.

### **Data Extraction and Critical Appraisal**

Two reviewers (CB/MG) independently screened all titles and abstracts identified from the literature search for relevance (n=1694). Full paper manuscripts of any titles/abstracts that were considered relevant by either reviewer were obtained (n=84) and independently assessed for inclusion. Any discrepancies were resolved by consensus and if necessary a third reviewer (MP) was consulted. The following data were extracted: review details, intervention, search strategy, inclusion/exclusion criteria, number of studies in the review, outcomes evaluated, methods used to synthesise the findings, the results obtained, and the authors' conclusions and research recommendations. Primary studies contained in each review were checked for duplication and none was present. Each systematic review was critically appraised using a checklist list adapted from DARE. The checklist was used to highlight variations in the reviews and assess the reliability and validity of the reviews (see Box 2).

## **Box 2: Methodological Quality Checklist**

1. Is there a well defined question?
  - *The question should define at least the participants, the intervention, the outcomes and the study designs.*
2. Is there a defined search strategy?
  - *The search strategy should include at least one named database combined with reference checking, hand-searching, citation follow-up, or expert contact.*
3. Are inclusion / exclusion criteria stated?
  - *The review should make the grounds for study inclusion and exclusion transparent in terms of participants, intervention, outcomes and study design.*
4. Are the primary study designs and number of studies clearly stated?
  - *The review should outline the designs of included studies and make it clear which and how many studies are in the final synthesis.*
5. Have the primary studies been quality assessed?
  - *The review should clearly describe the quality assessment process, which quality appraisal tool is used, and the relative quality of each included study.*
6. Have the studies been appropriately synthesised?
  - *The review should use meta-analysis or narrative synthesis, whichever is most suitable given the heterogeneity of studies and their methodological quality. If studies are very heterogeneous, narrative synthesis is appropriate.*
7. Has more than one author been involved at each stage of the review process?
  - *To minimise bias, the review should have at least two reviewers involved in each stage (study selection, data extraction, quality appraisal, synthesis) of the review.*

Source: Adapted from Database of Abstracts of Reviews of Effects (DARE), Main et al (2008) and Egan et al (2008).



## RESULTS

Seven reviews addressing the health effects of changes to the psychosocial work environment were located: three examined increased employee control (Aust & Ducki, 2004; Bambra et al., 2007; Egan et al., 2007a), and four evaluated the effects of changes to the organisation of work (shift work, privatisation, health and safety legislation)(Bambra et al., 2008a; Bambra et al., 2008b; Egan et al., 2007b; Rivara & Thompson, 2000). Five of the reviews specifically examined effects on health inequalities (Bambra et al., 2007; Bambra et al., 2008a; Bambra et al., 2008b; Egan et al., 2007a; Egan et al., 2007b). Five of the reviews met all seven of the critical appraisal criteria (Bambra et al., 2007; Bambra et al., 2008a; Bambra et al., 2008b; Egan et al., 2007a; Egan et al., 2007b). The results of these seven reviews are summarised by intervention type in tables 1-3 as well as synthesised narratively, taking into account the results of the critical appraisal.

### Employee Control

Three reviews examined the health effects of increasing employee control in the workplace (Table 1). Two focused largely on increasing employee participation in workplace decision making (Aust & Ducki, 2004; Egan et al., 2007a), whilst the other examined the effects of increased control over work tasks (Bambra et al., 2007).

The review by Aust and Ducki (2004) synthesised five retrospective studies of “Dusseldorf health circle” interventions (employee discussion groups in which decisions were made about improving harmful working conditions). The review concluded that the effects on health were mixed and inconclusive. Sickness absence decreased in the four uncontrolled studies (by between 2% and 5%), and two of these also found improvements in psychosocial outcomes and general health. However, there was no significant difference in health outcomes between the intervention and the control group in the one controlled study. The review did not address differential effects by socio-economic or demographic group. In terms of rigour, the review met six of the seven critical appraisal criteria (it was not clear if more than one reviewer had been involved at each stage of the review).

The review of participatory employee committees (involvement of employees or employee representatives in modifying the workplace, in budgetary decisions, or in personnel matters) synthesised eighteen studies (Egan et al., 2007a). The review found that participatory committee interventions which increased employee control had a consistent and positive impact on self-reported health. The review also looked for evidence of differential effects by gender, ethnicity and socio-economic status. However, only three such studies were included in the review. One controlled prospective Dutch study found that serum cholesterol levels improved for men but not women (pre-post: men,  $p=0.02$ ; women,  $p=0.09$ )(Maes et al., 1998). An American prospective controlled study found that psychosocial outcomes improved amongst African-American and Hispanic, but not white, employees ( $p<0.05$ ).(Park et al.,

2004) An uncontrolled UK study found improvements in mental health (mean anxiety and depression scores) amongst manual workers (from 2.71 to 2.45;  $p < 0.01$ ) but not managers or clerical employees.(Parker et al., 1997) This review met all of the appraisal criteria.

The third review examined nineteen studies of the health effects of three types of changes to employee control over work tasks: increasing task variety, team working and autonomous groups (Bambra et al., 2007). The review found that task structure interventions did not generally alter levels of employee control. However, where job control decreased and work demands increased, self-reported mental health appeared to get worse. This review also looked a priori for evidence of differential effects and three such studies were included. One uncontrolled Austrian study of civil servants found that the adverse health effects of a team working intervention were only experienced by the lowest grade of employees.(Korunka et al., 2003) Similarly, a controlled study of team working amongst Japanese factory workers found that depression levels improved only in men not women.(Kawakami et al., 1997) However, an uncontrolled study of team working amongst UK doctors found no difference between men and women in terms of anxiety or depression.(Appleton et al., 1998) This was a well conducted review meeting all seven of the appraisal criteria.

**Table 1: Summary of psychosocial work environment reviews (n=3)**

<b>Review details</b>	<b>Main findings</b>	<b>Quality Appraisal*</b>
Aust and Ducki (2004)	Mixed results: sickness absence increased in the controlled study, whilst it decreased in the four uncontrolled studies. One study reported improvements in some psychosocial outcomes such as relationships with colleagues.	1 2 3 4 5 6
<i>Review Objective:</i> To assess the effects of health circles		
<i>Intervention(s):</i> Dusseldorf Health circles – staff discussion groups on improving potentially harmful working conditions (including psychosocial)		
<i>Population:</i> Employees		
<i>Health outcomes:</i> Health and wellbeing		
<i>Number of relevant primary studies:</i> 5, retrospective studies with/without control.		
<i>Number of databases searched:</i> 10		
<i>Location:</i> Germany.		
<i>Synthesis method:</i> Narrative		
Egan et al (2007)	Participatory committee interventions which increased employee control had a consistent and positive impact on self-reported health.	1 2 3 4 5 6 7
<i>Review Objective:</i> Systematic review of the health and psychosocial effects of increasing employee participation and control through workplace reorganisation, and to determine whether those effects differ for different socioeconomic groups..		
<i>Intervention(s):</i> Organisational level work reorganisation: participatory committees, control over hours of work.		
<i>Population:</i> Employees		
<i>Health outcomes:</i> Health inequalities, self-reported demand, control and support and related psychosocial factors; self-reported physical health, mental health, absenteeism and physical measures.		
<i>Number of relevant primary studies:</i> 18, prospective with/without controls, retrospective, qualitative.		
<i>Number of databases searched:</i> 17		
<i>Location:</i> USA, UK, Norway, Canada, Sweden, Netherlands, Japan.		
<i>Synthesis method:</i> Narrative		
Bambra et al (2007)	Task structure interventions did not generally alter levels of employee control. However, where job control decreased (and psychosocial demands increased), self-reported mental (and sometimes physical) health appeared to get worse.	1 2 3 4 5 6 7
<i>Review Objective:</i> To systematically review the health and psychosocial effects of changes to the work environment brought about by task structure work reorganisation, and to determine whether those effects differ for different socioeconomic groups.		
<i>Intervention(s):</i> Task structure work reorganisation: job enrichment and enlargement (task variety), collective coping and decision making (team working), autonomous production groups (autonomous groups).		
<i>Population:</i> Employees		
<i>Health outcomes:</i> Health inequalities, self-reported		

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demand, control and support and related psychosocial factors; self-reported physical health, mental health, absenteeism and physical measures

*Number of relevant primary studies:* 19, prospective with/without controls.

*Number of databases searched:* 17

*Location:* USA, UK, Sweden, Netherlands, Austria, Japan.

*Synthesis method:* Narrative

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\* See box 1.

## Changes to the Organisation of Work

Five reviews were located which focused on the health and wellbeing effects of changes to the organisation of work (Tables 2 and 3): two examined changes to shift work (Bambra et al., 2008a; Bambra et al., 2008b), one examined privatisation (Egan et al., 2007b), whilst another evaluated the introduction of health and safety legislation in the US construction industry (Rivara & Thompson, 2000). Four of these reviews met all seven of the appraisal criteria although the review by Rivara and Thompson met only five (it was unclear if the primary studies had been quality appraised or if more than one reviewer had been involved at each stage of the review).

### *Shift work interventions*

Two systematic reviews specifically examined organisational-level workplace interventions amongst shift workers (Table 2). One focused on the health and psychosocial effects of changing to a compressed working week, (Bambra et al., 2008a) whilst the other examined various other changes to shift work schedules (Bambra et al., 2008b).

In the review of compressed working weeks (usually changing from five days of 8hr shifts to four days of 12hr shifts) (Bambra et al., 2008a), 40 studies were synthesised. The review found that whilst positive health effects were not always evident, there was seldom a detrimental effect. Work-life balance was often improved by such interventions. The review looked for evidence of differential effects but only one study included in the review, an uncontrolled Canadian study of factory workers, differentiated outcomes by socio-economic or demographic group. It found that total morbidity and injury rates decreased amongst men, but not women, after the change to a compressed working week. (Laundry & Lees, 1991)

**Table 2: Changes to the Organisation of Work: Summary of reviews on shift work (n=2)**

Review details	Main findings	Quality Appraisal*
Bambra et al (2008a)**	Health effects were inconclusive, although there was seldom a detrimental effect. Work-life balance was often improved.	1 2 3 4 5 6 7
<i>Review Objective:</i> To systematically review studies of the effects of the Compressed Working Week on the health and work-life balance of shift workers, and to identify any differential impacts by socio-economic group.		
<i>Intervention(s):</i> Changing from an 8hr, 5 day week to a Compressed Working Week (CWW) of a 12hr/10hr, 4 day week.		
<i>Population:</i> Shift workers		
<i>Health outcomes:</i> Health inequalities, specific diseases, general measures of physical or psychological health and		

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wellbeing, sickness absence, health behaviours and injuries resulting from workplace accidents, physiological measures, tiredness, fatigue and sleep; work-life balance and the psychosocial work environment.

*Number of relevant primary studies:* 40, prospective studies with/without controls, retrospective with/without controls.

*Number of databases searched:* 27

*Location:* Canada, USA, UK, Sweden, Netherlands, Australia, Japan, Switzerland.

*Synthesis method:* Narrative

Bambra et al (2008b)<sup>\*\*\*</sup>

Switching from slow to 1  
fast shift rotation; 2  
changing from backward 3  
to forward shift rotation; 4  
and the self-scheduling of 5  
shifts were found to 6  
benefit health and work- 7  
life balance.

*Review Objective:* To systematically review effects of organisational level interventions on the health and WLB of shift workers and their families, and to identify any differential impacts by socio-economic group.

*Intervention(s):* Various organisational level changes to shift work schedules: changes to the rotation of shifts, alterations to night work, the introduction of later or more flexible shift times, changes to weekend working, decreased shift length, and the self-scheduling of shifts.

*Population:* Shift workers

*Health outcomes:* Health inequalities, specific diseases, general measures of physical or psychological health and wellbeing, sickness absence, health behaviours and injuries resulting from workplace accidents, physiological measures, tiredness, fatigue and sleep; work-life balance and the psychosocial work environment.

*Number of relevant primary studies:* 26, cross-over controlled trial, prospective with/without controls, retrospective with/without controls.

*Number of databases searched:* 27

*Location:* Germany, USA, UK, Sweden, Netherlands, Australia, Japan, Finland, Denmark, France.

*Synthesis method:* Narrative

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\*See box 1.

\*\* Compressed working week interventions usually involved changing from five days of 8hr shifts to four days of 12hr shifts.

\*\*\* Slow rotation is six or seven consecutive shifts of the same type, fast rotation is a maximum of three or four consecutive shifts of the same type. Backward rotation is night, then afternoon and morning shift. Forward rotation is morning, then afternoon, then night shift rotation

The second review of shift work interventions synthesised 26 studies of various changes to the organisation of shift work (Bambra et al., 2008b). It found that three types of intervention had beneficial effects on health and work-life balance: (1) Switching from slow to fast shift rotation (slow rotation is six or seven consecutive shifts of the same type, fast rotation is a maximum of three or four consecutive shifts of the same type); (2) Changing from backward (night, afternoon, morning) to forward (morning, afternoon, night) shift rotation; and (3) self-scheduling of shifts. Again, although this review was designed to look for studies of health inequalities, only one of the included studies differentiated outcomes by age group. This uncontrolled prospective cohort found that amongst male steel workers in Finland, changing from slow to fast rotation improved sleep quality amongst older, but not younger, workers.(Hakola & Harma, 2001)

### *Privatisation*

One review (Egan et al., 2007b) examined eleven studies of the effects on general health, health inequalities, injury rates and psychosocial outcomes of the privatisation of public utilities and industries (Table 3). The review suggested that the job insecurity and unemployment resulting from privatisation had an adverse impact on mental health and on some physical health outcomes. One of the aims of this review was to synthesise data on health inequalities. However, only one of the studies in the review contained any relevant data. It found that eight months after privatisation, occupational stress amongst clerical and administrative staff had increased significantly, although manual workers and managers experienced no such changes over the same period.(Nelson, 1999)

### *Health and safety legislation*

One review (Rivara & Thompson, 2000) examined the effects of increased enforcement of health and safety legislation on the number of fall related injuries in the USA construction industry (Table 3). Based on administrative (workers compensation) data, it found that increased regulation, especially when enforced with inspections, is associated with a decrease in fall injury rates. The review did not look for studies of differential impacts.

**Table 3: Changes to the Organisation of Work: Summary of reviews on privatisation (n=1) and health and safety (n=1)**

Review details	Main findings	Quality Appraisal*
Egan et al (2007) <i>Review Objective:</i> To systematically review the effects of privatising industries and utilities on the health and health inequalities of employees and the public. <i>Intervention(s):</i> Privatisation of public utilities and industries <i>Population:</i> Those affected by privatisation of public utilities and industries (employees and general public) <i>Health Outcomes:</i> General health, psychosocial outcomes and injury rates, health inequalities. <i>Number of relevant primary studies:</i> 11, prospective with/without controls, uncontrolled interrupted time series analyses. <i>Number of databases searched:</i> 21 <i>Location:</i> UK and Portugal. <i>Synthesis method:</i> Narrative	Higher quality studies suggested that job insecurity and unemployment resulting from privatisation impacted adversely on mental health and on some physical health outcomes.	1 2 3 4 5 6 7
Rivara and Thompson (2000) <i>Review Objective:</i> The objective of this study was to review the evidence for the effectiveness of different strategies to prevent falls from heights in the construction industry. <i>Intervention(s):</i> Legal regulations (increased safety regulations) to prevent falls from height in construction industry. <i>Population:</i> Construction workers <i>Health Outcomes:</i> self-reported falls, self-reported injuries, documented falls (workers compensation), and injuries. <i>Number of relevant primary studies:</i> 1, controlled cross-sectional ecological study of administrative data. <i>Number of databases searched:</i> 5 <i>Location:</i> USA <i>Synthesis method:</i> Narrative	Increased regulation, when enforced with inspections, might be associated with a decrease in fall injury rates.	1 2 3 4 6

\* See box 1.



## DISCUSSION

### Effects of the Interventions

Overall, the systematic review evidence synthesised in our *umbrella* review suggests that organisational level changes to the psychosocial work environment can have important and generally beneficial effects on health. Further, the five reviews which examined differences by socio-economic or demographic group (Bambra et al., 2007; Bambra et al., 2008a; Bambra et al., 2008b; Egan et al., 2007a; Egan et al., 2007b), when taken together, tentatively suggest that organisational workplace interventions may also have the potential to have an impact on health inequalities amongst employees.

### *Health and wellbeing*

Changes to employee control appeared to have had mixed, but largely positive, impacts on health outcomes. Similarly, in terms of the wider changes to the psychosocial organisation of work, the two reviews of changes to shift work identified positive impacts on work-life balance of the compressed working week, switching from slow to fast shift rotation, changing from backward to forward shift rotation, and self-scheduling of shifts. (Bambra et al., 2008a; Bambra et al., 2008b) The latter three interventions were also found to have positive effects on mental health. Similarly, the review of health and safety legislation in the construction industry found a decrease in fall-related injuries after the intervention (Rivara & Thompson, 2000). The review of privatisation suggested that increased job insecurity and unemployment resulting from privatisation impacted adversely on mental health (Egan et al., 2007b).

### *Health Inequalities*

Five of the seven reviews examined differential health effects by socio-economic or demographic group (Bambra et al., 2007; Bambra et al., 2008a; Bambra et al., 2008b; Egan et al., 2007a; Egan et al., 2007b). Generally, they found a larger effect for men compared to women, and that the interventions were more likely to improve health amongst ethnic minorities and older workers. This may have been because the pre-intervention health status of these groups was considerably lower and thus they had more to gain from the intervention. However, it may also be because the health effects of work may be greater for some groups than others. For example, studies have traditionally shown a stronger association between work and health amongst men than women (Bartley et al., 2006). In terms of socio-economic status, the participatory interventions improved mental health amongst manual but not managerial or clerical employees. Whereas the adverse effects of team working and privatisation were experienced more by the lower grades of employees. This suggests that the positive and negative health effects of organisational changes to the psychosocial work environment are felt more by men and lower socio-economic groups.

## **Research, Policy and Practice**

### *Research*

In comparison to other public health interventions addressing the social determinants of health, the systematic review evidence base on organisational changes to the work environment is fairly well developed (Millward et al., 2003). Further, the existing reviews are generally well conducted with six meeting all seven of the critical appraisal criteria. However, in terms of gaps in the coverage of the systematic review evidence base, this umbrella review suggests that there is a particular need for future reviews to examine the health impacts of wider organisational changes to the psychosocial work environment such as flexible working, part-time working, or other interventions which may enhance work-life balance.

There was a consensus amongst all the reviews on the issue of future primary research, calling for the conduct of prospective (preferably randomised) controlled studies of organisational level workplace interventions. Such studies also need to record the wider organisation and labour market context in which the interventions take place (Egan et al., 2007b). Further, the need for studies which evaluate any differential impacts of interventions by socio-economic status was particularly noted (Bambra et al., 2007; Bambra et al., 2008a; Bambra et al., 2008b; Egan et al., 2007a).

### *Policy and Practice*

In terms of policy and practice, the findings of our *umbrella* review suggest that the increasing focus on psychosocial conditions in the workplace in national public health strategies is soundly based (Black, 2008; Department for Work and Pensions., 2005; Department of Health, 2004; United States Department of Health and Human Services, 2002). Specifically, the systematic reviews suggest that increasing employee job control (Bambra et al., 2007; Egan et al., 2007a); introducing the compressed working week;(Bambra et al., 2008a) or implementing some other structural changes to shift work (Bambra et al., 2008b) could be beneficial to health and wellbeing and may also have the potential to reduce health inequalities.

## **Study strengths and limitations**

The main challenge was to locate relevant systematic reviews. Searching for reviews of organisational workplace interventions is difficult and time-consuming and the searches can often suffer from a lack of sensitivity and a lack of specificity (Jackson & Waters, 2004; Ogilvie et al., 2005). The task of searching is made more difficult because of the lack of a comprehensive register of studies addressing health inequalities. However, to ensure the searches were as extensive as possible, our strategies were piloted and revised. Further, the searches were conducted by an experienced information specialist at the Centre for Reviews

and Dissemination. In addition, leading public health journals were hand searched and review authors were contacted. Despite this, as for any review of complex and difficult-to-define interventions, it is not possible to be sure that all relevant reviews have been located (Ogilvie et al., 2005). Further, there may of course be older reviews (pre-2000) that might provide additional evidence, although if such reviews exist they may well be out-dated. Another important limitation relates to the nature of umbrella reviews: there is clearly a risk that bias is transmitted upward from primary studies, to systematic reviews and then to umbrella reviews. This means that ideally the primary studies still need to be consulted in detail. Consequently, this umbrella review provides an overview only of organisational workplace interventions. It cannot offer detailed information on practice or implementation.

## **CONCLUSION**

Seven systematic reviews of the health effects of organisational level changes to the psychosocial work environment were identified. Changes to employee control and wider psychosocial changes to the organisation of work were found to have important and generally beneficial effects on health. Some reviews provided evidence which suggests that organisational workplace interventions may also have the potential to reduce health inequalities amongst the employed, particularly between men and women, and between socio-economic groups. Policy makers should therefore consider organisational level workplace interventions when seeking to improve the health of the working age population.

## **ACKNOWLEDGEMENTS**

The work was undertaken by the authors as part of the Public Health Research Consortium. The Public Health Research Consortium is funded by the Department of Health Policy Research Programme. The views expressed in the publication are those of the authors and not necessarily those of the DH. Information about the wider programme of the PHRC is available from [www.york.ac.uk/phrc](http://www.york.ac.uk/phrc).

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**PRECIS**

Systematic review level evidence suggests that organisational level workplace interventions can improve the health and wellbeing of employees, and show potential for reducing health inequalities.