



Public Health
Research Consortium

Tackling the wider social determinants of health and health inequalities: evidence from systematic reviews

Bambra C.,¹ Gibson M.,² Petticrew M.,³ Sowden A.,⁴ Whitehead M.,⁵ Wright K.⁴

1. Centre for Public Policy & Health, Durham University
2. MRC Social and Public Health Sciences Unit, Glasgow
3. Public and Environment Health Research Unit, London School of Hygiene and Tropical Medicine
4. Centre for Reviews and Dissemination, University of York
5. Division of Public Health, University of Liverpool.

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.

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Preface: What this study adds to knowledge

We know already that there are few evaluations of “wider public health” interventions, such as policies which affect the social determinants of health and health inequalities. From this project we find some suggestive evidence that certain categories of intervention may impact positively on inequalities, in particular interventions in the fields of housing, and employment, though further evidence is needed. In the case of employment for example there is evidence that the effects of employment change are experienced differently by employees in different occupational categories, and some evidence about how this may be addressed. This suggests that the workplace may indeed be an important setting in which inequalities may be addressed. Similarly, there is some evidence that housing improvements may positively affect physical health, but the effects may be quite small.

The most striking gap in the evidence base however is in relation to interventions to improve access to health and social care. The few reviews that we identified in the “access to healthcare” domain were limited to small-scale interventions to improve the access of very specific groups (and mainly in the US, where the nature of the highly commercialised healthcare system limits generalisability of findings to the rest of the world). No reviews were found that assessed the effects of wider health policies and health systems on access to health and social care for different groups in the population. As we also carried out additional searches to attempt to identify primary studies which would not have been included in the reviews, this may indicate a need for further research in this area.

We also identified no reviews in the education domain which examined the relationship between better standards of education in the population and better long-term health outcomes in adults. One priority for new reviews should be to investigate the role of education policies on health outcomes in this group. There are many observational studies which show a clear association between education and health, and the association is not in dispute; however further analyses which explore the effects of educational policies and health outcomes over time are needed.

Given the relatively few evaluations, it is particularly important to assemble evidence on the *mechanisms* by which policies within the sectors we examined may affect health; this will help identify points at which to intervene and will provide a framework for the development of new primary research.

1. Executive summary

Background/Aims

Evidence synthesis is an essential component of the identification of effective interventions to improve public health and reduce health inequalities. Within the past five years, there have been increasing numbers of systematic reviews which directly address the social determinants of health. Moreover, various international groups have been systematically working on health equity issues to locate primary studies and systematic reviews of interventions which address health inequalities. These reviews should in theory provide evidence on the effects of interventions to improve health and reduce health inequalities both in terms of (i) identifying what we already know about the effects of interventions; and (ii) identifying the gaps and using this information to identify priorities for new primary and secondary research. The aim of this study was identify existing systematic reviews and relevant primary studies, and to use these to identify priorities for new systematic reviews and for new primary studies of interventions addressing inequalities in health. The study was funded through the Public Health Research Consortium, which is funded by the Department of Health Policy Research Programme (DH PRP).

Design and Methods

Systematic review methods were used to locate and evaluate published and unpublished systematic reviews of interventions around the social determinants of health (sometimes referred to as an 'umbrella' review) - with a focus on developed/OECD countries – conducted during 2000-2007. The review focused on living and working conditions and access to essential goods and services, water and sanitation, agriculture and food production, health (and social care) services, unemployment (and welfare), work environment, housing (expanded to include community, regeneration and crime), education, and transport.

The findings were data extracted, critically appraised, and tabulated. Information was also extracted where available on inequalities and implementation issues. Finally, the research recommendations were extracted from the systematic reviews. Although we started by attempting to identify reviews, we then extended the search in order to identify and describe recently published primary intervention studies - that is, new primary studies which would not have been included in the reviews. Thus any "gaps" in the evidence base we identify do not simply relate to areas where there are no systematic reviews.

Main findings

We identified 32 systematic reviews and 16 primary studies across eight sectors: water and sanitation; agriculture and food; health (and social care) services; unemployment and welfare; working conditions; housing and community; education; and transport.

There is some evidence that certain categories of intervention may impact positively on inequalities, in particular interventions in the fields of housing and employment, though, as always, further evidence is needed. In the reviews of employment interventions (such as changes to the organisation of work, and privatisation) there is evidence from primary studies that the effects of change are experienced differently by employees in different occupational categories. This suggests that the workplace may indeed be an important setting in which inequalities may be addressed. Similarly there is some evidence that housing improvements may positively affect physical health but the effects are small. We will be able to examine this issue further when the results of an unpublished systematic review become available later in 2008. In the case of transport, the strongest evidence derives from studies of injury prevention, but the wider health impacts of transport policies on inequalities remain to be demonstrated.

There appear to be gaps in the evidence base in relation to adult education, and access to health and social care. We identified no reviews in the education domain, and yet there is undoubtedly an untapped evidence base relating to the relationship between education and long-term health outcomes in adults, and there also is a wealth of observational evidence. However new systematic reviews which investigate the role of education policies and interventions on adult health and inequalities may be of value.

The few reviews that we identified in the “access to healthcare” domain were limited to small-scale interventions to improve the access of very specific groups (and mainly in the US, where the nature of the highly commercialised healthcare system limits generalisability of findings to the rest of the world). No reviews were found that assessed the effects of wider health policies and health systems on access to health and social care for different groups in the population. This is a major “evidence gap”.

Conclusions

Although we focused mainly on systematic reviews, we also searched for primary studies which may not have been included in those reviews (because they were too recent, for example). Thus any gaps in the evidence base we identify do not only relate to an absence of systematic reviews. There are for example some gaps where primary research may be available but has not yet been fully exploited, particularly in relation to access to health and social care, and the effects of education policies on adult health and health inequalities.

With relatively few reviews and primary studies available from recent years, the scope for further research is of course vast. In such circumstances, it is of paramount importance that the selection of priorities be guided by public health theory as well as by the existing evidence. In particular it is becoming clear that the most important determinants of public health and health inequalities are the wider, upstream determinants; this raises the real possibility that government policies in sectors other than health - including housing, education, transport, employment - offer real opportunities to improve health and reduce the health gap. Healthy public policy involves not just identifying magic

bullets - through developing new individual-level interventions to change behaviour – but also making existing policy healthier, and collecting the evidence of these impacts using appropriate scientific methods.

2. Introduction/background

Evidence synthesis is an essential component of the identification of effective interventions to improve public health and reduce health inequalities. One of the original intentions of systematic reviews was to help make sense of ever-increasing amounts of research literature. However the growth in the number of reviews has meant that it is now difficult to keep pace. This problem is compounded by the numbers of (sometimes conflicting) reviews in the same topic areas, particularly within the past 4-5 years. Moreover, various international and national groups have been systematically working on health equity issues to conduct systematic reviews of interventions which address health inequalities. Among these are the Cochrane/Campbell Equity Group, the EPOC group (both based in Ottawa), the EPPI Centre at the Institute of Education in London, and the Cochrane Public Health Review Group (<http://ph.cochrane.org/en/index.html>), as well as the UK EvidenceNetwork funded by the Economic and Social Research Council, which represented a significant investment in the development of methods for evidence synthesis relevant to the social determinants of health.

The rate of production of new reviews on the social determinants of health and health inequalities is therefore increasing. In the UK this has received additional stimulus by comments from Wanless to the effect that systematic reviews are a robust, reliable and important contribution to ongoing work. [1] Wanless points for example to the HDA briefings as good examples of accessible documents that synthesise international review-level literature. However, turning this demand for better evidence about interventions into action requires (i) identifying what we already know (in terms of the effects of interventions and their differential impacts); and (ii) identifying the gaps and using this information to identify priorities for new research.

This report represents a direct response to this call, in which we present the results of a review of the evidence on the effects on health and health inequalities of interventions aimed at influencing the social determinants of health.

3. Purpose of the study

The aim of this study was to identify priorities for new systematic reviews and primary studies addressing the means of tackling inequalities in health. The specific questions were:

1. What systematic reviews of interventions are available which address the main social determinants of health?

2. Comparing this to what is already known about the social determinants of health, where are the gaps?
3. What can be concluded from these reviews about the health-related effects of interventions in different subgroups?
4. What are the research recommendations from these reviews?
5. What does recent primary research on interventions (that is, primary studies not included in the above systematic reviews) tell us about the most effective means of addressing health inequalities?

It should be noted here that the focus of this review is on living and working conditions and access to essential goods and services as represented by Dahlgren and Whitehead's well known 'rainbow' model of the social determinants of health (see Figure 1, below): water and sanitation, agriculture and food production, health (and social care) services, unemployment (and welfare), work environment, housing (including community, regeneration and crime), education, and transport.

4. Design & methods

Systematic review methods were used to locate and evaluate published and unpublished systematic reviews of interventions around the social determinants of health (sometimes referred to as an 'umbrella' review). We used an accepted conceptual model of the main determinants of health to guide our selection of domains. This was supplemented by using systematic methods to identify recent primary intervention studies.¹

4.1 Search Strategies

For the umbrella review, a series of searches which aimed to identify systematic reviews that had evaluated the effects of interventions based on the social determinants of health were conducted. Initially, CRD's Wider Public Health (WPH) database (a database of systematic reviews of public health and related interventions) was searched. This consists of evidence from systematic reviews relevant to public health policy and practice and covers the period from 2000 to 2002. A wide range of other health and non-healthcare databases, bibliographies and websites were also searched from January 2002 to April 2007 (Box 4.1) (a period during which there was known to be an increase in the production of relevant reviews and primary studies). Experts were contacted and we hand-searched four leading journals (*American Journal of Public Health*, *American Journal of Preventive Medicine*, *Journal of Epidemiology and Community Health*, *Social Science and Medicine*). The full search strategy is available from the authors.

Similar extensive searches were conducted to identify primary evaluative studies (that is, evaluations of specific interventions). Finally, we supplemented this with further searches of DARE (Database of Abstracts of Reviews of Effects) in December 2007.

¹ A "scoping" review aims to systematically locate studies on a particular topic, but unlike a full systematic review does not extract detailed data and critically appraise each study in detail.

4.2 Inclusion and exclusion criteria

Interventions

We used the Dahlgren and Whitehead 'rainbow' model of the 'main determinants of health', to identify the range of social determinants upon which interventions could be based.[2] We concentrated on the third layer from the centre, that is living and working conditions and access to essential goods and services (see Figure 1, below): water and sanitation, agriculture and food production, health (and social care) services, unemployment (and welfare), work environment, housing (expanded to include community, regeneration and crime), education, and transport.

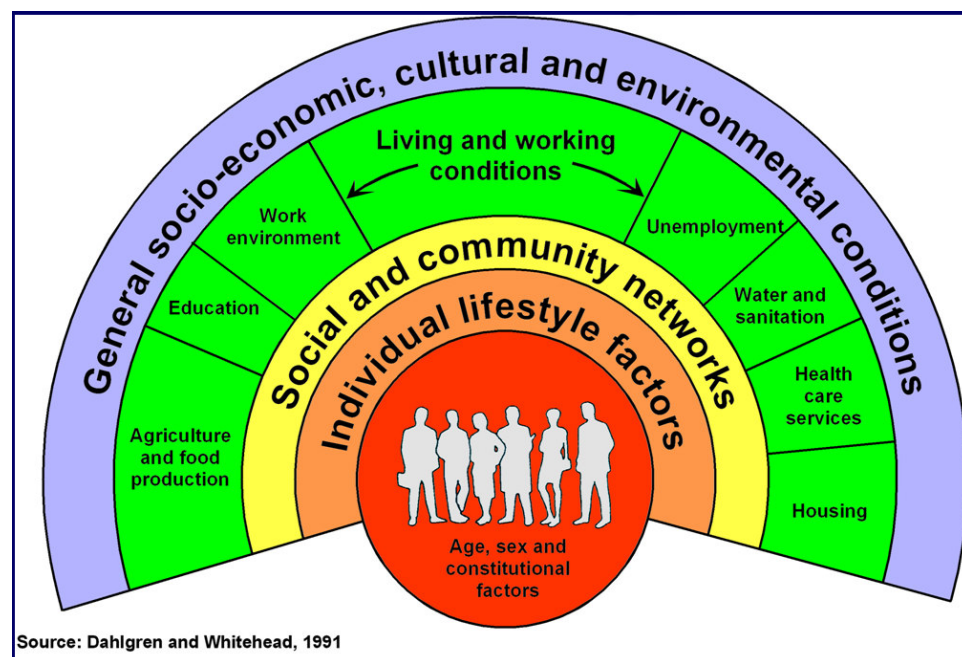


Figure 1: Dahlgren and Whitehead's model of the social determinants of health

(Interventions based on the first two layers of the rainbow are covered in another DH PRP-funded review being undertaken by the EPPI centre, focused on young people: <http://eppi.ioe.ac.uk/cms/>).

Participants

Only reviews and primary studies which included adult participants (16+) or the general population in developed countries (North America, Europe, Australasia, Japan) were eligible.

Outcomes

We were particularly interested in impacts on inequalities in health or wellbeing (primarily by socio-economic status, but also in terms of age, gender or ethnicity). However, for the umbrella review, we also assessed the overall population health effect of interventions. A wide range of health and wellbeing outcomes were considered (not just disease conditions but also indirect indicators of physical or psychological health and wellbeing (including work/life balance, and the psychosocial

work environment (such as levels of job demand, control or support). We also included non-health effects (such as employment or income) on people from a disadvantaged group with a pre-existing health condition. The primary studies had to report effects on health inequalities or the health and wellbeing of vulnerable/disadvantaged groups (using the same broad range of health and wellbeing outcomes).

Study design

To be included, systematic reviews had to meet the two mandatory criteria DARE; that there is a defined review question, and that an effort has been made to identify all the relevant literature. Primary studies could be prospective or retrospective evaluations (with or without control groups) of interventions aimed at influencing the social determinants of health.

4.3 Data extraction

Two reviewers independently screened all titles and abstracts identified from the literature searches for relevance. Data on review methods were extracted and recorded. (See Appendix 1; only relevant studies within a given review or relevant outcomes within a given study were extracted). For the primary studies, information about study methods was extracted, along with details of the intervention and the social determinant domain of the rainbow to which it related.

4.4 Critical Appraisal

The quality of each systematic review was assessed using a checklist list adapted from CRD's criteria for DARE. Quality was assessed by one reviewer and independently checked by a second. The primary studies were not critically appraised.

Box 4.1: Websites searched for systematic reviews and primary studies

Domain	Website
Water and Sanitation	Department of the Environment, Food and Rural Affairs
Agriculture and Food	Department of the Environment, Food and Rural Affairs
Health and Social Care Services	Food Standards Agency Department of Health National Institute for Clinical Excellence National Institute for Health Research (US) World Health Organisation Public Health Research Consortium
Housing and Community	Department Of Communities And Local Government Communities Scotland
Transport	Department of Health
Unemployment and Welfare	Department For Transport
Work	Department for Work and Pensions Health and Safety Executive Department for Trade and Industry International Labour Organisation Finnish Institute Of Occupational Health The Work Foundation
Education	Department for Education and Skills Institute of Education The Centre for Research on the Wider Benefits of Learning
Generic	The Community Guide

5. Main findings

Table 5.1 below lists the reviews and primary studies which were identified and from which data were extracted.

Table 5.1: List of systematic reviews and subsequent primary studies included

Domain	Systematic reviews (n)	Primary studies (n)
1. <i>Housing and community</i>	9	11 (3 not discussed here)
2. <i>Work environment</i>	9	0
3. <i>Unemployment and welfare</i>	3	4
4. <i>Health and social care services</i>	4	1
5. <i>Transport</i>	5	0
6. <i>Agriculture and food</i>	1	3
7. <i>Water and sanitation</i>	1	0
8. <i>Education</i>	0	0
<i>Total</i>	32	19

The findings from these reviews and studies are summarised below. Within each section, we report on the characteristics of the reviews and the effects of the intervention. The focus is on extracting information on the effects of interventions on health inequalities where given. We also report any information related to the implementation of the interventions, and any research recommendations made by the review authors. We add our own assessment of additional gaps and recommendations for future research based on the conceptual framework of the social determinants of health and a typology of interventions to tackle inequalities in health (Whitehead, 2007).[2-4] For ease of reading, each section ends with a box summarising the relevant information.

5.1 Housing and regeneration

There is a “housing evidence base” which goes back many decades; there are for example early evaluation studies from the 1930’s, and a number of controlled trials, and most recently several randomised controlled trials. Given this historical focus on the relationship between housing and health, it is probably not surprising that the housing evidence base is better developed than is the case for other domains. Much of the existing work to date is focused on changing the tenure mix within communities, and on physical improvements to homes.

5.1.1 Characteristics of the reviews

Eight reviews of relevance to this project were found and are discussed below. These fall into three broad categories: “social” changes (changes in tenure mix); “environmental” changes involving changes in the housing environment to reduce risk to inhabitants (for example, changes in lighting, or physical infrastructure, to reduce risk of falls, or injury); and “wider regeneration” activities. We also identified one unpublished systematic review, which is not discussed further as it has not yet been peer-reviewed.

5.1.2 The effects of changes in tenure mix/desegregation

The review which examined changes in tenure examined how rent assistance and other subsidies could be used to create mixed-income or desegregated housing in poorer U.S neighbourhoods.[5] It suggested that deliberate interventions to promote mixed housing may increase perceived neighbourhood safety, perhaps because exposure to crimes against person and property was reduced. Although two studies reported improvements in mental health and health status, the review’s authors concluded that the effectiveness of rental voucher programs on youth health risk behaviours, mental health status, and physical health status could not be determined because too few studies of adequate design reported these outcomes. The review also gives some insight into the possible social mechanisms by which reductions in social disorder may be achieved; for example, mixed tenure housing developments may change community norms, and raise the quality of existing services and amenities, as well as improving residential stability

Recent data also suggests that desegregation may improve mental health. For example, in a U.S. Moving to Opportunity (MTO) study, [6] in which families with children resident in high poverty neighbourhoods received assistance to move to low poverty neighbourhoods, depression and anxiety reduced significantly post-intervention.[6, 7] Another similar study found physical health improvements and reductions in alcohol abuse.[8] Mental health benefits of the voucher offers for adults and for female youth were also “substantial” in the recent study of MTO by Kling et al.(2007) .[9] The authors suggest that these mental health gains result from the reduction in stress associated with moving to neighbourhoods with lower rates of random violence. The benefits were greater for adults and female youth than for young males.

Acevedo-Garcia et al’s (2004) review examined a wider range of housing mobility policies with a closer focus on health outcomes; [10] like the previous review, it examined housing mobility, but also included housing policy for the mentally ill. Their conclusions were that housing mobility policies (at least in the US) result in improvements in health and health behaviours, though the number of studies is small. They concluded that, given that such policies are usually targeted at disadvantaged groups, they may also have the potential to contribute to health inequalities policy.

Additional primary studies

Other primary studies which were identified did not fall strictly within the category of tenure mix/desegregation and are not described here.[11-13] These examined the effect of individual-level incentives (e.g., housing vouchers to encourage homeless drug addicts to give up drugs or other substance misuse, and whether a housing incentive with a threat of withdrawal if abstinence was not maintained was more effective than the housing incentive alone in helping participants remain drug-abstinent.

Research recommendations

Anderson et al. (2003) suggest that research is needed on the effects of mixed tenure on housing hazards, on youth risk behaviours, and on health outcomes.[5] Acevedo-Garcia et al. also note this need, because the bulk of evidence to date is from the United States.[10] Both reviews note that it is not just evidence of effectiveness that is needed; new studies should also examine and test the processes and mechanisms by which these outcomes are achieved.

5.1.3 Physical home improvements

Five reviews examined the effects on health of removing hazards and improving energy efficiency. These interventions ranged from interventions (such as home visits, risk assessments and removal of hazards) to reduce the risk of injury; [14] [15] to physical changes to housing structure (such as insulation, furniture) and general housing policies.[16-18] These suggest that in elderly people fall-related injuries may be prevented by educational/promotion and environmental modifications; the effect is statistically significant in one review (ranging from a 6% to 33% reduction in fall-related injuries), and non-significant in the other, but with a positive trend.[14]

In the general population, improvements to the physical environment within the home are associated with limited improvements in physical health, with respiratory health also improving; mental health and wellbeing improve more consistently.[19] Some further evidence exists to suggest that housing improvement is associated with positive change in social outcomes – such as reductions in fear of crime, and improvements in social and community outcomes (social participation).[5] Missing from these studies however is any specific consideration of the effects of such interventions on inequalities.

Additional primary studies

Howden-Chapman et al. (2007) found significant improvements in health-related quality of life in an RCT of retrofitting of insulation in New Zealand homes, and concluded that targeting home improvements at low income households not only significantly improved social functioning and both physical and emotional wellbeing (including respiratory symptoms) but was also a more realistic approach politically than income redistribution.[20] The study also showed that the intervention was cost-effective. Interim data from an uncontrolled study by Kearns et al. in social housing tenants in Scotland also found improvements in SF-36 vitality scores (indicating increased levels of energy), but not in mental health scores and little change in physical health at one year.[21] Further controlled

data on other health outcomes from this latter study will be available in 2008. Thomson et al. (2007) found no significant changes in a small controlled study of social housing improvement in Scotland; although the housing itself improved significantly, this was not translated into significant health improvement.[22]

5.1.4 Wider regeneration activities

Thomson et al. (2006) examined the effects of UK urban regeneration programmes on health, and health determinants, and while the review did not find enough evidence to demonstrate the impacts of these programme on health or socioeconomic outcomes, there was a consistent small positive impact observed across the included studies, with great variability between areas.[16] It was not possible therefore to state confidently what the effects on health or inequalities was likely to be.

Additional primary studies

The possibility of adverse effects of regeneration are borne out by a further study – an RCT conducted in Manchester which found that regeneration was associated with greater mental distress, perhaps due to environmental nuisance.[23] They suggest (drawing on qualitative data) that this may be mitigated by establishing residents’ priorities prior to housing improvement.

5.1.5 Quality of the reviews

Housing is an area in which there are now a number of methodologically robust systematic reviews, which have been described above. Others are also underway. The quality appraisal of the included reviews can be seen in the methodological tables in Appendix 1.

Finally, one further review was located which is relevant to living conditions and crime though is not directly related to housing and regeneration, but is included here for completeness. This considered the effects of firearms restrictions, but found little evidence and concluded that there was insufficient evidence for or against efficacy of firearms restrictions (See Table 2).[66]

<i>Box 5.1 Housing, regeneration and community: summary of findings</i>

<i>General effects</i>

The review of tenure change suggested that interventions to promote mixed housing may result in increases in perceived neighbourhood safety, perhaps because exposure to crimes against person and property is reduced, along with neighbourhood social disorder. There is some tentative evidence that housing mobility policies (at least in the US) do improve health and health behaviours, though research on the mechanisms is required. General housing improvement is also associated with positive change in social outcomes – such as reductions in fear of crime, and improvements in social and community outcomes (social participation), but where evidence on the effects on health is presented the effects are small. Although housing improvement often takes place within the context of regeneration activities, and aims to reduce inequalities and improve health, evidence of the independent or additive effects of regeneration on health-related outcomes remains to be demonstrated. ...continued

Health inequalities

Missing from these studies is any specific consideration of the effects of such interventions on inequalities. In the case of wider regeneration activities in particular, there is a need for evaluations of the health outcomes of such activities, taking into account their effects on the wider determinants of health – in particular employment, education and worklessness, which are often the target of regeneration activities in poorer areas.

Implementation

There was no information reported on the implementation of the tenure change programmes, though it is likely that the implementation issues will be different in the UK; however even in the UK some housing agencies have adopted policies aimed at producing mixed-tenure communities.

Research recommendations

The reviews summarised above highlight the need for prospective controlled studies which incorporate measures of effectiveness and cost-effectiveness, but which also consider the wider social context, and the multifactorial nature of causality in relation to housing – for example to explore whether reverse selection is at work; not only whether worse housing lead to worse health, but whether worse health leads to worse housing. Such selection mechanisms are often neglected as explanatory factors in the field of health inequalities, but may merit further research in the field of housing. Nilsen (2004) similarly points out the need for “more sophisticated” evaluations which take account of the context, process, structure and duration of housing interventions.[17]

Our identification of additional gaps/research priorities

New research could also focus on the following specific issues:

- The health effects of tenure change, and interventions to promote housing mobility;
- The mechanisms by which housing change and improvement may improve perceptions of safety, and the effects on health - in particular mental health; and
- The effects of regeneration activities on health and social outcomes.

5.2 The work environment

There has been a recent shift in focus from work as a source of occupational diseases to the wider impacts of work on health and wellbeing.[24] There has been significant interest in the role of psychosocial factors in influencing health (and inequalities), and there is a growing evidence base on the effects of interventions, to add to the wealth of observational evidence already available. This is reflected in the systematic reviews we located.

5.2.1 Characteristics of the reviews

Nine reviews of work environment interventions were located [25] [26-29] [30] [31] [32] [33] and no primary studies. The reviews focused on five types of intervention: three evaluated increased employee control; [25, 26, 30] two looked at the effects of changing the organisation of shift work; [28, 29] two examined workplace smoking bans; [31, 32] whilst two other reviews covered the impacts of privatisation, [34] and health and safety regulations. [33] All but two [25, 33] of the reviews synthesised relevant studies from more than one country. Five of the reviews reported effects on health inequalities; [26-29] [30] the other four only reported overall health effects. [25, 31-33]

5.2.2 The effects of increasing employee control

Three reviews examined the health effects of increasing employee control in the workplace. Two focused largely on increasing employee participation in workplace decision making, [25, 30] whilst the other examined the effects of increased control over work tasks. [26] Two of the reviews contained information on the effects of the interventions on health inequalities. [26, 30]

The review by Aust and Ducki (2004) [25] synthesised 11 studies of “health circle” interventions. Five studies examined the Dusseldorf model (employee discussion groups in which decisions were made about improving harmful working conditions) and six examined the Berlin model (discussions of how to cope with work-related stress). Only the Dusseldorf health circle met our inclusion criteria for interventions (five studies were included).

No study examined the effects on health inequalities. In terms of general health effects, the results were mixed. The controlled study of three separate health circles found that general sickness absence and sickness absence due to low back pain increased in both the intervention and control group. The four uncontrolled studies all reported positive outcomes: three of the studies recorded decreases in sickness absence (by between 2% and 5%), one of which also recorded improvements in general health; the fourth study reported improvements in some psychosocial outcomes such as relationships with colleagues. There was no information on implementation. The research recommendations reflect the authors’ methodological concerns about the existing evidence.

The review by Egan and colleagues (2007) [30] synthesised eighteen studies of participatory employee committees from seven countries (USA, UK, Norway, Canada, Sweden, Netherlands, Japan). Seven studies examined employee participation interventions or increased control over

working hours. The remaining studies were multi-intervention studies combining participatory committees with other, usually, individual-level interventions. The review concluded that participatory committee interventions which increased employee control had a consistent and positive impact on self-reported health. Three of the included studies reported on differential health effects by gender, ethnicity or socio-economic status. One multi-intervention controlled prospective Dutch study, which combined a participatory committee with a health promotion intervention, found that serum cholesterol levels improved for men but not women (T1 - T2: men, $p=0.02$; women, $p=0.09$). A single prospective, controlled intervention study based in the retail industry in the USA found that psychosocial outcomes (particularly social support) improved amongst black and Hispanic, but not white, employees ($p<0.05$). One uncontrolled study of a participatory committee intervention implemented in a UK factory during a period of downsizing, differentiated results by socio-economic status (occupation). In a four year follow-up, it found improvements in terms of mental health outcomes (mean anxiety and depression scores) amongst manual workers (from 2.71 to 2.45; $p<0.01$) but not managers or clerical employees.

One problem with the interpretation of this study, is that the workers in the four-year follow-up were the “survivors” who had not been made redundant in the downsizing. If the shop-floor workers were most at risk of redundancy, then the ones who escaped might very well be expected to show an improvement in mental health (perhaps out of a sense of relief) over-and-above any improvements in lower risk managers and clerical staff. Studies such as these highlight the need to take into consideration the wider employment context in which interventions take place, including the local and national labour market conditions. The reviewed studies rarely mentioned the context in this way.

The reporting of implementation data was generally poor or difficult to assess.

The 2007 review by Bambra et al. [26] examined the health effects of increasing employee control by examining the reorganisation of work tasks. Three broad types of intervention were examined: increasing task variety (eight studies), team working (seven studies) and autonomous groups (six studies). Any health or psychosocial work environment outcomes, including effects on inequalities in health, were included.

The authors concluded that 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. 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: perceived stress, emotional strain, and tiredness increased amongst customer service advisors and clerical staff but not amongst managers. Two other studies of team working interventions differentiated their results by gender. One controlled study of Japanese factory workers found that depression levels improved only in men not women. The other

(uncontrolled) study of UK doctors found no difference between men and women in terms of anxiety or depression.

Bambra and colleagues[26] draw attention to the lack of detail in most of the included studies about the nature of the interventions and how they were implemented. Prospective well-controlled studies of task-restructuring interventions are now needed.

Research Recommendations

All three of the systematic review authors highlighted the poor quality of the evidence base. In their review of health circle interventions, Aust and Ducki (2004)[25] called for new controlled studies. Egan and colleagues (2007)[30] and Bambra and colleagues[26] similarly asserted that more methodologically robust studies are required, and ones that evaluate differential impacts of interventions by socioeconomic status.

5.2.3 Changes to the organisation of shift work

Two linked systematic reviews specifically examined organisational-level workplace interventions amongst shift workers. [28, 29] (Both of these reviews were conducted by this report's authors and were funded by the DH Public Health Research Consortium (UK)). One looked at the health effects of changing to a compressed working week, whilst the other examined various other changes to shift work schedules.[29]

In the study of compressed working weeks (usually changing from five days of 8hr shifts to four days of 12hr shifts),[28] 40 studies were found from eight countries (Canada, USA, UK, Sweden, Netherlands, Australia, Japan, Switzerland). The authors concluded that whilst the health effects were not conclusive, there was seldom a detrimental effect. Work-life balance was often improved by such interventions. One (uncontrolled) Canadian study of factory workers found that total morbidity decreased amongst men after the change to a compressed working week but not amongst women. Injury rates decreased for men, but not women, after implementation of the 12hr shifts. None of the included studies differentiated outcomes by socio-economic group, but the authors speculate that due to the concentration of shift work amongst lower socio-economic groups, interventions such as the compressed working week, which improve the health and work-life balance of shift workers have the potential to reduce health inequalities.

In terms of implementation, the review authors note that in a sizeable number of the studies, the intervention was either at the behest of the work force, or from the management out of a stated desire to improve health or work-life balance. However, in other studies, the motivation was more obviously efficiency or productivity. The authors state that prospective, well controlled studies, which measure objective health outcomes, and which describe the background to the study and the implementation of the intervention, are now needed, in particular studies which examine the mental health effects of compressed working week interventions and any interaction with changes in work-life balance.

The second review of shift work interventions[29] found 26 studies from ten countries (Germany, USA, UK, Sweden, Netherlands, Australia, Japan, Finland, Denmark, France). It examined changes to the speed or direction of shift rotation, alterations to night shifts, the introduction of later or more flexible shift times, changes to weekend working, decreased shift lengths, and self-scheduling of shifts. The review suggested that three types of intervention were found to have particularly beneficial effects on health and work-life balance: (1) Switching from slow to fast shift rotation; (2) Changing from backward to forward shift rotation; and (3) self-scheduling of shifts. One uncontrolled prospective study (a multiple intervention study of rotation) of male steel workers in Finland differentiated outcomes by age. It found that sleep quality improved more for older workers. No studies differentiated outcomes by socio-economic status. The reviewers noted that there was relatively little information provided in some studies about the background to the interventions or how they had been implemented.

Research Recommendations

In both reviews the authors suggested that future studies need to measure objective health outcomes, describe the context and the implementation of the intervention, and differentiate outcomes by socio-economic group.

5.2.4 Workplace smoking bans

Two reviews [31, 32] examined the impacts of workplace smoking bans or restrictions on health behaviours (e.g. cigarette consumption). Neither review differentiated outcomes by social or demographic group. Fitzenburg and Glantz's (2002)[31] review synthesised single intervention studies of smoking bans which looked at changes in employee smoking behaviours after unrestricted workplaces changed to being smoke-free. Their meta-analysis found that totally smoke-free workplaces are associated with reductions in the prevalence of smoking of 3.8% (95% confidence interval 2.8% to 4.7%) and that 3.1 (2.4 to 3.8) fewer cigarettes were smoked per day by those who remained smokers. Combining the effects of reduced prevalence and the lower consumption of remaining smokers yields a mean reduction of 1.3 cigarettes per day per employee, which corresponds to a relative reduction of 29%. Based on this, the review authors speculate that if all workplaces became smoke-free, consumption per capita in the entire population would drop by 4.5% in the USA and 7.6% in the UK. The reviewers make no comments on implementation and no research recommendations.

The Cochrane review by Moher and colleagues (2005)[32] looked at workplace smoking bans and smoking cessation services either as single interventions or in combination with one another. The fourteen relevant studies dated from 1983 – 1993 and were from just three countries (USA, Australia, Canada). Most studies were multi-intervention (workplace bans with smoking cessation programmes), only three uncontrolled studies looked at smoking bans as single interventions. Smoking prevalence

and cigarette consumption were the primary outcomes, although one included study also examined general sickness absence.

In six multi-intervention studies there was a reduction in the number of cigarettes consumed during working hours. One of the uncontrolled single intervention evaluations also reported a slight decrease in consumption at work but less consistent evidence that overall daily consumption decreased. Six multi-intervention studies, and two single intervention studies, reported a non-significant decrease in overall consumption while three multi-intervention studies found no decrease or a non-significant increase. There is inconsistent evidence that smoking prevalence can be reduced as five studies, including two single intervention studies, reported no change, and four studies (one single intervention ban only study) reported only non-significant decreases. Four multi-intervention studies however reported significant decreases: two uncontrolled studies reported a decrease in prevalence from 22% to 14% ($p < 0.003$), and 29% to 24% ($p < 0.001$) respectively at 12 months post-ban; a controlled study reported that the three-month CO-validated quit rates were higher in the workplace with a policy compared to one without (9.2% versus 1.4%, $p < 0.02$), as were the nine-month validated quit rates of 10.8% versus 2.9% ($p < 0.03$); the other controlled study found a net decrease in cessation rates of 4% (7% in the ban hospital and 11% in the comparison hospital, no p value given). One multi-intervention USA study found a net reduction in the percentage of workers reporting a sick day in the last month between treatment and control sites of 3.7% ($p = 0.04$) in cross-sectional analysis and 3.4% ($p = 0.06$) in cohort analysis.

In terms of implementation, the review authors drew attention to the fact that as many of the studies were multi-interventional, it was difficult to isolate the effects of workplace bans. They focus on the need for future studies to include measures of direct and indirect costs, and economically relevant outcomes such as absenteeism and productivity.

Research Recommendations

Moher and colleagues (2005)[32] highlighted the need for future studies to include measures of direct and indirect costs, and economically-relevant outcomes such as absenteeism and productivity.

5.2.5 Privatisation

One review[34] examined the effects on general health, injury rates and psychosocial outcomes of the privatisation of public utilities and industries. The higher quality studies suggested that job insecurity and unemployment resulting from privatisation impacted adversely on mental health and on some physical health outcomes. One study found that eight months after privatisation, occupational stress amongst clerical and administrative staff had increased, compared to prior to privatisation. No significant changes in stress occurred amongst manual workers or managers over the same period. It should be noted, however, that work-related stress is known to increase with the *threat* of change, so the comparison with levels of stress one month prior to privatisation is unlikely to reveal the full extent

of the change in stress levels pre- and post-privatisation. The reviewers made no comments about the implementation of the privatisation interventions.

Research Recommendations

The reviewers suggested that more robust evaluations (using controlled prospective designs) of the health impacts of privatisation are required.

5.2.6 Health and safety legislation

One review by Rivara and Thomas (2000)[33] examined the effects of health and safety legislation on the number of fall related injuries in the construction industry. Two studies examined educational interventions, whilst the other examined the effects of increased enforcement of health and safety legislation. The one relevant study was a controlled cross-sectional ecological study of administrative data. It compared firms that had been subjected to a health and safety inspection versus those that had not. The study found that regulations, which are enforced with inspections, might be associated with a decrease in fall injury rates (using workers' compensation data). However, the authors were concerned that the decrease in falls may be at least partly due to the fact that the rate of falls, even after the intervention, was higher in the inspected sites than the baseline rate in the control sites. It is possible therefore, that the sites that received visits from health and safety inspectors were the ones that were more dangerous or had more accidents in the first place and that was the reason *why* they were inspected. The review did not discuss any differential impacts. No comments were made about implementation.

Research Recommendations

The reviewers asserted that, due to the severity of the injury rate in the construction industry, there is an urgent need for better designed studies – RCTs, case-controls or controlled observational – of the effects of preventative interventions.

5.2.7 Quality of the reviews

The nine reviews in this domain were of a generally high quality (Table 4, Appendix 1).

Box 5.2 The work environment: summary of findings

General effects

Overall, employee control interventions appeared to have had mixed impacts on health outcomes. In the review of health circles[25] mixed health effects were recorded whilst the reviews of employee participation[30] and task restructuring,[26] noted more consistently positive health effects when job control was actually increased[30] (and negative effects when job control decreased).[26]

The two reviews of changes to shift work[28, 29] 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. The latter three interventions were also found to have positive effects on self-reported (particularly mental) health.[29]

The two reviews of workplace smoking bans were conflicting.[31, 32] The review by Fitzenburg and Glantz (2002),[31] which only looked at single intervention studies, found significant decreases in smoking prevalence and cigarette consumption after the intervention. The Cochrane review by Moher and colleagues (2005)[32] found less consistent results with some studies reporting decreases in prevalence and consumption, whilst others found no significant differences. However, a number of the studies included in this review were of multiple interventions, so the impacts attributable to smoking bans alone could not be identified.

The review of privatisation suggested that job insecurity and unemployment resulting from privatisation impacted adversely on mental health.[34] The single review of health and safety legislation in the construction industry found a decrease in fall-related injuries after the intervention, but this conclusion was based on only one study, which had some flaws.[33]

Health inequalities

Four of the nine reviews reported effects on health inequalities. [26, 28, 30, 34] Usually only one or two of the included studies in these reviews differentiated their outcomes by socio-economic or demographic characteristics. Several studies looked at gender differences; although these related to different workplace interventions they found either a larger effect for men compared to women,[26, 28, 30] or no difference in outcomes by gender.[26] Only one study, of participatory interventions, looked at ethnic differences concluding that psychosocial outcomes were improved amongst black and Hispanic but not white workers.[30] One study examined differences by age, finding that changes to shift work rotation were beneficial for the sleep quality of older, but not younger, workers.[28] Three studies looked at differences by socio-economic status, usually occupation.[26, 30, 34] Egan and colleagues' review of participatory interventions found one uncontrolled study which differentiated results by socio-economic status.[30] It found improvements in terms of mental health outcomes amongst manual workers but not managers or clerical employees. In Bambra and colleagues' review of task restructuring,[26] an uncontrolled study found that the adverse health effects of a team working intervention were only experienced by the lowest grade of employees. The review of privatisation also identified just one study which differentiated by socio-economic status. It found that eight months after privatisation, occupational stress increased only amongst clerical and administrative staff, and not among manual workers or managers.[34] It is not known whether the levels of stress were higher among manual workers before privatisation anyway, or whether the threat of privatisation increased stress levels before the actual privatisation in the groups most at risk.

The authors of one of the reviews[28] suggested that the lack of focus on inequalities in the effects of workplace interventions may be due to the lack of opportunity presented by conducting most of the studies in fairly homogeneous working populations, particularly in terms of gender and socio-economic status (e.g. female nurses or male steel workers).

Implementation

Four of the reviews commented on the implementation of the interventions in the included studies. [26, 28, 30, 32] ...continued

Research recommendations

There was a consensus amongst all the reviews on the issue of future research. [25, 26, 28, 30, 32-34] which called for the conduct of prospective (preferably randomised) controlled studies of organisational-level workplace interventions. [25, 26, 28, 30, 32-34]. Such studies also need to record the wider organisation and labour market context in which the interventions take place (e.g. whether the company is downsizing or the labour market is buoyant or in recession).

Note: One further review (funded by DH PRP), which examined population-level tobacco control interventions, was not yet published at the time this project was completed. The interventions reviewed included total and partial bans on indoor smoking. The balance of evidence from five comparatively weak studies suggested that restrictions on smoking in workplaces may be more effective for staff in higher occupational grades. It found insufficient evidence of differential effects by income, educational level or ethnicity, inconsistent evidence of differential effects by age, and no evidence of differential effects by gender.[69]

5.3 Unemployment and Welfare

There is considerable longitudinal data on the linkages between unemployment and health, which suggests that ill health can be both a cause and a consequence of unemployment (the latter being the so-called "direct health selection" hypothesis).[35] A number of the reviews and studies we located in this domain were of interventions which aimed to assist those who were prevented from entering the labour market by ill health, for example through supported employment, providing skills and training, and other mechanisms. Others primarily involved evaluating interventions to increase the uptake of welfare entitlements.

Some of the welfare entitlement studies described below were conducted in healthcare settings. In the UK many of the people targeted for welfare benefits advice in health care settings are elderly or suffering from chronic illness or disability, and such advice would open up access to disability-related welfare benefits. Under such circumstances, it is probably unrealistic to expect to see a major improvement in their original chronic condition, as measured by physical health indicators, for example. Changes in mental health, well-being and quality of life measures may be more realistic expectations. Some of the studies examined bear out this interpretation.

5.3.1 Characteristics of the reviews

There were three reviews[27, 36, 37] and four primary studies[38-41] in the unemployment and welfare domain. These focused on two types of intervention: one review[37] and three primary studies[38, 39, 41] evaluated the health impacts of welfare rights advice aimed at improving access to and uptake of social security benefits to which patients are entitled. This advice was delivered in healthcare settings. Two reviews[27, 36] and one primary study[40] were concerned with the impact of welfare to work (W2W) programmes for unemployed people with physical or mental health problems. All but one of these papers was based on studies conducted in the UK. One review on W2W for people with severe mental illness[36] was based on US studies. None of the reviews specifically examined differential impacts across different socioeconomic groups, but it should be noted that they all targeted disadvantaged groups: either patients on low incomes and eligible for means-tested benefits, or unemployed chronically ill or disabled people.

5.3.2 Welfare rights advice

Systematic reviews

The unfunded review by Adams et al.(2006) [37] included 55 studies (54 from the UK and one from the USA). Studies of welfare rights advice delivered either in a healthcare setting, or where the initial point of referral to the welfare rights advisor was in a healthcare setting, were included. Eligibility criteria were not reported by all of the included studies. Of those which did report eligibility criteria, approximately half were available to all patients registered at the participating practices, and half were

available to particular subgroups such as the elderly or those suffering from a specific health condition. A very broad range of health, financial and social outcomes was assessed. Approximately half of the studies reported financial outcome data on either lump sums or on recurring benefits gained by participants. The remainder reported a combination of these, frequently in a manner which rendered comparison impossible.

The seven studies which included a control or comparison group showed statistically significant improvements in a range of health indicators. In the six before-and-after studies which used validated measures, six out of fifty-nine comparisons were statistically significant. Most of these significant improvements related to emotional or mental health outcomes. Of those studies which reported full data on financial gains, the mean gain was £1026 per client in the year post-intervention. Thus there is evidence that welfare rights advice delivered in healthcare settings delivers tangible financial benefits, but that health impacts are limited and tend to be psychological or social rather than physical.

Primary studies

The impact of welfare rights advice delivered in healthcare settings was assessed by three primary studies[38, 39, 41]. One RCT[38] found that 68% of the intervention group received a welfare benefits award, with the median financial award being £55 per week. However, there was little significant change at twenty-four months in health or any other outcomes, although an accompanying qualitative study suggested that participants did experience substantial improvements in psychosocial outcomes such as 'peace of mind'. Abbot et al.'s study (2005) [41] compared participants who received benefit increases attendant upon welfare rights advice against participants whose claims for extra benefits were unsuccessful. The only significant improvements at twelve months were in SF-36 emotional role and mental health. In Greasley's (2003) uncontrolled study[39] of welfare rights, debt and immigration advice, two out of eleven health and mental health indicators improved significantly at twelve months. The final response rate was low (16.7%).

Research recommendations

According to Adams et al. (2006) [37], research is needed which explores the characteristics of those most likely to benefit financially from welfare rights advice as well as more methodologically robust studies with more specific health measures and appropriate follow-up periods. Mackintosh et al. (2006) [38] also recommend RCTs using more sensitive health measures.

5.3.3 Welfare to work

Systematic reviews

Crowther et al's (2001) [36] review of USA welfare-to-work interventions for people with severe mental illnesses included eleven studies, all of which were RCTs. Interventions consisted of either prevocational training or supported employment. Prevocational training included sheltered workshops, transitional employment with a rehabilitation agency, and skills training. Supported

employment comprised placing clients in standard jobs, with on the job support provided by 'job coaches'. Five studies compared prevocational training with standard community care, five compared prevocational training with supported employment, and one compared supported employment with standard community care. Participants were unemployed people aged 18-65 with severe mental illness, including schizophrenia, bipolar disorder and depression with psychotic features.

The primary outcome was the proportion of people in 'competitive' employment, defined as 'a job paid at the market rate, and for which anyone can apply'. Secondary outcomes included other employment outcomes, clinical outcomes and costs. Five RCTs which compared prevocational training with standard care found no significant difference in employment rates at any follow up between three and eighteen months. Three of these trials found no significant difference in hospital admissions, and one trial found no significant difference in self-esteem. One RCT which compared supported employment with standard care found no significant differences in employment rates at twelve months. However, after twenty-four and thirty-six months, supported employment participants were significantly more likely to be in competitive employment, and were also significantly likely to earn more (\$60.50 per month compared to \$26.90). There was no significant difference in hospital admissions, and monthly healthcare costs were significantly higher for the supported employment group (\$1559 compared to \$527.30 for standard care). There is no information on whether the patients were paying their own healthcare costs.

Five RCTs comparing supported employment with prevocational training showed that people in supported employment were more likely to be in competitive employment at four, six, nine, twelve, fifteen and eighteen months. For example, at twelve months pooled employment rates were 34% to 12%, (RR 0.76). Three out of four trials found that participants in supported employment had higher monthly earnings (\$127.1 compared to \$71.7, \$188.5 compared to \$59.9, \$41.9 compared to \$11.8). Two trials found no significant differences in self-esteem, quality of life and symptom severity. One trial found that supported employment programme costs were greater than those for prevocational training, but that healthcare costs were lower for those in supported employment. It should be noted here that it is difficult to interpret data on the costs of healthcare collected in a US context – and particularly difficult to generalise to other contexts/countries.

Overall, people in supported employment were more likely to enter competitive employment, earned more, and worked more hours per month than those who had prevocational training. Data on clinical outcomes were inconclusive, but suggested that there were no significant differences between supported employment and prevocational training. In terms of implementation, the review authors noted that in the only trial which compared supported employment to standard care, the supported employment group also received assertive community treatment, introducing a possible source of confounding.

In Bamba et al.'s (2005) [27] review of W2W interventions for people with disability or chronic illness in the UK, a search from the earliest possible date until 2002 yielded sixteen studies, two of which were controlled. Interventions included education, training and work placements (four studies); vocational advice and support services (four studies); in-work benefits for employees (four studies); employer incentives (two studies) and improved workplace accessibility (four studies). The participants were unemployed adults aged 16-59/64 who had a moderate physical or mental illness/disability.

The primary outcome of interest was the proportion of participants in employment following the intervention. Health outcomes were not assessed in any of the included studies. Four uncontrolled studies of education, training and work placement initiatives found that 18.5% to 50% of participants were in employment at between thirteen weeks and two years post-intervention. A further four studies of vocational advice and support services found that participation improved employment outcomes. However, only one of these studies was controlled, and this study found no significant difference between intervention and control groups. In one uncontrolled study, employment rates increased from 18% to 26% after six months. The controlled study found that over a two year period the rate of benefit exit was 11% among participants compared to 7% in the control group. In-work benefits were evaluated by four studies, which found that these had little impact on decisions to enter the labour market, primarily because there was low awareness and uptake of such benefits. Four uncontrolled studies which evaluated Access to Work (support, aids and workplace alterations) found that 41% of participants said they would not have started working without the scheme (in 1997), although employers were less enthusiastic about the scheme. The interventions were highly heterogeneous, and studies differed as to which aspects of specific interventions appeared to have the greatest impact. Wide variations in schemes' success at assisting participants into employment appeared to hinge on a number of factors, including the 'job-readiness' of the clients selected to participate, the nature of the impairment suffered by the client, client gender and distance from the labour market. There was some evidence that such schemes had assisted the target groups in returning to the labour market, but in many cases lack of controls meant it was not possible to account for the influence of confounding factors such as local labour market conditions.

Primary studies

The impact of the Pathways to Work programme on individuals in pilot areas who made an enquiry about Incapacity Benefit was assessed by Adam et al.'s controlled study.[40] Pathways to Work included Mandatory Work-Focused Interviews, in-work benefits and other labour market programmes. The study found that self-reported limiting health problems fell by a small but significant amount among the intervention group (2.87%, $p < .05$). After 10 months, the number of respondents who reported working in the week prior to the follow-up interview increased by 9.4%. There was a net increase of £72 in monthly earnings, although this was not significant and was described as 'imprecisely estimated'. There was also a reduction of 8.2% in receipt of IB in the intervention areas. The policy had a differential impact on certain subgroups: over-45s and those with more than one

health problem were more likely to be affected by the policy while those with mental health problems were less likely to commence work.

Finally, after completion of this project one further study was identified by a referee. This involved an evaluation of the New Deal for Young People.² As this study may include relevant data on the health effects of measures to support young adults into employment, it should be considered for inclusion in any future full systematic review.

Research recommendations

The review by Bambra et al.[27] recommends mixed-method studies of complex social interventions including both experimental and qualitative methods, which investigate the manner in which the desired outcome was (or was not) achieved. According to Crowther et al.[36], trials of welfare to work interventions have only been conducted in the USA so future randomised research in other welfare systems such as the UK is needed.

5.3.4 Quality of the reviews

The reviews in this domain were of high quality, with two meeting all DARE criteria[27, 36] and a further review meeting all but one of the criteria[37]. See Table 6, Appendix 1.

Health Impacts of New Deal for Young People. Lakey J, Bonjour D. Policy Studies Institute, London 2002.

Box 5.3 Unemployment and welfare: summary of findings

General effects

The review of welfare rights interventions[37] indicated that there were clear financial effects. However, effects on health outcomes were limited. Those health outcomes that were affected tended to be psychological or social. In the primary studies of welfare rights interventions[38, 39, 41] impacts on health outcomes were also limited and often related to psychosocial or mental health outcomes. However, the brevity of the follow-up periods and the nature of the health measures used in these studies may have contributed to the apparent lack of impact.

Crowther et al.'s(2001) [36] review of W2W interventions found that supported employment delivered more positive employment outcomes than prevocational training, but there was little significant evidence of impact on health outcomes. In Bambra et al.'s[27] review, there was some evidence of positive effects on employment outcomes, but since so few studies were controlled it was not possible to account for the influence of confounding factors. The studies included in the review contained no data on health outcomes. Adam (2006) [40] found evidence of positive impacts on employment outcomes in addition to a small but significant effect on self-reported limiting health problems.

Health Inequalities

Although none of the reviews or primary studies explicitly assessed the impact of interventions on health inequalities, several authors commented on the possibility of W2W interventions having differential impacts upon sub-groups of clients. Some studies reviewed by Bambra et al (2005).[27] found that factors such as gender, nature of health problem and distance from the labour market mediated the impact of the intervention on employment outcomes. Similarly, Adam (2006) [40] noted that clients aged over 45, or with more than one health problem or with mental health problems experienced different impacts. It is possible that such differences in employment outcomes could lead to differing health outcomes and affect health inequalities.

Three studies in Bambra et al (2005) examined outcomes by gender: one found a higher employment rate for women, one found no significant difference, and one found a higher employment rate for men. One study found that those with sensory problems were less likely to be employed (23.6% v 43%); another found no difference by impairment, and a third found that those with mental health problems were less likely to gain employment.

Implementation

Few data were presented on implementation.

Research recommendations

There was consensus among a number of the review and primary study authors on the need for more randomised controlled trials of both W2W and welfare rights interventions[27, 37, 38]. In the field of welfare rights interventions, both Adams et al (2006).[37] and Mackintosh et al. (2006)[38] recommended that more sensitive health measures should be developed and that trials should be long enough to account for the periods over which changes in physical health *might* be expected to occur. Bambra et al.(2006)[27] recommended studies employing both qualitative and quantitative methods in the evaluation of complex social interventions, in tandem with greater attention to the processes whereby interventions achieve (or fail to achieve) their intended outcomes.

Additional gaps identified

From our conceptual model of the main determinants of health and understanding of the public health literature, we identify additional gaps in the evidence base. Questions relating to work conditions and employment that need further research include:

- the effects on mental and physical health of policies and interventions to help people who are not employed but want to work, into work (e.g. welfare to work policies for lone parents, for the long-term unemployed, for young people);
- the effects on mental and physical health of interventions for unemployed people to help prevent the decline in mental health commonly observed following unemployment;
- the effects on health and wellbeing of family-friendly employment policies; and
- the effects on health and wellbeing of EU employment policies.

5.4 Access to health and social care

Access to effective health care is an important, though by no means major, determinant of population health. As several different types of access are relevant to our review aims - in particular, geographic, economic and cultural access - it is important to set out the conceptual basis of our search for evidence in this domain. Geographic access is concerned with the location and physical availability of health services in different parts of a country or region. Economic or financial access relates to the affordability of health services for different groups in the population. It is possible for people to have health services conveniently in their neighbourhood, which they cannot afford to use, or if they are desperate and have to use them, their use may impoverish them. This situation would amount to inadequate economic access. Thirdly, there is cultural access, which relates to acceptability of services for the people they serve.

Interventions in the access to healthcare domain may therefore seek to remove geographic, economic or cultural barriers to health service access, to promote greater uptake of effective care (including preventive and health promotion services). They may operate locally, regionally or nationally to ensure greater coverage of the population, better geographic spread and higher ethical standards in the provision of care. The following sections reveal disappointingly few reviews in this domain, which, in addition, only relate to small-scale, local initiatives, not upstream, national policies.

5.4.1 Characteristics of the reviews

We identified four reviews[27, 36, 37, 42] and one primary study[43] in the “access to healthcare” domain. Three of the reviews and the only primary study[43] focused on interventions to improve cultural access (one reviewing training of healthcare providers to offer more culturally relevant services and the other reviewing the use of lay health workers, aiming to be more in tune culturally with disadvantaged patients than professionals).

One review focused on interventions to improve geographic access, in the form of outreach clinics.[44] This systematic review of RCTs, CCTs, CBAs and ITS was supplemented by a descriptive overview of all studies – comparative and descriptive - of specialist outreach clinics. The overview provides additional information, particularly for urban and rural disadvantaged populations. No studies focusing on urban disadvantaged groups were included in the systematic review, whereas, the overview identified one comparative and six descriptive studies. Similarly, eleven descriptive studies of rural disadvantaged populations were identified, compared with one study meeting the criteria for inclusion in the systematic review. Although these studies cannot provide evidence of effect they do offer insight into the types of intervention that have been implemented with which population groups. For example, there were three studies in deprived areas of inner city London, two in psychiatry and one in ophthalmology. This provides further evidence for the need to properly evaluate the impact of

implementing outreach initiatives with disadvantaged groups; interventions are being implemented but their effects are largely unknown. (See also review by Powell, 2002, [45]).

The final review was difficult to classify as it assessed a range of educational interventions targeted at people with low literacy.[46] . These could be seen as interventions to improve cultural access as they sought to improve knowledge of and better use of health care resources. These are not discussed further here (we describe them in the longer version of this report for completeness).

5.4.2 Improving cultural access to care

Review of professional training

Six US based studies were included in the review of culturally relevant healthcare training, all with a focus on African-American or Latino populations.[42] All six studies were controlled, evaluating the use of interpreter services or bilingual providers; cultural competency training for providers; and linguistically and culturally appropriate health education materials. No studies were identified that addressed recruitment and retention of staff representing cultural diversity or culturally/ethnically specific clinics and services.

Overall, the effectiveness of interventions to improve the cultural competence of healthcare systems could not be determined due to the lack of evidence. However, the findings from one study investigating language concordance between physician and client or use of an interpreter was found to increase the likelihood of being discharged with a follow-up appointment, although there was no effect on adherence to appointments. A single study also found that clients who received counselling from providers who had received cultural sensitivity training were more satisfied with the service provided and more likely to return for follow-up visits than clients seen by providers who had not received any training. Four studies that examined the impact of culturally sensitive health education, delivered through videos found an increase in self-reported HIV testing and in measures of satisfaction with the education received.

Primary study of cultural sensitivity training

One Canadian RCT evaluated the impact of cultural sensitivity training amongst nursing and home care providers.[43] Although the training had a positive effect on providers, such as increases in cultural awareness, understanding of cultural differences and beliefs, no differences were found in patient outcomes (client satisfaction, mental or physical health and activities of daily living). The majority of patients in both the intervention and control groups were female, identified their ethnicity as Canadian, and their first language as English.

Research recommendations

The review made recommendations for comparative studies evaluating i) programmes to recruit and train staff members who reflect the cultural diversity of the community served and ii) the use of culturally specific healthcare settings.[42] The primary study suggested that future research assessing cultural sensitivity training should involve larger and more representative samples as well as inclusion of multiple agencies .[43]

Use of lay health workers

Forty-three RCTs were included in a systematic review assessing the effects of interventions delivered by lay health workers in primary and community health care settings.[47] The studies were mostly from North America (n=28). Four were from the UK and one from Ireland. Almost half of the interventions were aimed at low income or minority populations (n=19). In comparison with usual care promising benefits were shown for the use of lay health workers in promoting the uptake of immunisation in both children and adults. There is also some evidence to suggest that lay health workers may be effective in promoting the uptake of breastfeeding. The few studies that compared lay health workers with professional care found mixed results.

Research recommendations

Further research should compare lay health workers with similar services provided by professionals, and include better descriptions of the interventions, any co-interventions and any possible harms of the interventions. Where lay worker interventions have demonstrated benefit, greater understanding about the impact of various components is needed.

5.4.3 Improving geographic access to care

Nine studies were included in a systematic review assessing the effectiveness of specialist outreach clinics in terms of access, quality of care, health outcomes, patient satisfaction, use of services and costs.[44] Most studies focused on urban, non-disadvantaged populations. Outreach as part of complex interventions involving primary care collaborations, education and other services was associated with improved health outcomes, more efficient care and less use of inpatient care. Outreach involving the shifting of outpatients from major hospital facilities to primary care or remote hospital settings was shown to improve access, but there was no evidence of impact on health outcomes.

Research recommendations

Comparative studies of outreach are needed in rural and disadvantaged settings. Future research would also benefit from using a clearer typology of outreach interventions.

5.4.4 Quality of the reviews

The reviews in this domain were generally of high quality (See Appendix 1, Table 10).

Box 5.4 Access to health and social care: summary of findings

General effects

Overall the evidence evaluating interventions to promote culturally relevant health care was generally inconclusive. Individual studies did not support improved health outcomes in patients treated by health care providers who had undergone cultural sensitivity training, although satisfaction with services was increased. Although positive effects were found for lay health workers in promoting immunisation uptake, there was insufficient evidence to support the use of lay health workers in other contexts.[47] Simple outreach (shifted outpatients model) was found to improve geographic access to care, whilst multifaceted outreach (increased collaboration, involving a range of personnel and services) was found to improve health outcomes. [44]

Health Inequalities

The review focusing on cultural competence in healthcare systems was concerned with the reduction of racial and ethnic inequalities in access to health care, All six studies in the review found some indication of a slight improvement in cultural access in that five studies found that patient satisfaction with services increased after the intervention and two found that follow-up visits or appointments were more likely with providers who had received the training [42] Although it was reported that nearly half of the studies included in the review of lay health workers were aimed at low income and minority populations the findings were not stratified according to type of participant.[47] . In relation to geographic access, despite the potentially important role specialist outreach clinics have to play in reaching disadvantaged populations such as the homeless and mentally ill, no such studies were identified.[44] However, the review did include one study of a rural disadvantaged population in Australia, which demonstrated a significant reduction in annual hospital outpatient consultations and outreach was found to be less expensive per patient, though it is unclear whether appropriate treatment increased.

Implementation

Issues related to implementation were not explicitly addressed in one review,[42] whilst in the other reviews comments were made about the poor description of interventions.

Research recommendations

All four reviews made recommendations for further comparative studies. Two also highlighted the need for better descriptions of the interventions evaluated, one the need to focus specifically on rural and disadvantaged populations[44] and one the need to assess differential effectiveness to help tailor interventions for maximum impact.[42]

Our identification of additional gaps/research priorities

It was particularly difficult to identify appropriate reviews in this domain of “access to health care” as a social determinant of health. Despite extensive and rigorous searching, we only identified four systematic reviews and one primary intervention study that met our inclusion criteria. The inclusion of one of the four identified reviews (on educational interventions for people with low literacy) was debatable. Moreover, the studies in the reviews do not represent the full range or intensity of potential intervention types in this domain. There are, for example, glaring gaps in the evidence base (at least as represented in systematic reviews) on the effects of nationwide changes in health systems to improve geographic, economic or cultural access for the population as a whole, and for groups in greater need in particular. It is our opinion that this particular evidence gap is a priority for evidence synthesis in this domain, but that it will require methodological work both in locating and in synthesising the different types of evidence appropriate for these research questions.

5. 5 Transport and health

Transport policies are often cited as a major influence on health and health inequalities, though it is a field where relatively few evaluative studies and reviews have been carried out (at least, ones with health outcomes). One reason is that transport policies often involve large-scale structural or other changes which pose difficulties for evaluation; another is that health improvement is not of course the primary purpose of transport policies; and it is only relatively recently that public health has shifted from a focus on transport as a source of risk (injury, pollution), to its potential role in promoting general health and wellbeing.[48] As will be seen, this is reflected in the available evidence.

5.5.1 Characteristics of the reviews

There were five reviews in the transport domain.[49, 50] [51] [52] [53] Each dealt with a different type of intervention, although four were concerned with similar outcomes, that is road injuries. Of these four, one review[49] included a range of interventions designed to reduce alcohol-impaired driving, another[50] was concerned with area-wide traffic calming schemes [51] and a further review [52] focused on the impact of new roads on health. Pilkington and Kinra (2005) [53] examined the effectiveness of speed cameras in reducing road traffic injuries. Finally, one review [51] examined the impact of policies designed to promote modal shift from driving to walking and cycling. There were no additional primary studies located.

5.5.2 Reducing alcohol-impaired driving

Shults et al. (2001)[49] reviewed a range of interventions designed to reduce alcohol-impaired driving. Thirty-eight relevant studies from the USA, Canada, New Zealand Australia, France and Holland were included in their review. Legislative interventions included lowered blood alcohol concentration (BAC) laws, lowered permitted BAC for younger drivers and minimum legal drinking age laws (MLDA). These interventions were implemented at state level and aimed at all drivers who drink and at drivers under 21. The principal outcome of interest was fatal and non-fatal alcohol-related traffic injuries.

Nine studies, with a median follow-up time of five years, reported on interventions to reduce permitted BAC levels from 0.10-0.15 g/dL to 0.8 g/dL. Eight of these found a decrease in alcohol-related motor vehicle fatalities; the median decrease was -7% (interquartile range -15% to -4%). In six studies evaluation was hampered by the contemporaneous introduction of legislation to allow law enforcement personnel to seize the licences of drivers who failed or refused BAC tests. However, two other studies which separated the effects of such legislation from that of BAC legislation estimated that reductions of 5% and 8% in alcohol-related fatal injuries respectively were directly attributable to BAC laws. The impact of reductions in permitted BAC (typically to 0.2 g/dL) for young or inexperienced drivers (either under 21 or newly licensed) was assessed by five studies with a median follow-up time of twenty-two months. All of these studies reported reductions in crashes; three studies that reported fatal crash outcomes recorded declines of 24%, 17% and 9%, and two studies that

examined fatal and non-fatal injuries reported declines of 17% and 3.8%. In thirteen studies the impact of raising the minimum drinking age from 18 to 21 was assessed. The median decrease in fatal injury crashes in the nine studies which assessed these was 17% (range -30% to -7%). In four studies which assessed fatal and non-fatal injury crashes the median decrease was 15% (range -33% to -6%). Of seven studies of the impact of lowering the minimum drinking age from 21 to 18, three assessed fatal injury crashes only. These found a median increase of 8% (range 2% to 38%). Four studies which assessed fatal and non-fatal injury crashes found a median 5% increase (range -2% to 22%). For each of these interventions, the authors concluded that there was strong evidence of impact on fatal and non-fatal crash outcomes; 0.8% BAC laws, lower BAC laws for young drivers and higher MLDA laws reduced both types of crash outcome, while lower MLDA laws increased both types of outcome. The authors note that implementation of these interventions may be influenced by various factors such as differing enforcement levels. There are no comments on the potential impact of these interventions on health inequalities.

Research recommendations

A variety of research recommendations were made, including: more economic evaluations of the cost-effectiveness of such interventions; research on the manner in which such interventions interact with one another; studies of the impact of interventions on social norms around drinking and driving; the impact of enforcement levels on the effectiveness of legislative interventions; the independent effects of publicity on the effectiveness of such interventions, and variability over time in compliance with such laws.

5.5.3 Traffic calming

Bunn et al (2003)[51] reviewed traffic-calming measures designed to prevent road injuries and included studies of area-wide traffic calming schemes (road narrowing, road closures, creation of one way streets, changes at junctions, mini roundabouts, road surface treatment, and speed humps). The included studies were conducted in Germany, the UK, Australia and Holland. The relevant outcomes were road user deaths and fatal and non-fatal road user injuries among populations affected by the interventions.

Eight studies reported the number of road user deaths. The pooled rate ratio was 0.63 (CI 0.14 to 2.59). The number of fatal and non-fatal road traffic injuries was reported by sixteen studies, with a pooled rate ratio of 0.89 (CI 0.80 to 1.00). Thus the authors conclude that area-wide traffic calming can prevent road traffic injuries, but that the estimated reduction in road user deaths is imprecise. The review includes no data on health inequalities.

Research recommendations

The included studies were conducted in the 1970s and 80s, and the majority were conducted in Europe. The authors contend that more recent studies, and studies conducted in low- and middle-income countries, are necessary (none of the studies included in the review were RCTs).

The review of speed cameras Pilkington & Kinra (2005) also falls within this category (i.e., traffic calming); fourteen observational studies were reviewed, which reported a reduction in road traffic collisions and casualties, with the reduction in the vicinity of the camera ranging from 5%-69% for collisions, 12-65% for injuries, and 17-71% for deaths.[53] No data on inequalities was available; all studies were conducted in high-income countries. Detailed research recommendations are provided, which in particular note the opportunity provided by the phasing in of such cameras with the possibility of randomising the allocation of cameras. They note that such research needs to be conducted as soon as possible, before the widespread introduction of cameras.

5.5.4 Building new roads

The impact of new road building on health was considered in Egan et al.'s review (2003)[52]. The thirty-two studies were conducted in Norway, Denmark, New Zealand, the USA and the UK. The studies assessed the impact of major urban roads, bypasses and major connecting roads on injury accidents, casualties and injury severity and respiratory health among the general population.

Of eleven studies which reported injury accidents, seven were meta-analyses of data from multiple new road sites and four reported data from single sites. All reported before-and-after comparisons of police injury statistics. Four studies of major urban roads produced variable findings. In two studies small decreases of 1% and 4% in injury accidents were found, whilst in the remaining two studies there were significant decreases of 19% and 26%. However on re-examination of the latter result, the review authors concluded that a figure of 8.5% was more accurate. Five studies of bypasses found a general decline in injury accidents, ranging from -3% to -33%. Results also varied according to which categories of road were included in the analysis. The impact of major connecting roads on injury accidents was assessed by two studies. Both found significant decreases in rates ranging from -19% to -32%. One study of the impact of major connecting roads on casualties found a decrease of 6%. There was little consistent evidence of changes in injury severity. Only one study examined the impact of a new bypass on respiratory health. This found little evidence of improvement among residents affected by the bypass, although there was a significant decrease of 10.3% (CI 3.1%-17.3%) in rhinitis.

The authors conclude that there is little evidence that major new urban roads reduce injury incidence. Out of town bypasses do appear to reduce injury accidents on main routes, but this may be achieved at the cost of displacing accidents to secondary routes. There were no comments on health inequalities, as the differential effects of road building on social groups were not considered by any of the studies. Neither were there any comments on implementation.

Research recommendations

Since many studies were biased in favour of the urban communities from where traffic was diverted, further research on the effects on rural communities receiving diverted traffic is needed. The impact of

new roads on access to health services, health inequalities, physical activity and the health effects of specific pollutants warrants further investigation, as does the impact of alternative interventions designed to reduce traffic in residential areas.

5.5.5 Promoting walking and cycling

In Ogilvie et al.'s 2004 review of interventions to promote walking and cycling [50] there were nine relevant studies, of varying designs. Studies were conducted in the Netherlands, Germany, Norway, the UK and the USA. Relevant interventions reviewed included engineering measures, financial incentives and providing alternative services. The interventions were aimed at people living in urban areas. Outcomes of interest included the percentage shift from journeys made by car to journeys made on foot or bicycle, the health impacts of the interventions and the distribution of health impacts between social groups.

Four relevant studies of engineering measures included a heterogeneous range of interventions. One study of a cycle route improvement intervention found that the share of journeys made by bicycle increased by 3% after three years, with the share of journeys made on foot or by car remaining constant. Another uncontrolled study of cycle route improvement reported a negative shift of 5% in one study area and no shift in another study area after five years. An uncontrolled study of traffic restraint schemes (20mph zones) found no evidence of change in travel patterns. A repeat cross-sectional survey of residents of a bypassed town found a negative shift of 3% in main mode of travel. The introduction of a downtown auto restricted zone in Boston generated a positive shift of less than 1% of commuting journeys in an uncontrolled study of office workers. Financial incentives were evaluated by two studies. In one controlled repeat cross-sectional study staff who did not commute to work by car were given subsidies equivalent to those offered to drivers for workplace parking. A positive and significant shift of 1% was recorded after one to three years. Another uncontrolled panel study of a city centre toll ring found a negative shift of 2.6% after one year. Three studies of providing alternative services involved varying interventions. One repeat controlled cross-sectional study of a car share club found that the share of journeys made by car increased by more than that of walking and cycling combined (17% and 3.7% respectively). The opening of a train station in a commuter town realised a significant positive shift of 5% of all trips after one year. A controlled retrospective study of telecommuting centres found a negative shift of 0.2% on telecommuting days, and a 24% decrease in distance travelled by foot or bike. In general, the included studies did not provide any robust evidence of impact on health outcomes.

Overall, commuter subsidies and alternative provision (a new train station) had the strongest impact on modal shift (1% and 5% respectively). Other interventions, however, had little impact; indeed, car sharing clubs and telecommuting had negative impacts on journey type. No conclusions about the social distribution of intervention effects could be derived from the included studies, although the authors observe that individual-level interventions may have the effect of increasing health

inequalities due to their focus on already motivated groups. No comments on implementation were provided.

Research recommendations

The authors recommend that well designed prospective (and preferably controlled) studies of transport policy interventions employing multiple evaluation methods be used to permit investigation of the causal relationship between complex interventions and their effects. In particular the impact of such interventions on physical activity, well-being and injuries should be investigated. Further research on the above outlined risk of increasing health inequalities is also recommended.

5.5.6 Quality of the reviews

The reviews in this domain were of high quality, with each review meeting all seven of the DARE methodological criteria (See Appendix 1, Table 13).

Box 5.5 Transport and health: summary of findings

General effects

In relation to road injury outcomes, the interventions assessed by the three reviews included here[49, 51, 52] appeared to have broadly positive impacts. Studies of legislative interventions to curb alcohol-impaired driving[49] found strong evidence for reduction of fatal and non-fatal crash outcomes. Similarly, traffic calming interventions[51] delivered reductions in road traffic injuries, although the evidence for reductions in road user deaths was less robust. Evidence for the impact of new road building on injuries[52] was less conclusive; while out of town bypasses delivered reductions in injuries, it was not clear whether this was due to the displacement effect of diverting traffic to rural areas. Major new roads did not appear to reduce injury outcomes. In the only study which examined the impact of a new bypass on respiratory health, there was little evidence of effectiveness.

Interventions aiming to encourage modal transport shift from driving to walking and cycling met with mixed results[50]. Commuter subsidies and alternative provision were successful in reducing the share of journeys made by car. Other interventions had little effect, and several, including car sharing and telecommuting, had negative impacts. There was very limited evidence of impact on health outcomes, although some studies of programmes targeted at motivated individuals delivered small improvements in some health outcomes.

Health Inequalities

Only one review[50], which examined interventions to promote walking and cycling, contained any comments on health inequalities, and this was only to observe that no studies had collected data on the topic. However, the review authors speculated that interventions which targeted motivated individuals could potentially increase health inequalities by encouraging those who are already relatively active to become more so, while leaving the less motivated unaffected, thus increasing the gap between the active and the inactive.

Implementation

Two reviews commented on implementation of the interventions they assessed. Shults et al.[49] noted that various factors, including levels of enforcement, may affect implementation of MLDA and BAC laws. According to Bunn et al.[51] the effectiveness of traffic calming schemes was influenced by the nature of the intervention. However, neither the nature of the interventions nor the direction of effect were discussed.

Research recommendations

Research recommendations from these reviews varied widely depending on the nature of the intervention reviewed. In relation to MLDA and BAC laws[49], recommended research included: economic evaluations; studies of interactions between interventions and of the impact of interventions on social norms and the impact of enforcement levels and time on intervention compliance. Bunn et al.[51] commented that more recent studies of traffic calming interventions, and studies conducted in low and middle-income countries were needed. Research on the impact of new road building on rural communities, health inequalities and a range of other areas, preferably using rigorously designed prospective studies, was recommended by Egan et al.[52]. Similarly, Ogilvie et al.[50] recommended that robust prospective studies of transport shift interventions addressing the issues of health inequalities, well-being and physical activity were required.

Our identification of additional gaps/research priorities

More generally, the effects of policies to promote healthy transport (such as policies to promote walking) require further research; including studies of the effects of changes to the quality of the environment (removing barriers to walking, building paths and other facilities); and policies for improving public transport, and vehicle restraint (e.g., pricing/taxation policies, and traffic bans), as suggested by McCarthy et al. (2004).[48]

5.6 Agriculture and food

Agricultural policies affect the quality, quantity, price, availability of food, all of which are important for public health.[54]While overall increases in life expectancy may be partly attributed to better nutrition, increases in the prevalence of obesity in many countries point to the contribution food policies also make to over-nutrition. Agriculture and food interventions (such as policies) may therefore provide some of the mechanisms for addressing diet-related health inequalities.

5.6.1 Characteristics of the reviews

One review was identified [55] which focused on monetary incentives (including price decreases) on low-fat snacks, coupons for farmers' markets, financial rewards and free food provision. The review included four US-based RCTs. The outcomes included weight loss, consumption of fruit and vegetables, redemption of coupons and attitudes towards fruit and vegetable consumption. The review aimed to assess effects on different socioeconomic or ethnic groups. All four studies found a positive effect of incentives on the outcomes measured. However, each had various methodological shortcomings.

Health inequalities

None of the studies assessed effects of the interventions according to socioeconomic or ethnic group. However, the study of coupons for use at farmers' markets recruited only low-income women, from existing community nutrition programmes. Issues of implementation were not specifically addressed.

Research recommendations

Further RCTs are needed of pricing strategies for dietary modification, particularly for socio-economically disadvantaged and ethnically diverse populations who typically experience higher rates of nutrition-related diseases.

5.6.2 Characteristics of the primary studies

Two primary studies[57-58] evaluated the impact of the opening of new food retail outlets in areas of the UK previously defined as 'food deserts'. [57, 58]

5.6.3 Food retail interventions

Wrigley et al. (2003)[56] conducted an uncontrolled before-and-after study of residents of a deprived district of Leeds which had been defined as a food desert. At baseline, 70-90% of survey households were not within reasonable walking distance of a retail outlet which stocked fresh food. Tesco, the local council and a number of other bodies collaborated in the opening of a new superstore in the area. The study collected data on fruit and vegetable (F+V) consumption at baseline and at twelve months post-intervention. They found that there was a small but significant increase in post-intervention daily F+V consumption among those who switched to the new store. Those who switched increased their F+V consumption by 0.23 portions per day while those who did not switch saw a slight

but insignificant decrease. Further analysis indicated that switching to the new store had a significant and positive impact on F+V consumption.

A further study of a similar intervention in a deprived area of Glasgow was conducted by Cummins and colleagues.(2005)[57] A quasi-experimental prospective cohort study compared the intervention area with a matched control area ten months after the opening of a retail hypermarket. The study measured F+V consumption, and self-reported health. There was evidence for a weak and insignificant increase in F+V consumption in the intervention area. The authors argued that evidence to suggest that new retail outlets improve health is limited, and noted that the study by Wrigley et al.[56] lacked a control group, so no firm conclusions could be drawn about causation. A selection effect can also not be ruled out, if, for example, more affluent people in the disadvantaged areas were the only ones able to afford to shop at the new store, and they increased their F+V consumption.

Box 5.6 Agriculture and food: summary of findings

General findings

There are few reviews and primary studies, with a few studies examining meso-level interventions, and no major studies of the effects of health policies on inequalities. Food access in the UK may be affected by access to retail outlets but the effect may be weak.

Health inequalities

In the context of policy assumptions regarding the ability of food retail interventions to tackle health inequalities, Cummins et al.(2005)[57] argue that there is limited evidence to support this. There are no direct findings on any differential impacts of the intervention in Wrigley et al.(2003)[56]; however, they argue that such initiatives may assist in tackling social exclusion.

Implementation

In relation to intervention implementation, Wrigley et al.(2003)[56] note that physical access to healthy food does not automatically equate to economic or social access, since residents in the study area may still have been constrained by lack of economic resources or by socio-cultural norms regarding diet. Cummins et al. [57] suggest that concurrent economic regeneration and other interventions may confound the effects of retail developments in studies designed to assess their impact.

Research recommendations

Wrigley et al. (2003)[56] argue that it is essential to monitor the effects of both large-scale and small-scale retail access interventions since as yet there is no evidence of effectiveness for the latter type of intervention. Further studies of large-scale interventions are required to establish whether these positive findings are replicated. For Cummins et al. (2005)[57], there is a need for more controlled studies to assess the impact of new retail provision. They also suggest that studies using face-to-face interviews and other methods would help to increase response rates and minimise selection bias.

Additional identified gaps

More studies are needed on the effects of national and international food and nutrition policies on dietary outcomes. These include the differential impacts of food price controls, of improvements in food distribution, and of major influences on food availability and price at a European level, including the EU Common Agricultural Policy.

5.7 Water and sanitation

There are many aspects of water and sanitation which may have implications for public health. Aside from the direct effects of pollution and contamination, other aspects of water management, including abstraction, water metering, and the provision of flood defences may all have potential public health implications. However there are few reviews with health outcomes, and only one systematic review was identified for inclusion in this section.

5.7.1 Characteristics of the review

The one review evaluated interventions in the water and sanitation domain focusing on changes in levels of water fluoridation; it did not report on the effects on health inequalities..[59] No primary studies met our inclusion criteria.

5.7.2 Water fluoridation

The 2001 review of changes in water fluoridation levels [59] yielded 33 studies of which fifteen met our inclusion criteria. Most of the included studies were of women aged 45-65. A controlled cohort showed a significant increase in fracture incidence over a five year period associated with fluoridation levels of 4 ppm compared to the control group of 1 ppm (RR-1.81 95%CI 1.01:4.43). In contrast, one controlled cohort study showed a non-significant improvement in hip fracture rates in the intervention group after five years exposure (fluoride levels of 0.05-1.8 ppm). An uncontrolled cohort showed a non-significant improvement on lumbar spine or hip bone mineral density after 20 years exposure at 1 ppm. Ten of the twelve clinical trials showed an increase in bone mineral density of the femoral neck, femoral condyle and lower spine associated with 9-22.6 mg fluoride per day for one to four years. The authors concluded that fluoridation at levels up to 1ppm have no adverse effects on bone fracture incidence, bone mineral density or bone strength. The reviewers made no comments about the implementation of the fluoridation interventions, nor did they make any recommendations for future research. There was no information presented relating to the effects on inequalities. An earlier systematic review on water fluoridation from the Centre for Reviews and Dissemination at the University of York (see: <http://www.york.ac.uk/inst/crd/pdf/fluorid.pdf>) suggested that while there was some limited evidence that water fluoridation reduces the inequalities in dental health across social classes in 5 and 12 year-olds, (using decayed/missing/filled teeth as an outcome), the effect was not seen in the proportion of caries-free children among 5 year-olds, nor was it seen in children of other ages. The authors concluded that the small number of studies, the differences between these studies, and their poor quality, suggests caution in interpreting these findings about the effects of fluoridation on inequalities.

5.7.3 Quality of the review

The review met five of the DARE criteria. (Further details appear in the Appendix 1, Table 17).

Box 5.7 Water and sanitation: summary of findings

With only one review of fluoridation identified, there are few findings and many potential gaps, even from a developed world perspective. One gap relates to the effects of water metering, which, it has been suggested may lead to poorer families economising on water to the detriment of child health.

5.8 Education

There is undoubtedly a strong case for highlighting education as a major determinant of health and health inequalities – not least through its interaction with other determinants. For example:

“Education has traditionally been an important route out of poverty for disadvantaged groups in many countries. Generally, qualifications improve people’s chances of getting a job and of having better pay prospects and the resulting increase in standard of living. This in turn improves opportunities to obtain the prerequisites for health – nutritious food, safe housing, a good working environment and social participation” [2].

We found no systematic reviews or primary studies which considered the role of educational interventions in adults in improving health (though there is considerable observational evidence linking access to education with health in general). (Note that health education was excluded from this review, so any such studies would not have been eligible). Also, this project was focused on adult health, and so did not include studies on education and health in children. It is widely accepted that education in children may be an important means of tackling health inequalities (see Box 5.8 for examples).

Further research in this field (apart from studies examining the impacts on health of educational interventions in adults) could investigate the full potential scope of the relationship between education (in its widest sense), health and health inequalities to highlight the priority that this determinant holds in relation to public health. The following is reproduced (with permission) from the WHO report on European strategies to tackle social inequities in health (Dahlgren and Whitehead, 2007).[2] It outlines the theoretical pathways from education to improved population health and reduced health inequalities, and puts forward selected suggestions for policy options to improve the current situation. All of these pathways and policy options are candidates for further research:

“Studies across Europe have shown a close association between education and health: the lower the educational achievement, the poorer the adult health status and vice versa (Cavelaars, Kunst & Geurts, 1998). The pathway between better education and better health may be direct – greater health knowledge may help people promote their own health and avoid health hazards, including risky behaviour. The pathway may also be indirect – through influences on the types of work open to an educated person, the greater income that they can command, and the lower levels of stress that they encounter as a result of their privileged position. (Judge et al., 2005).

“...a well-functioning education system has tremendous potential for promoting health (in general) and reducing social inequities in health (in particular)...

“Education has also been a channel for social mobility, allowing people to improve their socioeconomic position in society. At its best, it can influence the size of the social division, improving social cohesion by equalizing incomes and social conditions in the population...”

“Empowerment is an important outcome of education: the role of education in encouraging participation in the community, and also in the democratic process, should not be underestimated.

The education system plays a fundamental role in preparing children for life, giving them the knowledge and skills they need to achieve their full health potential – socially, emotionally and physically.” (Dahlgren and Whitehead, 2007:pp57-58).[2]

Further policy options are presented in Box 5.8.

Box 5.8 Education and health: policy options for promoting equity in health through the education system - and possible areas for further research (from Dahlgren & Whitehead, 2007) [2]

Promoting equity in health through the education system includes the following policy options.

Identify and reduce economic, social and other barriers to gaining access to education at all levels, and provide life-long learning, to increase access to education and training for disadvantaged groups.

- Introduce comprehensive support programmes for children in less privileged families, to promote preschool development
- Promote efforts to reduce social segregation within the school system. This calls for policies to reduce social segregation in general between different residential areas and also for specific policies within the educational sector to strengthen the general public school system.
- Ensure that schools in less privileged areas receive extra resources to meet the greater needs for special support to children from low-income and poor families.
- Provide extra support to students from less privileged families. The goal should be that educational achievements do not differ due to socioeconomic background.
- Prevent children from becoming early dropouts from formal education and training, by early actions and support.
- Provide extra support in the transition from school to work – in particular, for those with a weak position in the labour market.
- Develop and secure comprehensive adult-education programmes for those with very limited basic education or vocational training.
- Maintain and develop Healthy Schools programmes, with a focus on equity. This, in addition to the policy options for individual schools above, could include:
 - increased attention to (and actions on) the physical and psychosocial work environment of schools, with healthy work environments in schools given at least the same attention and resources as any other work environments;
 - free healthy school lunches; ...continued

- promotion of physical activities that also can attract obese children and that promote sound habits of everyday exercise for life;
- improved nutritional education and cooking skills;
- health education that takes into consideration that special efforts and approaches may be needed to reach those at greatest risk;
- equity-oriented injury prevention programmes, where students, teachers and parents are engaged to secure a safe school (including safe transport and walking to the school).

6. Contribution to PHRC themes

This project contributes to the PHRC themes of health inequalities, risk and health, incentives and regulation and in particular the work environment. Data on the effects of interventions on health inequalities were extracted when identified, and the studies themselves describe interventions which may reduce exposure to specific health risks - for example, poor housing, or poor access to healthcare. The theme of "Incentives and regulation" covers protective environments, including policies and legislation, studies of which were eligible for inclusion. Finally, the work environment was one of the sectors specifically considered in this report.

7. Conclusions

This project aimed to map some of the gaps in research on the social determinants of health and to use this to identify next steps. We start with summarising what is known. Summaries of the specific findings are provided at the end of each section, so to avoid undue repetition this final section is confined to general issues and observations. It has already been demonstrated elsewhere that the public health evidence base is sparsely-populated.[60] We feel that the current project has built on this work and has the potential to move the debate on and to make specific recommendations about where further research may be most fruitfully targeted. Note that reviews published prior to our inclusion date may offer further evidence/insight but are likely to be out of date (i.e. will not include more recent studies).

It may be helpful first however to summarise what is known, and identify any commonalities across the domains. First, it is clear that hard evidence on differential impacts on different socioeconomic groups is largely absent, though this is not surprising. What we do have however is suggestive evidence that certain categories of intervention may impact positively on inequalities, in particular interventions in the fields of housing and employment, though, as always, further evidence is needed. In the reviews of employment interventions for example (such as changes to the organisation of work, and privatisation) there is evidence that the effects of change are experienced differently by different levels of employee, and that health outcomes differed accordingly. This suggests - as noted in the Whitehall and other studies - that the workplace may indeed be an important setting in which inequalities may be addressed.

Similarly there is suggestive evidence that housing change may positively affect physical health but the actual effects may be small. This is potentially important because it is part of the public health canon that housing is an important determinant of current population health and health inequalities. However, although there is a growing and mixed evidence base - which now includes RCTs, and controlled trials - hard evidence that health is significantly impacted today by major housing change remains elusive. There are many possible reasons why this may be so. The effects may be small,

and thus existing studies may be underpowered, and large RCTs may be required to confidently attribute change to the intervention; the time lags to health improvement may be long, such that short-term outcome assessments fail to detect physical health change. This latter point may explain why improvements in mental health are consistently reported, but physical health change less so, at least in UK studies. We cannot however entirely discount the possibility that the effects of housing on population health in the 21st Century may be modest in high-income country contexts. That is not to deny the clear historical evidence that poor physical housing conditions in the slums of the 19th and first half of the 20th Century had a major, detrimental effect on health; but housing standards may have become generally so high in high-income countries over the past few decades that we may be experiencing ceiling effects (the study populations are either healthy, and/or the housing being improved or renovated was not significantly health-damaging). We will be able to examine this issue further when the results of a new and as yet unpublished systematic review become available later this year.

In the case of transport, the strongest evidence derives from studies of injury prevention, but the wider health impacts of transport policies on inequalities remain to be demonstrated. It therefore seems particularly important to strive for better evidence on how transport policies may be used to promote physical activity, and reduce related inequalities.

There appear to be no systematic reviews (that we identified) which examined the *adult* outcomes of educational interventions – for example, reviews of the relationship between educational policies and health in a population. Yet there is undoubtedly an untapped evidence base relating to the relationship between levels of education in a society and health outcomes. There is certainly a considerable research literature on the social and economic returns to education, though it does not examine the returns in terms of health in detail.[61] The recently-completed report from the WHO Commission on the Social Determinants of Health on early child development also notes that low levels of education and literacy affect child development both directly and through their effects on the knowledge and skill-base of children’s carers. (See: http://www.who.int/social_determinants/resources/ecd_kn_report_07_2007.pdf) One major priority for new systematic reviews should therefore be to investigate the role of education policies on health and health inequalities, using the wider evidence base (that is, including non-experimental evidence) that is available.

We did identify one systematic review which examined the association between literacy and health, which found that literacy is related to health, health care, hospitalisation, and some chronic diseases (though little evidence was found on inequalities). Though this review focused on the observational evidence (and did not meet the inclusion criteria for our project) it provides a valuable starting point for the design of new studies and for any new review of the effects of interventions on health and related outcomes.[62]

Finally, given the importance of access to healthcare in potentially helping to reduce health inequalities, evaluations of interventions to promote access, including lay health workers, outreach clinics and the provision of culturally-relevant healthcare, are needed.

Implementation and generalisability

There are also a number of general points which can be made regarding the utility of the evidence we have on the social determinants. The absence of information on implementation for most reviews is notable. Most reviews provide, at best, "thin" descriptions of what interventions consisted of, and of the cultural, political or other environment within which they were delivered. This poses difficulties for those seeking to understand how the interventions - or their components - can be applied in other settings. The generalisability of the evidence must also be considered; many studies in these reviews are already old, are non-UK based and thus unlikely to translate easily. Although some public health evidence (about interventions) already exists, we also need to consider not just "filling gaps" - but also replicating and updating existing studies where appropriate. Many gaps exist; but new gaps also continue to emerge – in particular in relation to UK-based studies.

Limitations of the review

Perhaps one of the main challenges for this project was to locate relevant primary and secondary literature. Searching for studies on social determinants and/or inequalities is difficult, and time-consuming and the searches - more so than searches for studies of the effects of healthcare interventions - suffer from lack of sensitivity and lack of specificity. The search strategies took many iterations to develop, and we sought methodological advice from colleagues in the EPPI Centre. Despite this, having completed the searches, and having extracted the data we became concerned that reviews may have been missed, and supplemented the searches with further extensive searches of DARE; this produced approximately 1200 further reviews which needed to be screened as the project finished, identifying two further reviews. We also again contacted experts in specific areas. Despite this, we feel that, as for any review of complex and difficult-to-define social interventions, we cannot be sure that all reviews have been located. However we are confident that the gaps we identify, while perhaps surprising, are real. There may of course be older reviews that might provide additional evidence, although these may be out-dated. However systematic reviews addressing the social determinants of health are comparatively recent so there may in any case be few of these.

It is also worth noting that the task of searching is made more difficult because of the lack of a comprehensive register of studies on inequalities. This situation may improve in future as the Campbell/Cochrane Equity Field and the Cochrane Public Health Review Group are working towards compiling such a register for those conducting equity-focused systematic reviews. We intend to contribute the studies and reviews identified as part of this current project to the new Equity Field register.

It is also possible that there may be additional approaches to identifying relevant literature which may be more efficient in this regard than traditional literature searching techniques. These may be worth further exploration and development.

We also need to consider the limitations of systematic reviews for identifying "what works" in terms of social determinants. In particular, there may be an inbuilt "intervention selection" bias: interventions which are easiest to evaluate, get evaluated; these are then gathered into a systematic review, and lower-level, downstream interventions then tend to become over-represented in the evidence base.[3] (That is, smaller-scale interventions delivered at a lower level - to smaller populations, or to individuals, and which are targeted at the symptoms of poverty rather than its societal causes). Large scale, macro-level influences on health and health inequalities are by their very nature difficult to evaluate using robust "traditional" epidemiological methods; prospective controlled studies of policies are uncommon for example; yet these influences may have the greatest direct or indirect impact on health inequalities. In general, the further upstream the searches, the less frequent the outcome evaluations. Some of this observational evidence of the effects of policies may already exist, but may be under-exploited; for example longitudinal survey data may be used to model the effects of interventions - such as changes in policies (e.g. tax credits) - on inequalities. International or regional differences in policies may provide another source of comparative evaluative data - recently described as "comparative social epidemiology".[68] This type of information may be particularly difficult to track down (for example, some may be unpublished). A similar point is made strongly in the final report of the Measurement and Knowledge Network (MEKN) of the WHO Commission on the Social Determinants of Health, to the effect that the scope of "admissible evidence" needs to be expanded without sacrificing rigour and "systematicity" in synthesising evidence.[63] (For example Lynch et al's (2004) review of observational studies on the connection between income inequality and health inequality is a useful example of such an approach, examining the impact of income inequality on health inequality). [64]

Whitehead has argued that there are four categories of intervention aimed at tackling inequalities in health: Category 1: strengthening individuals through health educational measures; Category 2: strengthening communities; Category 3: improving living and working conditions and access to essential goods and services; and Category 4: promoting healthy macro-policies.[3] We excluded Category 1 interventions. Most of the interventions identified in this current project pertained to Categories 2 and 3. Even within these categories, studies tended to be on small-scale or pilot projects of limited potential impact. There appears to be limited evidence about sector-wide policies and interventions in Category 3, such as the effect on access to health care of changes to the health care system. There appears to be even less about interventions located within Category 4, and this Category should be an important focus of further research. These particular causes of health inequalities include the overarching macroeconomic, cultural and environmental conditions prevailing in a country, which influence the standard of living achieved by different sections of the population, the prevailing level of income inequality, unemployment, job security and so on. Interventions within

this category would therefore be aimed at altering the macroeconomic or cultural environment to reduce poverty and the wider adverse effects of inequality on society, including measures to ensure legal and human rights, "healthier" macroeconomic and labour market policies, the encouragement of cultural values promoting equal opportunities and environmental hazard control (including upholding international obligations and treaties in this field).[3]

It appears, then, that not only is the public health evidence base weak but that there are specific areas which need further work, in particular research on sector-wide policies in the health system, food and agriculture, and more generally on the influence of macro-level policies on health inequalities. Although it is now a given that the effects of any interventions on inequalities should be assessed, the evidence base does not allow us to say with any confidence what interventions are likely to positively affect health inequalities, because differential impact by socioeconomic position is rarely assessed. Nonetheless it appears that there is a growing evidence base around housing and regeneration, and a significant evidence base in the field of employment and health suggesting that this is indeed a sector with significant responsibility for improving health and reducing inequalities. Given the few intervention studies, it is particularly important to assemble evidence on the *mechanisms* by which policies may affect health; this will help identify points at which to intervene and will provide a framework for the development of new research. [3] An example from housing policy is given after Section 8 at the end of this report)

We referred earlier to the need for better public health theory. It is possible that existing systematic review methods have not been developed to deal with such theory, and that better, more informative reviews may result from the incorporation of relevant theory with evidence of outcomes – perhaps incorporating the strengths of theory-based synthesis (e.g., realist synthesis) and “traditional” systematic review approaches, which focus largely on the outcomes of interventions. This may mean for example that interventions would be grouped not just according to specific intervention and outcome, but according to the pathways through which those outcomes are expected to be achieved. Thus in the example of housing, if reducing stigmatisation is held to be one outcome of increasing tenure mix, then it may be helpful to review such studies with other studies that reduce stigma in other ways.³

Despite the methodological challenges and the difficulties of dealing with a restricted amount of evidence, we feel that this report has been valuable in opening up new areas of enquiry in specific areas. We therefore conclude with a number of specific research recommendations. We hope these will be used to direct researchers to the most productive areas for developing new primary and secondary research. (Individual recommendations are also summarised at the end of each section).

We need:

³ Thanks are due to one of the report referees who suggested this example.

- Research aimed at understanding the *mechanisms* which link social determinants with health outcomes;
- New reviews and primary research on the social and economic returns to education;
- Primary and secondary research on the effects of educational policies on health and health behaviours;
- New reviews (requiring methodological development) of the effects of nationwide changes in health systems to improve geographic, economic or cultural access for the population as a whole, and for groups in greater need in particular;
- Primary Research on the effects of macro-level policies on health and health behaviours; in particular food policies, given their under-representation in the evidence base;
- Primary research on the effects of community-level interventions to promote food access;
- Primary research on the effects of transport policies on physical activity;
- Primary research on the effects of changes in the work environment on health and health inequalities;
- New primary research on the health effects of welfare rights and welfare to work interventions;
- Evaluations of interventions to promote access to healthcare, including lay health workers, outreach clinics and the provision of culturally-relevant healthcare;
- Primary research on the effects of traffic calming, given that existing studies are now old and mostly non-UK based; and
- Primary research on the effects of transport infrastructure on health and non-health outcomes (e.g. health, and other services), and
- Further methodological research on the conduct of effective searches in the field of health inequalities.

8. Dissemination/Outputs

The findings of this project will be developed for several academic papers. At time of writing it has been submitted for presentation at the European Public Health Association conference, and we will also use it as an input to the work of the Cochrane/Campbell Equity Group, and the Cochrane Public Health Review Group.

Specific sections of this project are also pertinent to the work of the WHO Commission on the Social Determinants of Health, in particular the WHO Knowledge Networks. For example the Final Report on Employment Conditions and Health Inequalities[65] discusses some of the gaps in the evidence and notes that most of the research (for example, on employment relations) is descriptive. A short paper therefore which draws on the employment section of our report in responding to the WHO report may

be a useful contribution. There are other similar synergies between individual sections of our project and the WHO reports.

One other output is new methodological work, and we intend to apply for separate funding to develop methods of searching for observational and evaluative studies on public health and inequalities, drawing on our experience in this project. Finally, we have compiled a list of 700+ studies which are of relevance to efforts to reduce health inequalities; though not all met the inclusion criteria for the current project, they may be of value to other systematic reviewers and we will contribute details of these to the new Cochrane/Campbell Equity Field register.

Funding/Acknowledgements

The work was undertaken by [contractor's name] 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.

We are particularly grateful to colleagues at the EPPI-Centre for advice and support (Sandy Oliver and Josephine Kavanagh), and to the anonymous referees for their thoughtful and helpful comments on an earlier draft of this review.

Figure 1: Mixed tenure housing: example of an analytic framework [5]

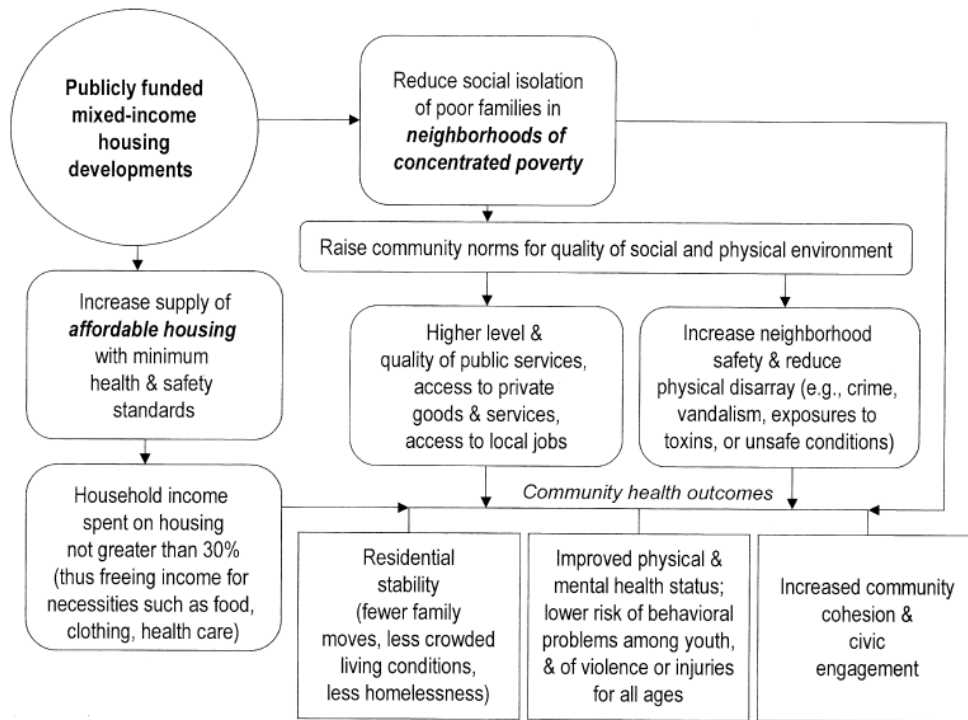


Figure 1. Analytic framework used to evaluate the effectiveness of mixed-income housing developments. (Circle denotes intervention, rectangles with rounded corners denote intermediate outcomes, and rectangles with square corners denote community health outcomes.)

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Appendix 1: Quality appraisal and results tables for included reviews and primary studies

Table 1: methodological quality checklist for housing domain reviews

	Anderson et al. (2003)[5]	Acevedo-Garcia et al. (2004)[10]	Chang et al. (2004)[14]	McClure et al. (2005)[15]	Thomson et al. (2006)[16]	Nielsen (2004)[17]	Saegert et al. (2003) [18]	Hahn et al. (2005) [66]	Thomson et al. (2001) [19]
Is there a well defined question?	+	+	+	+	+	+	+	+	+
Is there a defined search strategy?	+	+	+	+	+	+	+	+	+
Are inclusion / exclusion criteria stated?	+	+	+	+	+	+	+	+	+
Are the primary study designs and number of studies clearly stated?	+	+	+	+	+	+	+	+	+
Have the primary studies been quality assessed?	+	+	+	+	+	+	+	+	+
Have the studies been appropriately synthesised?	+	+	+	+	+	+	+	+	+
Has > 1 author been involved at each stage of the review process?	+	Unclear	+	+	+	-	+	+	+

Key: + yes; - no; ? unclear

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Table 2: Results tables for housing domain reviews (9)

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal***
<p><i>Citation:</i> Anderson et al 2003 [5]</p> <p><i>Intervention(s):</i> A. Creation of mixed income housing developments in low SES neighbourhoods (market rate and subsidized properties together); B. Tenant based rental assistance programmes (rent subsidies in private sector allowing low SES access to more expensive areas)</p> <p><i>Population:</i> Low SES families with children, USA.</p> <p><i>Health outcomes:</i> community health; residential stability (family moves, crowded living conditions, homelessness); physical and mental health, youth behavioural problems, violence and injuries; community cohesion and civil engagement</p> <p><i>Relevant study N:</i> 12, experimental, controlled and uncontrolled prospective before and after.</p> <p><i>Database N:</i> 10</p> <p><i>Time/language/country restrictions:</i> 1965-2000, USA</p> <p><i>Synthesis method:</i> Narrative with some results pooled.</p>	<p>No studies included for intervention A.</p> <p>Intervention B: Increased neighbourhood safety (5 studies reported a median decrease of 6% in household victimisation 6 months post intervention). Decrease in social disorder (4 studies reported median decrease of 15.5%).</p> <p>3 studies reported a median decrease in youth behavioural problems of 7.8% (follow up ranged from 1-5 years).</p> <p>2 studies reported a decreased in self-reported symptoms of depression by head of household of 8%. Also reported improvement in self-reported health status with an 11.5% increase in people reporting health as good or excellent.</p> <p>However, 1 study reported a decrease in housing standards (e.g. rodent infestation, inadequate plumbing) that were a health and safety risk (decrease of 28%-53%).</p> <p>Tenant based rental assistance programs (2) improve household safety (crime, social disorder).</p> <p><i>Implementation:</i> No comment on implementation.</p>	<p>No explicit research recommendations made although authors comment that there is insufficient evidence on housing hazards, youth risk behaviours, or physical and mental health because too few studies of high quality design and execution exist.</p>	<p>1 2 3 5 6</p>
<p><i>Citation:</i> Chang et al 2004[14]</p> <p><i>Intervention(s):</i> Environmental factors – home visit by professional to check for hazards such as poor lighting or sliding carpets, recommendations made and in some cases implemented (review also examined multifactorial falls risk assessment and management programme interventions, exercise interventions, educational interventions).</p> <p><i>Population:</i> People aged over 60</p> <p><i>Health outcomes:</i> Falling at least once during a specified follow-up period, monthly rate of falling</p> <p><i>Relevant study N:</i> 5 (40), RCTs</p> <p><i>Database N:</i> 6</p> <p><i>Time/language/country</i></p>	<p>NS reduction in 'at least one fall' (adjusted risk ratio of 0.90 0.77 to 1.05).</p> <p>NS reduction in monthly rate of falling (adjusted incidence rate ratio 0.85 0.65 to 1.11)</p> <p>Implementation: No comment on implementation.</p>	<p>None</p>	<p>1 2 3 4 5 6 7</p>

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal***
<p><i>restrictions:</i> 1992-2002, other not stated.</p> <p><i>Synthesis method:</i> Meta-analysis</p>			
<p><i>Citation:</i> Hahn et al 2005[66]</p> <p><i>Intervention(s):</i> A. Bans on specified firearms or ammunition; B. Restrictions on firearms acquisition; C. Waiting periods between application to purchase and acquisition of firearm; D. Licensing of firearms users and registration of firearms; E. Shall issue concealed-weapons carry laws; F. Combinations or systems of firearms laws</p> <p><i>Population:</i> No restrictions</p> <p><i>Health outcomes:</i> Specific violent crimes (e.g. homicide, rape), including unintentional firearms injury, suicide.</p> <p><i>Relevant study N:</i> 32, controlled and uncontrolled prospective, retrospective and cross-sectional.</p> <p><i>Database N:</i> 11</p> <p><i>Time/language/country restrictions:</i> 1979-2001, language n/s, established market economies but included studies mainly USA.</p> <p><i>Synthesis method:</i> Narrative</p>	<p>A. 3 comparative studies (with other regions as controls) found a decrease in homicide and suicide. 1 other comparative study found an increase in homicide, whilst 1 cross-sectional study reported inconsistent results. Authors conclude that there is insufficient evidence to make any conclusions about the intervention.</p> <p>B. Available evidence was insufficient to determine effect on outcomes.</p> <p>C. Findings on suicide and unintentional injury inconsistent across studies and insignificant.</p> <p>D/E/F. Results inconsistent across studies</p> <p>Authors concluded that there was insufficient evidence for or against efficacy of firearms restrictions</p> <p>Implementation: Degree of intervention compliance may have an impact on outcomes.</p>	<p>Numerous recommendations for future research are made, relating to: violent outcome data sources; measurement of exposure; measurement of violent outcomes; measurement of potential confounders; methods and specific priorities for research on each of the interventions included in the review.</p>	<p>1 2 3 5 6 7</p>
<p><i>Citation:</i> Thomson et al 2006 [16]</p> <p><i>Intervention(s):</i> Area based initiatives (ABIs) – urban regeneration programmes</p> <p><i>Population:</i> no restrictions</p> <p><i>Health outcomes:</i> quality of life, well-being, health, morbidity, mortality, use of or satisfaction with local health services. Also, housing, income, education, training or employment.</p> <p><i>Relevant study N:</i> 3 (10), prospective cohorts, prospective repeat cross-section.</p> <p><i>Database N:</i> 8</p> <p><i>Time/language/country restrictions:</i> 1980-2004, English, UK</p> <p><i>Synthesis method:</i> Narrative</p>	<p>Impact of interventions on reported outcomes was highly variable.</p> <p>Self-reported health: 1 before and after evaluation found deteriorations in measures of self-reported health (+ 3.8%).</p> <p>Mortality: 2 prospective evaluations reported improvements in standardised mortality rate: paper A = 131v 114; paper B = 122v 118.</p> <p>Authors conclude that there is 'little evidence to demonstrate the impacts on health or socioeconomic outcomes' of ABIs, although 'a small overall positive impact is suggested.' However, adverse impacts of ABIs are also possible.</p> <p>Implementation: Detailed information on nature and context of interventions is required as these may have an impact on outcomes</p>	<p>Evaluations including detailed descriptions of contextual factors that may influence variability in outcomes between areas. Panel studies tracking original residents of target areas. Clear hypotheses outlining specific mechanisms whereby outcomes may be improved</p>	<p>1 2 3 4 5 6 7</p>

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal***
<p><i>Citation:</i> Acevedo-Garcia et al 2004 [10]</p> <p><i>Intervention(s):</i> Residential mobility policy – rent assistance so that low income families can choose where to live (public/private), used mainly to overcome racial segregation</p> <p><i>Population:</i> Low income families (including ethnic minorities)</p> <p><i>Health outcomes:</i> Mental or physical health; experience of violence; substance abuse.</p> <p><i>Relevant study N:</i> 13, randomised and non-randomised experimental studies</p> <p><i>Database N:</i> 8</p> <p><i>Time/language/country restrictions:</i> 1974-2002, English, USA</p> <p><i>Synthesis method:</i> Narrative</p>	<p>Residential mobility programmes have the potential to improve health: Overall health and 'calmness' (1 study), distress and anxiety (1 study), depression (1 study), problem drinking and substance abuse (1 study) improved in the experimental groups. Exposure to violence decreased at follow-up (6 studies)</p> <p>Implementation: No comment on implementation.</p>	<p>Future epidemiological research on housing and health should describe the mechanisms by which housing interventions could affect specific health outcomes. Racial discrimination should be examined within this conceptual framework and studies need to present results within a racial context (e.g. the relative make up of communities). Qualitative studies could help with this.</p> <p>Improvements in health should be followed up to see if they lead to economic improvements.</p> <p>Larger samples of individuals and neighbourhoods, and more detailed demographic characteristics. Multi-level analysis required.</p> <p>Better measures of health outcomes and triangulation of different measures (biological, self-report, validated scales e.g. for depression).</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p>
<p><i>Citation:</i> Thomson et al 2001[19]</p> <p><i>Intervention(s):</i> Rehousing, physical changes to housing infrastructure (e.g. double glazing, insulation).</p> <p><i>Population:</i> Housing residents</p> <p><i>Health outcomes:</i> Socio-economic change, health, illness and social measures.</p> <p><i>Relevant study N:</i> 18 (11 prospective cohorts, 6 with controls; 7 retrospective, 3 with controls).</p> <p><i>Database N:</i> 16</p> <p><i>Time/language/country restrictions:</i> Dating from 1887 in any language. Included studies were from UK, USA, Japan and Denmark.</p> <p><i>Synthesis method:</i> Narrative</p>	<p>3 studies examined the health impacts of rehousing based on medical need – all found improvements in self-reported physical and mental health. Only one was prospective and it was small.</p> <p>11 examined health effects of rehousing or refurbishment and renovation/area regeneration. 2 prospective controlled studies found positive effects. One, which controlled for confounders, found a decrease in illness episodes after 18 months of 29 episodes/1000 people. Also recorded improvements in mental health. The other study reported improvements in mental and physical health but the study was small (n=62), sample was of old people, and the comparability of the control group was unclear. However, adverse effects were identified in three studies where residents had been rehoused. These included increases in chronic respiratory conditions, reduced ratings of good health and increased mortality rates.</p> <p>4 on energy efficiency all found that interventions improved respiratory health, but only one study had a control group.</p> <p>4 uncontrolled retrospective studies reported improvements in social outcomes such as perceptions of safety, and social and community participation after housing improvements. One of these also reported a small increase in social support. Two reported a decrease in concerns about local crime, and another reported that fewer days were lost at school due to asthma.</p> <p>Implementation: Little information provided in the studies on the costs of interventions.</p>	<p>Few studies, quality poor and some are very old. Need for better quality – large, prospective, controlled studies which examine comparative effectiveness and cost effectiveness and consider the wider social context and multifactorial nature of causality in this area. Mixed method, longitudinal studies are also needed.</p> <p>Need for more studies on the relationship between health and housing: does poor health lead to worse housing.</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p>

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal***
<p>Citation: Saegert et al 2003 [18]</p> <p>Intervention(s): Housing improvements: Rehousing, changes in physical infrastructure, changes in indoor equipment or furniture, changes in housing policy.</p> <p>Population: USA housing residents (31% of studies related to low SES)</p> <p>Health outcomes: Any health outcomes</p> <p>Relevant study N: 72 (44 studies were controlled, 35 were randomised)</p> <p>Database N: 12</p> <p>Time/language/country restrictions: USA 1990-2001 Peer reviewed papers only.</p> <p>Study designs: Unclear</p> <p>Synthesis method: Narrative (and quantitative content analysis)</p>	<p>49/72 studies reported a significant improvement in health outcomes (unspecified).</p> <p>Implementation: A number of barriers to success were identified in the included studies such as participant's awareness, housing characteristics, inadequate resources. However, few studies provided details about participants e.g. SES. No evaluation of process.</p>	<p>Small study populations and lack of controlling for confounders a problem. Comparative studies needed. Future studies should look at wider social impacts of housing interventions. More ecological approaches to housing need to be evaluated. Few studies provided information on content or context of interventions. Comparative studies addressing the value of individual level as opposed to policy or multi-level interventions, as well as housing versus other public health interventions are needed.</p>	<p>1 2 3 7</p>
<p>Citation: McClure et al 2005[15]</p> <p>Intervention(s): Population-based interventions to reduce fall-related injury among older people.</p> <p>Population: Elderly people aged 65 years and over.</p> <p>Health outcomes: Fall-related injury incidence</p> <p>Relevant study N: 5, prospective controlled community trials.</p> <p>Database N: 7</p> <p>Time/language/country restrictions: None, relevant studies were from Australia, Denmark, Sweden, Norway, 1996-2001.</p> <p>Synthesis method: Narrative</p>	<p>Each of the 5 included studies reported on interventions which employed a range of strategies including both education/promotion and environmental modifications. It was not possible to discern from the reporting of the results which aspect of the intervention had the greatest impact. However, all 5 interventions had positive effects, with significant decreases in some groups or some types of fall-related injuries reported in each case (relative reduction in fall related injuries ranging from 6-33%).</p> <p>Implementation: Little information was provided in the included studies on the exact nature of the interventions.</p>	<p>Cluster randomised, multiple community trials of population based interventions.</p> <p>Also research to establish barriers and facilitators to success in population-based interventions.</p>	<p>1 2 3 4 5 6 7</p>
<p>Citation: Nilsen 2004[17]</p> <p>Intervention(s): Community level injury prevention programmes - combination of: housing environment modifications, as well as distribution of safety materials, policy/legislative decisions, inspection of households etc.</p> <p>Population: residents of areas</p>	<p>Controlled studies found significant declines in some types of injury, although this varied considerably.</p> <p>1 study found a decline of 13% in healthcare treated injuries, 15% for hospital treated injuries and 41% for non-trivial healthcare treated injuries.</p> <p>1 study found a decline of 24% in outpatient injuries and 46% for workplace injuries.</p>	<p>'More sophisticated evaluation' taking account of context, process, structure and duration of interventions</p>	<p>1 2 5</p>

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal***
<p>subject to community level injury prevention programmes</p> <p>Health outcomes: Injuries</p> <p>Relevant study N: 16, before and after controlled and uncontrolled</p> <p>Database N: 2</p> <p>Time/language/country restrictions: Not stated, relevant studies from Sweden, USA, Australia, Denmark, Greece, New Zealand, 1975-1995.</p> <p>Synthesis method: Narrative</p>	<p>1 study found a decline of 27% for traffic injuries, 26% for fall fractures amongst the elderly and 15% in skiing injuries.</p> <p>1 study found a decline of 27% in home injuries, 28% for occupational injuries, and 28% for traffic injuries. However, inpatient rates increased.</p> <p>A number of studies found no decline in rates of any kind of injury.</p> <p>Most interventions involved a combination of active and passive interventions. It was not possible to discern which elements of each intervention impacted on outcomes.</p> <p>Implementation: Little detail on specific nature of interventions. Context, process and structure of interventions influenced outcomes, in particular duration, socio-economic status and 'cultural homogeneity' of intervention areas appeared to influence success.</p>		

* total no of studies in review in parentheses

** Limited by details included in the reviews – these vary with some authors providing effect sizes etc and others not.

***Following the DARE quality guidelines employed in a recent umbrella review of tobacco control interventions (REF): 1= Is there a well-defined question? 2= Is there a defined search strategy? 3= Are inclusion/exclusion criteria stated? 4= Are study designs and number of studies clearly stated? 5= have the primary studies been quality assessed? 6= Have the studies been appropriately synthesised? 7= Has more than one author been involved in each stage of the review process?

Table 3: Results tables for housing domain primary studies (10)

Study details	Main findings and implementation	Policy & Research Recommendations
<p>Citation: Cheng et al 2007 [13]</p> <p>Intervention(s): A. HUD-VASH: Dept of Housing and Urban Development and Department of Veteran Affairs Supported Housing, involve intensive case management and Section 8 housing vouchers. Housing vouchers authorise payment of a standardised local fair market rent less 30% of the individual beneficiary's income. B. Intensive case management without Section 8 vouchers. (control = usual VA homeless services, i.e. short term case management.)</p> <p>Population: Homeless veterans with substance and/or major psychiatric disorder</p> <p>Setting: San Francisco, San Diego, New Orleans, Cleveland (US).</p> <p>Health outcomes: Clinically assessed - Addiction Severity Index; Brief Symptom Inventory (psychological distress); Lehman Quality of Life Index.</p> <p>Design: RCT with follow-ups at 6, 12, 18, 24, 30 and 36 months.</p> <p>Final sample N: N/S (baseline 460)</p>	<p>After 3 years, HUD-VASH group used alcohol on fewer days than intensive case management controls (p=0.46). Also fewer days than the standard care group (p=0.0047) and fewer days on which they drank to intoxication (p=0.0053) and fewer days of drug use (p=0.028). Also, sig. lower score on the ASI drug problem index (p=0.015) and the ASI alcohol problem index (p=0.018). Lower expenditure on alcohol and drugs (p=0.048).</p> <p>HUD-VASH is associated with improved housing outcomes and substance abuse outcomes compared with both usual care and intensive case management without housing vouchers.</p> <p>Implementation: No comment on implementation.</p>	<p>Policy: Access to housing subsidies and intensive case management improves housing and substance abuse outcomes for the population in question.</p> <p>Research: No research recommendations.</p>
<p>Citation: Fauth et al 2004 [8]</p> <p>Intervention(s): A housing desegregation programme designed to combat increasing concentration of low-income minority families in certain areas through random assignment to publicly funded housing in middle-class areas.</p> <p>Population: Low-income minority families resident in high-poverty areas.</p> <p>Setting: Yonkers, NY, USA.</p> <p>Health outcomes: physical health, alcohol abuse, depression symptoms, anxiety/panic symptoms and drug abuse symptoms.</p> <p>Design: Retrospective controlled cohort: no baseline data, follow-up at 2 years.</p> <p>Final sample N: 315 (173 intervention, 142 control)</p>	<p>Only physical health and alcohol abuse symptoms improved significantly: Effect size for diagnosed physical health problems -0.18; effect size for symptoms related to alcohol abuse - 0.19.</p> <p>Implementation: No comment on implementation.</p>	<p>Policy: "Rehousing low-income, minority families within new publicly funded townhouses located in middle-class, primarily White neighbourhoods is an effective strategy for improving adults' economic well-being, as well as their safety, satisfaction with resources, and housing quality."</p> <p>Research: Longer term studies and qualitative research to establish whether programme effects are sustained.</p>
<p>Citation: Howden-Chapman et al 2007 [20]</p> <p>Intervention(s): Fitting of insulation in previously non-insulated housing: "installing ceiling insulation, draught stopping around windows and doors, and fitting sisalated paper beneath floor joists and a polythene moisture barrier on the ground beneath the house."</p> <p>Population: Residents of non-insulated housing</p>	<p>There were significant improvements in a range of SF36 scores, both in the intervention group pre/post intervention and between the intervention and control groups:</p> <p>Social functioning: Intervention group (pre/post): 69.2/78.4, difference 1 (CI 3.9-8.4, p<0.0001); Intervention/control post intervention: 78.4/72.3, difference 6.2 (CI 3.8-8.6, p<0.0001)</p>	<p>Policy: Targeting home improvements at low income households is a more realistic approach to tackling health inequalities than redistributing income. "Fitting insulation is a cost effective intervention for improving health and well-being".</p> <p>Research: No research</p>

Study details	Main findings and implementation	Policy & Research Recommendations
<p>in low income communities.</p> <p>Setting: 3 urban and 4 rural communities.</p> <p>New Zealand</p> <p>Health outcomes: SF36; Respiratory symptoms; Self-reported colds and flu; Days off work; GP attendance; Hospital admissions.</p> <p>Design: Single blind community level RCT, follow-up at 12 months.</p> <p>Final sample N: 1128 households, 3312 individuals</p>	<p>Physical: Intervention group (pre/post): 52.5/70.0, difference 11.2 (CI 7.4-15, p<0.0001); Intervention/control post intervention: 70.0/58.8, difference 11.8 (CI 8.0-15.0, p<0.0001)</p> <p>Emotional functioning: Intervention group (pre/post): 63.1/77.5, difference 10.8 (CI 7.2-14.5, p<0.0001); Intervention/control post intervention: 77.5/66.7, difference 10.9 (CI 7.1-14.6, p<0.0001)</p> <p>On a range of other health measures, the intervention group fared significantly better than the control group: Fair or poor self-reported health: adults in intervention group had half the odds of this (adj. odds ratio 0.50, CI 0.38 to 0.68); Respiratory symptoms: people in intervention group had half the odds of these (0.57, 0.47-0.70, p<0.0001); Self-reported colds and flu: again the odds were halved (0.54, 0.47-0.70, p<0.0001); Morning phlegm: incidence decreased significantly (0.64, 0.52 to 0.78; P<0.0001); Days off work: fewer adults reported having days off work (0.62, 0.46 to 0.83; P=0.0017); Self-reported GP attendance: 0.73 (0.62 to 0.87) P=0.0002; GP reported attendance:0.95 (0.81 to 1.13) P=0.58; Hospital admissions (respiratory condition): 0.53 (0.22 to 1.29) P=0.16 $\chi^2/df=0.89$; (control condition): 0.90 (0.59 to 1.37) P=0.61.</p> <p>Implementation: No comment on implementation.</p>	<p>recommendations</p>
<p>Citation: Kearns et al 2006 [21]</p> <p>Intervention(s): Intervention group were rehoused from existing social housing to new build social housing.</p> <p>Population: Residents of social rented housing</p> <p>Setting: Social rented housing, Scotland UK</p> <p>Health outcomes: Self-rated health, index of 10 common symptoms, mental health (SF36), vitality (SF36)</p> <p>Design: prospective cohort, follow up at approx 12 months</p> <p>Final sample N: 280</p>	<p>Self-rated health: pre-intervention 41% rated health as fair or poor. Post-intervention 37% did so (sig.; p-value not stated)</p> <p>Common symptoms: z score for index of 10 common symptoms pre- and post-intervention -2.189, p=0.029</p> <p>Mental health (SF36): mean mental health score pre-intervention 58.27, post-intervention 59.18 (p=0.507)</p> <p>Vitality(SF36): mean vitality score pre 42.31, post 51.45, p<0.001</p> <p>There were substantial and highly significant increases across a range of psychosocial measures.</p> <p>Changes in physical health measures were sig. but small. Mental health did not appear to have been affected by the intervention, but vitality and a number of psychosocial measures showed marked improvements.</p> <p>Implementation: The intervention was still in its early stages when these data</p>	<p>Policy: No policy recommendations</p> <p>Research: No research recommendations</p>

Study details	Main findings and implementation	Policy & Research Recommendations
	were collected; effects may be different or greater over a longer time-period, reflecting honeymoon or settling-in periods for intervention recipients.	
<p>Citation: Kling et al 2007 [7]</p> <p>Intervention(s): Moving to Opportunity (MTO); A. Section 8 housing vouchers without geographical restriction. B. Section 8 housing vouchers restricted to areas with less than 10% poverty rate + mobility counselling. (control = continued eligibility for public housing, no vouchers)</p> <p>Population: Residents of high poverty US housing projects</p> <p>Setting: Baltimore, Boston, Chicago, LA, NY (USA)</p> <p>Health outcomes: Physical and mental health outcomes; only sig. outcomes listed.</p> <p>Design: RCT, average follow-up at 5 years.</p> <p>Final sample N: ns (4248 households at baseline)</p>	<p>Intention to Treat analysis found significant differences between intervention and control ($p < .05$): Adults Decrease of 4.8 percentage points in prevalence of obesity (BMI >30); Increase of 6.1 percentage points in feeling calm and peaceful; Decrease of 9.2 percentage points in psychological distress.</p> <p>NS differences between control and usual Section 8 (intervention B).</p> <p>Authors conclude hypothesis that living in lower poverty neighbourhood has impact on physical health is not supported, apart from a large and sig. effect on obesity due to changed health behaviours among movers (diet and exercise). However, there were large and significant improvements in mental health, which the authors contend result from the reduction in stress associated with moving to neighbourhoods with lower rates of random violence. The benefits were greater for adults and female youth than for male youth.</p> <p>Implementation: No comment on implementation.</p>	<p>Policy: The benefits of moving people to lower poverty neighbourhoods significantly outweigh the costs, and that it is cheaper to subsidise such housing than to provide public housing.</p> <p>Research: No research recommendations.</p>
<p>Citation: Leventhal and Brooks-Gunn 2003 [6]</p> <p>Intervention(s): Moving To Opportunity = housing mobility experiment: families with children resident in high poverty neighbourhoods who volunteered to take part in the intervention randomised to:</p> <ol style="list-style-type: none"> 1) Section 8 vouchers and assistance to move to low poverty neighbourhoods (experimental) 2) standard Section 8 housing vouchers (section 8 control) 3) control, who received no vouchers, but continued to receive project-based assistance (in-place control) <p>Population: Families with children resident in high poverty neighbourhoods</p> <p>Setting: Neighbourhood, NYC USA</p> <p>Health outcomes: Parents' mental health/anxiety: Depressive Mood Inventory and Hopkins Symptoms Checklist. Each has a 5 point scale, from which a mean item score is calculated.</p> <p>Design: RCT. 3 years between intervention and follow-up.</p> <p>Final sample N: 550 (experimental=220, Section 8 =181 control=149)</p>	<p>Intention-to-treat and treatment-on-treatment analyses conducted separately because many in experimental group did not move.</p> <p>Mean depressive symptoms score post-intervention:</p> <p>In place control: 2.37 Experimental ITT: -0.19 ($P < .10$) Experimental TOT: -0.49 ($P < .05$) Section 8 ITT: -0.01 Section 8 TOT: 0.00</p> <p>Mean anxiety symptoms score post-intervention:</p> <p>In place control: 1.68 Experimental ITT: -0.21 ($P < .01$) Experimental TOT: -0.55 ($P < .01$) Section 8 ITT: -0.12 Section 8 TOT: -0.28</p> <p>ITT and TOT experimental group parents were significantly less likely to report depressive or anxiety symptoms post-intervention, demonstrating that neighbourhood effects have an important impact on mental health.</p> <p>Implementation: There is a possibility that self-selection of participating families introduced a source of bias in the study. However there do not</p>	<p>Policy: Policies to increase the mobility of low income families are recommended</p> <p>Research: No research recommendations.</p>

Study details	Main findings and implementation	Policy & Research Recommendations
	appear to be have been systematic differences between participating and non-participating families.	
<p>Citation: Milby et al 2005 [11]</p> <p>Intervention(s): 3 intervention groups: day treatment for substance abuse with no housing (NH) housing contingent upon abstinence (ACH) plus day treatment Housing not contingent on abstinence (NACH) plus day treatment Day treatment involved work therapy, CBT and aftercare in different phases of the intervention. Testing for marijuana, alcohol and cocaine occurred throughout intervention, with sanctions varying according to treatment group.</p> <p>Population: Cocaine-dependent homeless people with non-psychotic mental disorders</p> <p>Setting: Substance abuse treatment programme. Birmingham, Alabama, USA</p> <p>Health outcomes: 2 drug use measures collected: abstinence prevalence = proportion of participants abstinent each week, and weekly prevalence = most consecutive weeks abstinent for each participant.</p> <p>Design: Single blind RCT. Intervention occurred over 12 month period, with follow ups at 2, 6, and 12 months, although drug testing only collected sufficient data up to 6 months.</p> <p>Final sample N: 196</p>	<p>Mean consecutive weeks of abstinence were</p> <p>4.48 for NH group 6.60 for NACH group 8.32 for ACH group</p> <p>NS difference between NH and NACH groups, or between ACH and NACH groups, but sig. difference between NH and ACH (p=.0004)</p> <p>In phase 2, abstinence prevalence among NH group was 0.18 (0.036), among NACH group 0.40 (0.043), and among ACH group 0.46 (0.046). However, when level of attendance was controlled for, the ACH group fared significantly better.</p> <p>Mean consecutive weeks of abstinence adjusted for attendance: NH, NACH, and ACH: 5.28, 4.68, and 7.32</p> <p>Authors conclude that the provision of abstinence-contingent housing significantly improves substance abuse outcomes.</p> <p>Implementation: During this study, ACH participants earned independent income during the work therapy phase, with which they could access private accommodation if they were evicted from programme housing due to drug test failure. This may have diluted the programme effects.</p> <p>Participants in this study had agreed to take part in drug treatment programme; housing provision may not have such positive effects in addicts who are not interested in treatment.</p>	<p>Policy: Substance abusers should be provided with abstinence contingent housing during drug treatment.</p> <p>Research: Better methods for dealing with chronic problem of missing data in studies involving substance abusers are urgently required</p>
<p>Citation: Thomas et al 2005 [23]</p> <p>Intervention(s): Implementation of Single Regeneration Budget (SRB) housing improvement initiative to regenerate intervention area (Wythenshawe) (changes to heating, damp proofing, roofing etc)</p> <p>Population: Residents of deprived areas (council housing)</p> <p>Setting: Wythenshawe and Mersey Bank, South Manchester UK</p> <p>Health outcomes: GHQ12 score used to measure mental distress.</p> <p>Design: RCT , follow up at 22 months.</p> <p>Final sample N: 1344</p>	<p>Regression analyses controlled for age and susceptibility to mental distress using a 'restricted opportunities' scale to estimate psychosocial risk.</p> <p>Residing in the SRB area, or being a recipient of a housing improvement (whether in intervention or control group) was associated with greater mental distress as measured by GHQ12, perhaps as a result of environmental disruption associated with the intervention</p> <p>Authors conclude that stress contingent upon regeneration or housing improvement has negative impact on mental distress. This is contrary to expectations that improvement and/or regeneration would improve mental health</p> <p>They argue that better mental health</p>	<p>Policy: Future urban regeneration initiatives should establish residents' priorities and preferences prior to implementation of housing improvement</p> <p>"interventions that target the incidence of psychosocial risk."</p> <p>Research: No research recommendations.</p>

Study details	Main findings and implementation	Policy & Research Recommendations
	<p>outcomes are associated with lower psychosocial risk as measured by the restricted opportunities scale.</p> <p>Implementation: The follow-up survey may have been too soon after the intervention, so that apparent negative impact reflected the result of disruption and increased environmental nuisance caused by the intervention.</p> <p>Qualitative interviews conducted in tandem with this survey suggested that residents' concerns focused mainly on issues other than housing such as lack of employment opportunities, provision for children etc.</p>	
<p>Citation: Thomson et al 2007 [22]</p> <p>Intervention(s): Re-housing Local Housing Organisation tenants from sub-standard (damp, mouldy etc.) housing to new-build social housing.</p> <p>Population: LHO tenants</p> <p>Setting: West Dunbartonshire, Scotland</p> <p>Health outcomes: Self-rated health, SF36.</p> <p>Design: RCT, follow-up at 12 months.</p> <p>Final sample N: 100 (50 intervention, 50 control)</p>	<p>NS differences between intervention and control in health outcomes. Self-rated health over the past year = Excellent/Good: I = 15 (32.6%) C = 20 (40%) $\chi^2 = 0.368$, $p = 0.544$. Percentage change: I = +2.2% C = +6% $z = 0.92$ (95% CI 24.21 to 11.81). SF36v2 (Physical): I = 36.322 C = 36.864, $t = 20.07$ (95% CI 27.082 to 6.598), Change: I = +1.409 C = -0.317, I: paired t test = 1.01, (95% CI 21.418 to 4.236), C: paired t test = 20.238, (95% CI 23.01 to 2.372); SF36v2 (Mental) I = 46.052 C = 46.547, $t = 20.201$ (95% CI 25.376 to 4.387), Change: I = +2.083 C = -0.225, I: paired t test = 1.094, (95% CI 21.756 to 5.922), C: paired t test = 20.143, (95% CI 23.414 to 2.964).</p> <p>Although housing quality improved significantly, there was little sig. change in health.</p> <p>Implementation: No comment on implementation.</p>	<p>Policy: No policy recommendations.</p> <p>Research: Larger evaluative studies with longer follow-up periods are required to test the hypothesis that in the absence of wider policies to tackle multiple deprivation, housing improvement will not deliver major health improvements.</p>
<p>Citation: Tsemberis et al 2004 [12]</p> <p>Intervention(s): Housing First; intervention group = immediate permanent housing with no sobriety or treatment conditions, treatment and support available to participants.</p> <p>Control = housing contingent on sobriety and treatment.</p> <p>Intervention based on premise that lack of choice/control engendered by providing housing contingent upon sobriety/treatment leads to instability and prevents individuals from addressing multiple problems.</p> <p>Population: Substance dependent, chronically homeless people with psychiatric disorders</p> <p>Setting: Substance abuse treatment programme NY, USA</p> <p>Health outcomes: Alcohol and drug use: Drug and Alcohol Follow-back Calendar (drinks per day and days of drug use in previous 6 months). Substance abuse treatment utilisation:</p>	<p>NS difference in drug and alcohol use: alcohol use $F_{4,136} = 1.1$, $P = .35$</p> <p>drug use $F_{4,136} = .98$ $P = .42$</p> <p>Sig. difference in treatment utilisation, with control group using more services at each time and their use of services increasing over intervention period.</p> <p>NS difference in psychiatric symptoms: $F_{4,137} = .348$, $P = .85$</p> <p>The Housing First programme sustained an 80% housing retention rate, without leading to increase in substance abuse or psychiatric symptoms.</p> <p>Authors conclude that these results question practitioners' assumptions that chronically homeless are incapable of sustaining housing prior to substance abuse treatment.</p> <p>Implementation: They note that higher</p>	<p>Policy: "the elimination of treatment requirements as a precondition for housing, and the support of initiatives adopting a Housing First approach to end homelessness and increase integration into the community for individuals with psychiatric disabilities living on our streets"</p> <p>Research: Methods of accounting for or preventing under-reporting of substance use by this group are required.</p>

Study details	Main findings and implementation	Policy & Research Recommendations
<p>Treatment Services Inventory (use of 7 services in previous fortnight). Psychiatric symptoms: Colorado Symptom Index (15 item scale)</p> <p>Design: RCT, follow ups at 6, 12, 18 and 24 months</p> <p>Final sample N: NS (baseline=206 control 58%, intervention 42%)</p>	<p>levels of treatment use by control group were unsurprising giving that their housing was conditional on such treatment. Nonetheless, substance use among the control group did not differ significantly from the intervention group. Also, control group were more likely to under-report substance use for the same reasons.</p>	

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Table 4: methodological quality checklist for employment domain reviews

	Aust & Ducki 2004 [25]	Egan et al 2007 [30]	Bambra et al 2007 [26]	Bambra in press [28]	Bambra in press [29]	Fichtenburg and Glantz 2002 [31]	Moher et al 2005 [32]	Egan et al 2007 [34]	Rivara and Thompson 2000 [33]
Is there a well defined question?	+	+	+	+	+	+	+	+	+
Is there a defined search strategy?	+	+	+	+	+	+	+	+	+
Are inclusion / exclusion criteria stated?	+	+	+	+	+	?	+	+	+
Are the primary study designs and number of studies clearly stated?	+	+	+	+	+	+	+	+	+
Have the primary studies been quality assessed?	+	+	+	+	+	-	+	+	?
Have the studies been appropriately synthesised?	+	+	+	+	+	+	+	+	+
Has more than one author been involved at each stage of the review process?	?	+	+	+	+	?	+	+	?

Key: + yes; - no; ? unclear

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Table 5: results tables for employment domain reviews (9)

Review details*	Main findings and Implementation**	Research Recommendations	Quality appraisal***
<p><i>Citation:</i> Aust and Ducki (2004) [25]</p> <p><i>Review Objective:</i> To assess the effects of health circles</p> <p><i>Intervention(s):</i> Dusseldorf Health circles – staff discussion groups on improving potentially harmful working conditions (including psychosocial)</p> <p><i>Population:</i> Employees</p> <p><i>Health outcomes:</i> Health and wellbeing</p> <p><i>Relevant study N:</i> 5 (11), retrospective studies with/without control.</p> <p><i>Database N:</i> 10</p> <p><i>Time/language/country restrictions:</i> 1980-2001, Germany.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding:</i> Germany, German Academic Exchange Service.</p>	<p>1 controlled retrospective study of 3 health circles found that sickness absence and sickness absence due to low back pain increased across the whole company.</p> <p>1 retrospective study of 41 health circles reported that 40% of employees reported strong or some improvements in their self-reported health status; sickness absence also decreased from 10% to 5% after 6 months.</p> <p>1 other retrospective study found that participants in 5 health circles reported improvements in physical strain, work climate, and relationships to colleagues and supervisors.</p> <p>2 other retrospective studies of 2 or 3 health circles examined sickness absence: both reported decreases of 2 or 3 percentage points (in one study from 13% to 10%).</p> <p>Caution should be applied to results due to few controlled studies and lack of randomisation.</p> <p><i>Implementation:</i> No comments on implementation.</p>	<p>More studies that use at least a NRCT design. More studies that use statistical tests to analyse their data</p>	<p>1 2 3 4 5 6</p>
<p><i>Citation:</i> Egan et al (2007) [30]</p> <p><i>Review Objective:</i> Systematic review of the health and psychosocial effects of increasing employee participation and control through workplace reorganisation, with reference to the “demand–control–support” model of workplace health.</p> <p><i>Intervention(s):</i> Organisational level work reorganisation: participatory committees, control over hours of work.</p> <p><i>Population:</i> Employees</p> <p><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.</p> <p><i>Relevant study N:</i> 18 (18), prospective with/without controls, retrospective, qualitative.</p> <p><i>Database N:</i> 17</p> <p><i>Time/language/country restrictions:</i> Start date to 2006, no country/language limits but relevant studies were from USA, UK, Norway, Canada, Sweden, Netherlands, Japan.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding:</i> UK, Economic and Social Research Council.</p>	<p>Interventions that successfully increase employee control in the workplace appear to have a more consistent and positive impact on health outcomes than interventions that change demand and support.</p> <p>1 study reported that serum cholesterol levels improved for men but not women (T1-T2: men: P=0.02; women: P=0.09) Another controlled study reported that psychosocial improvements (P<0.05) for black and Hispanic, but not white, employees. 1 (uncontrolled) study found improvements in mean scores for strain for manual factory workers (from 2.71 to 2.45: P<0.01), but not managers or clerical staff (P>0.05), four years after a participation intervention implemented during company downsizing.</p> <p><i>Implementation:</i> Reporting of the interventions was generally poor or difficult to assess, even with the help of implementation evaluation tools. Lack of evidence that the interventions were implemented in full, or at all.</p>	<p>More robust evidence on the effects of interventions designed to increase employee control is required.</p> <p>Studies of the effect of participation interventions on workplace health inequalities.</p>	<p>1 2 3 4 5 6 7</p>
<p><i>Citation:</i> Bambra et al (2007) [26]</p>	<p>Task structure interventions were found not to alter the psychosocial work environment</p>	<p>Prospective, well controlled studies of task structure</p>	<p>1 2</p>

<p><i>Review Objective:</i> To systematically review the health and psychosocial effects (with reference to the demand–control–support model) of changes to the work environment brought about by task structure work reorganisation, and to determine whether those effects differ for different socioeconomic groups.</p> <p><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).</p> <p><i>Population:</i> Employees</p> <p><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.</p> <p><i>Relevant study N:</i> 19 (19), prospective with/without controls.</p> <p><i>Database N:</i> 17</p> <p><i>Time/language/country restrictions:</i> Start date to 2006, no country/language limits but relevant studies were from USA, UK, Sweden, Netherlands, Austria, Japan.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding:</i> UK, Economic and Social Research Council.</p>	<p>significantly, but where demands increased and control decreased, mental (and sometimes physical) health appeared to get worse. Increases in workplace support did not appear to mediate this relationship.</p> <p>Only one (uncontrolled) study of increased team working amongst Austrian local government civil servants differentiated by socio-economic status. It found that the adverse health effects of the intervention (perceived stress, emotional strain, tiredness) were only felt by the lowest grade employees.</p> <p>Two studies differentiated by gender: One controlled study of Japanese factory workers, found that depression levels improved only in men not women ($p < 0.05$). The other (uncontrolled) UK study of doctors, found no difference between men and women in terms of anxiety or depression ($p < 0.05$).</p> <p><i>Implementation:</i> Reporting of the interventions was generally poor or difficult to assess, even with the help of implementation evaluation tools. Lack of evidence that the interventions were implemented in full, or at all.</p>	<p>interventions which examine the impacts on the psychosocial work environment, health and health inequalities, and which also assess the fidelity of implementation, are therefore needed in the future. Studies which particularly examine the health and social effects of interventions which increase control would be the most useful.</p>	<p>3 4 5 6 7</p>
<p><i>Citation:</i> Bambra et al (in press) [28]</p> <p><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.</p> <p><i>Intervention(s):</i> Changing from an 8hr, 5 day week to a Compressed Working Week (CWW) of a 12hr/10hr, 4 day week.</p> <p><i>Population:</i> Shift workers</p> <p><i>Health outcomes:</i> 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.</p> <p><i>Relevant study N:</i> 40, prospective studies with/without controls, retrospective with/without controls.</p> <p><i>Database N:</i> 27 (27)</p> <p><i>Time/language/country restrictions:</i> Start date to 2005, no country/language limits but relevant studies were from Canada, USA, UK, Sweden, Netherlands, Australia, Japan,</p>	<p>CWW interventions did not always improve the health of shift workers, but they were seldom detrimental. However, the interventions generally improved work/life balance. There were few economic effects.</p> <p>One (uncontrolled) retrospective cohort study of Canadian factory workers differentiated outcomes by gender. Total morbidity decreased amongst men (from 1.02, 95% CI 1.00:1.05 to 0.47 95% CI 0.46:0.48) but not amongst women (from 0.76, 95% CI 0.71:0.82 to 0.67 95% CI 0.63:0.71). Injury rates also decreased for men ($p < 0.05$), but not women.</p> <p>No studies differentiated outcomes by socio-economic group. However, authors speculate that due to the concentration of shift work amongst lower socio-economic groups, CWW interventions which improve the health of shift workers have the potential to reduce inequalities.</p> <p><i>Implementation:</i> In a sizeable number of the studies, the intervention was either at the behest of the work force, or from the management out of a stated desire to improve health or WLB. However, in other studies, the motivation was more obviously efficiency or productivity. Some studies provided little information about the background to or detail about the implementation of the intervention.</p>	<p>Prospective, well controlled studies, which measure objective outcomes, and which describe the background to the study and the implementation of the intervention, are needed. Studies which examine the mental health effects of CWW interventions and any interaction with changes in work-life balance would be the most useful. Also a need for studies which differentiate by socio-economic group and look at health behaviour outcomes.</p>	<p>1 2 3 4 5 6 7</p>

<p>Switzerland.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding:</i> UK, Public Health Research Consortium.</p>			
<p><i>Citation:</i> Bambra et al (in press) [29]</p> <p><i>Review Objective:</i> To systematically review effects of organisational level interventions on the health and WLB of shift workers and their families.</p> <p><i>Intervention(s):</i> 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.</p> <p><i>Population:</i> Shift workers</p> <p><i>Health outcomes:</i> 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.</p> <p><i>Relevant study N:</i> 26 (26), cross-over controlled trial, prospective with/without, retrospective with/without.</p> <p><i>Database N:</i> 27</p> <p><i>Time/language/country restrictions:</i> Start date to 2005, no country/language limits but relevant studies were from Germany, USA, UK, Sweden, Netherlands, Australia, Japan, Finland, Denmark, France.</p> <p><i>Study designs:</i> All experimental and quasi-experimental, controlled and uncontrolled, prospective and retrospective evaluations.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding:</i> UK, Public Health Research Consortium.</p>	<p>Three types of intervention were found to have particularly beneficial effects on health and work-life balance: (1) Switching from slow to fast shift rotation; (2) Changing from backward to forward shift rotation; and (3) self-scheduling of shifts. Improvements were usually at little or no economic cost to the employer or employee.</p> <p>One study (a multiple intervention study of rotation) differentiated outcomes by age. It found that sleep quality improved ($F=8.48$, $p<.013$) for older workers (mean age 54 years) compared to younger workers (mean age 39 years).</p> <p>No studies differentiated outcomes by socio-economic group.</p> <p><i>Implementation:</i> There was relatively little information provided in some studies about the background to the interventions or how they had been implemented.</p>	<p>Reservations about the extent and quality of the evidence base on shift work reorganisation, which prospective, large N, well controlled studies should address.</p>	<p>1 2 3 4 5 6 7</p>
<p><i>Citation:</i> Fichtenberg and Glantz (2002) [31]</p> <p><i>Review Objective:</i> To quantify the effects of smoke-free workplaces on smoking in employees and compare these effects to those achieved through tax increases.</p> <p><i>Intervention(s):</i> Workplace smoking bans</p> <p><i>Population:</i> Employees in unrestricted and totally smoke-free workplaces</p> <p><i>Health Outcomes:</i> Daily cigarette consumption, smoking prevalence, cigarettes per day per employee</p> <p><i>Relevant study N:</i> 26 (26), uncontrolled observational studies: prospective and retrospective, cohorts and sequential cross-</p>	<p>Totally smoke-free workplaces are associated with reductions in prevalence of smoking of 3.8% (95% confidence interval 2.8% to 4.7%) and 3.1 (2.4 to 3.8) fewer cigarettes smoked per day per continuing smoker. Combination of the effects of reduced prevalence and lower consumption per continuing smoker yields a mean reduction of 1.3 cigarettes per day per employee, which corresponds to a relative reduction of 29%.</p> <p>If all workplaces became smoke-free, consumption per capita in the entire population would drop by 4.5% in the United States and 7.6% in the United Kingdom</p> <p><i>Implementation:</i> No comments on implementation.</p>	<p>No comments.</p>	<p>1 2 4 6</p>

sections. <i>Database N:</i> 5 <i>Time/language/country restrictions:</i> No details but relevant studies were from 1986-1996, USA, Australia, Canada, Germany. <i>Synthesis method:</i> Meta-analysis <i>Funding:</i> USA, National Cancer Institute			
<i>Citation:</i> Moher et al (2005) [32] <i>Review Objective:</i> To categorize workplace interventions for smoking cessation tested in controlled studies and to determine the extent to which they help workers to stop smoking or to reduce tobacco consumption. <i>Intervention(s):</i> Work place smoking restrictions/bans, with/without smoking cessation services; smoking cessation services <i>Population:</i> Working age smokers <i>Health Outcomes:</i> Smoking prevalence, number of cigarettes smoked, number of cigarettes smoked during working day. <i>Relevant study N:</i> 14 (61), quasi-experimental, uncontrolled before and after. <i>Database N:</i> 4 <i>Time/language/country restrictions:</i> 1966-2004, no time or language restrictions but relevant studies were from US, Australia and Canada only, 1983-1993. <i>Synthesis method:</i> Narrative <i>Funding:</i> National Health Service Research and Development Programme (UK)	Most studies were multi-intervention (bans/restrictions and smoking cessation programmes), only three uncontrolled studies looked at smoking restrictions/bans as single interventions. In six studies multi-intervention studies there was reduction in the number of cigarettes consumed during working hours. One of the uncontrolled single intervention evaluations also reported a decrease in work consumption from 7.7 pre-ban to 4.2 at 12 months. However, there was less consistent evidence that the overall daily consumption decreased. Six multi-intervention studies, and two single intervention studies, reported a ns decrease in overall consumption while three multi-intervention studies found no decrease or a ns increase. There is inconsistent evidence that smoking prevalence can be reduced as five studies, including two single intervention studies, reported no change, and four studies (one single intervention ban only study) Tsushima 1991) reported only ns decreases. Four multi-intervention studies however reported significant decreases: Two uncontrolled studies reported a decrease in prevalence from 22% to 14% (P < 0.003), and 29% to 24% P < 0.001) respectively at 12 months post-ban; a controlled study reported that the three-month CO-validated quit rates were higher in the workplace with a policy compared to one without (9.2% versus 1.4%, P < 0.02), as were the nine-month validated quit rates of 10.8% versus 2.9% (P < 0.03); the other controlled study found a net decrease in cessation rates of 4% (7% in the ban hospital and 11% in the comparison hospital, no P value given). One multi-intervention USA study found a net reduction in the percentage of workers reporting a sick day in the last month between treatment and control sites of 3.7% (P = 0.04) in cross-sectional analysis and 3.4% (P = 0.06) in cohort analysis. <i>Implementation:</i> Many of the studies were multi-intervention so difficult to assess the effects of workplace bans alone.	Future studies should include measurement of direct and indirect costs, and economically relevant outcomes such as absenteeism and productivity.	1 2 3 4 5 6 7
<i>Citation:</i> Egan et al (2007) [34] <i>Review Objective:</i> To systematically review the effects of privatising industries and utilities on the health (including injuries) of employees and the public. <i>Intervention(s):</i> Privatisation of public utilities	Psychosocial outcomes: The 3 highest quality studies, of psychosocial outcomes, suggested that job insecurity and unemployment resulting from privatisation impacted adversely on mental health and on some physical health outcomes.	Prospective and if possible controlled studies. More robust evaluations of health impacts of privatisation.	1 2 3 4 5 6 7

<p>and industries</p> <p><i>Population:</i> Those affected by privatisation of public utilities and industries (employees and general public)</p> <p><i>Health Outcomes:</i> General health, psychosocial outcomes and injury rates, health inequalities.</p> <p><i>Relevant study N:</i> 11 (11), prospective with/without controls, uncontrolled interrupted time series analyses.</p> <p><i>Database N:</i> 21</p> <p><i>Time/language/country restrictions:</i> 1945-2003/none/developed countries. Relevant studies were from the UK and Portugal, 1995 – 2003.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding:</i> UK, Economic and Social Research Council.</p>	<p>1 controlled prospective cohort found that 18 months after privatisation, longstanding illness increased among unemployed respondents not seeking work (OR 2.25; 95% CI: 1.1 to 4.4) compared with those in secure re-employment and respondents who were unemployed and seeking work or in insecure employment reported significant increases in GHQ 12 scores (mean difference 1.56 (95% CI: 1.0 to 2.2) and 1.25 (95% CI: 0.6 to 2.0) respectively) and were more likely to report >3 GP consultations in the past year (OR 2.04 (1.1 to 3.8) and 2.39 (1.2 to 4.7) respectively).</p> <p>A prospective cohort study found that 8 months after privatisation, occupational stress amongst clerical and administrative staff had increased to 51.87, compared with 48.86, 1 month prior to privatisation (P=0.018). No significant changes in OSI mean score occurred amongst manual workers or managers over the same period.</p> <p>In a controlled repeat cross-sectional study mental and physical ill-health symptoms were similar for both intervention and control groups before and after privatisation (F(1, 123) = 0.0, P>0.05).</p> <p>Injury related outcomes: 8 ITS studies of routine injury data before and after privatisation found no conclusive evidence of significant effects in either direction.</p> <p><i>Implementation:</i> No comments on implementation.</p>		
<p><i>Citation:</i> Rivara and Thompson (2000) [33]</p> <p><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.</p> <p><i>Intervention(s):</i> Legal regulations (increased safety regulations) to prevent falls from height in construction industry.</p> <p><i>Population:</i> Construction workers</p> <p><i>Health Outcomes:</i> self-reported falls, self-reported injuries, documented falls (workers compensation), and injuries.</p> <p><i>Relevant study N:</i> 1(3), controlled cross-sectional ecological study of administrative data.</p> <p><i>Database N:</i> 5</p> <p><i>Time/language/country restrictions:</i> No restrictions but relevant study was from USA, 1997.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding:</i> None acknowledged</p>	<p>Only relevant study was a controlled cross-sectional ecological study of administrative data. It compared firms that had been inspected versus those that had not. The study found that regulations, which are enforced with inspections, might be associated with a decrease in fall injury rates (using workers compensation data). However, authors were concerned that the decrease in falls may be at least partly due to regression to the mean in that the rate of falls even after the intervention was higher in the inspected sites than the baseline rate in the control sites.</p> <p><i>Implementation:</i> No comments on implementation.</p>	<p>Better designed studies e.g. RCTs, case-controls or observational designs need to be used urgently especially given the severity of the rate of injuries in the construction industry.</p>	<p>1 2 3 4 6</p>

* total no of studies in review in parentheses

** Limited by details included in the reviews – these vary with some authors providing effect sizes etc and others not.

***Following the DARE quality guidelines employed in a recent umbrella review of tobacco control interventions (REF): 1= Is there a well-defined question? 2= Is there a defined search strategy? 3= Are inclusion/exclusion criteria stated? 4= Are study designs and number of studies clearly stated? 5= have the primary studies been quality assessed? 6= Have the studies been appropriately synthesised? 7= Has more than one author been involved in each stage of the review process?

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Table 6: methodological quality checklist for unemployment domain reviews

	Adams et al 2006 [37]	Bambra et al 2005 [27]	Crowther et al 2001 [36]
Is there a well defined question?	+	+	+
Is there a defined search strategy?	+	+	+
Are inclusion / exclusion criteria stated?	+	+	+
Are the primary study designs and number of studies clearly stated?	+	+	+
Have the primary studies been quality assessed?	+	+	+
Have the studies been appropriately synthesised?	+	+	+
Has more than one author been involved at each stage of the review process?	-	+	+

Key: + yes; - no; ? unclear

Table 7: results tables for unemployment domain reviews (3)

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal** *
<p><i>Citation:</i> Adams et al 2006 [37]</p> <p><i>Objective:</i> To conduct a systematic review of the health, social and financial impacts of welfare rights advice delivered in healthcare settings.</p> <p><i>Intervention(s):</i> Professional welfare rights advice in health care settings (welfare benefit maximization)</p> <p><i>Population:</i> Primary care patients</p> <p><i>Relevant outcomes:</i> Health, finance</p> <p><i>Relevant study N:</i> 55, RCT, NRCT, before and after, qualitative.</p> <p><i>Database N:</i> 20</p> <p><i>Time/language/country restrictions:</i> Up to 2004.No place or language restrictions but all relevant studies were from the UK and USA.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding source:</i> None</p>	<p>7 controlled studies reported 72 comparisons, of which 7 were significant including: SF36 vitality (change): Control group mean score -7, Intervention group mean score +7.7, p=0.001 in score post-intervention) SF36 mental health (change): C -4.8, I + 7.2, p=0.019 SF36 bodily pain: C 30, I 43.1, p=0.013 SF36 role functioning emotional: C 42.7, I 52.2, p=0.02 SF36 mental health: C 56, I 58.3 p=0.03 NHP pain p=0.07 NHP emotional reaction p=0.046</p> <p>6 before-and-after studies reported 59 comparisons, of which 6 were significant: (mean score at follow up) SF36 vitality: 28.5. p=0.002 SF36 role functioning emotional: 51.4, p=0.037 SF36 mental health: 53.1, p=0.005 SF36 general health (6 months): 31.09, p=0.002 SF36 general health (12 months): 33.59, p=0.076 SF36 mental health: 47.86, p=0.076 NHP pain p=0.012 NHP emotional p=0.033</p> <p>Welfare rights advice in healthcare settings leads to financial benefits (mean annual gain of £1026/client), little evidence that the advice leads to measurable health and social benefits (largely due to absence of good quality evidence rather than evidence of absence of effect).</p> <p>Qualitative data in studies suggested that extra money was spent on healthier food, avoidance of debt, household bills, transport and socialising.</p> <p><i>Implementation:</i> No comments on implementation.</p>	<p>Research is needed to explore the characteristics of those most likely to benefit financially.</p> <p>More robust studies required, randomised and controlled with more specific health measures and appropriate follow-up periods to examine the health and social outcomes. Need for non-UK evaluations.</p>	<p>1 2 3 4 5 6</p>
<p><i>Citation:</i> Bambra et al 2005 [27]</p> <p><i>Objective:</i> To conduct a systematic review of the evidence on the impact on employment outcomes of UK W2W programmes for disabled people.</p> <p><i>Intervention(s):</i> Welfare to work - A. Education, training and work placements; B. vocational advice and support services; C. in-work benefits for employees; D. employer incentives; E. physical accessibility.</p> <p><i>Population:</i> Unemployed working age adults (16-59/64) with a disability or chronic illness</p> <p><i>Relevant outcomes:</i> Percentage of participants in employment</p> <p><i>Relevant study N:</i> 16, un/controlled prospective cohort, un/controlled cross-section, qualitative.</p>	<p>Employment effects ranged from 11-50%, this varied by intervention type, participant characteristics and local labour market context.</p> <p>A: 4 uncontrolled studies found that 18-50% of participants were in employment at 13 weeks to 2 years post-intervention.</p> <p>B: 4 studies found improved employment outcomes. However., the only controlled study found NS difference between intervention and control.</p> <p>C: 4 studies found little impact on return-to-work decisions, primarily due to low awareness.</p> <p>E: 4 uncontrolled studies found that 41% of participants said they would not have returned to work without the scheme.</p>	<p>Comprehensive, mixed-method studies of complex social interventions including both experimental and qualitative method, which investigate the manner in which the desired outcome was (or was not) achieved.</p>	<p>1 2 3 4 5 6 7</p>

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal** *
<p><i>Database N:</i> 17</p> <p><i>Time/language/country restrictions:</i> up to 2002; English, UK.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding source:</i> Economic and Social Research Council (UK)</p>	<p>3 studies examined outcomes by gender: 1 found a higher employment rate for women (intervention B), 1 found ns difference (intervention B), and 1 found a higher employment rate for men than women (intervention C). 3 studies of intervention type A examined outcomes by type of disability: 1 study found that those with sensory problems were less likely to be employed (23.6% v 43%); another found ns difference by impairment, and a third found that those with mental health problems were significantly less likely to gain employment (p<.007).</p> <p>Qualitative respondents often asserted would not have got into work without intervention.</p> <p>Controls rarely used, so possible confounding effect by relatively buoyant labour market.</p> <p>Overall, the evidence for positive effects on employment outcomes was not compelling</p> <p><i>Implementation:</i> No comments on implementation.</p>		
<p><i>Citation:</i> Crowther et al 2001 [36]</p> <p><i>Objective:</i> To determine the most effective way of helping people with severe mental illness to obtain competitive employment.</p> <p><i>Intervention(s):</i> Supported employment or prevocational training.</p> <p><i>Population:</i> People with severe mental illness (schizophrenia, bipolar disorder, depression with psychotic features) 18-65, 38% were minority ethnic.</p> <p><i>Health outcomes:</i> Proportion in competitive employment, other employment related outcomes, clinical outcomes, costs.</p> <p><i>Relevant study N:</i> 11, RCTs</p> <p><i>Database N:</i> 4</p> <p><i>Time/language/country restrictions:</i> USA, up to 1998.</p> <p><i>Synthesis method:</i> Meta-analysis and narrative</p> <p><i>Funding source:</i> NHS Health Technology Assessment Program (UK)</p>	<p>The 5 RCTs which compared prevocational training with standard care found no significant difference in employment rates (after 3,6,9,12, or 18 months).</p> <p>1 RCT compared supported employment with standard care. There was no significant difference in employment rates after 12 months (RR 1.01 95%CI 0.93:1.09), but after 24 (RR 0.92, 0.85:0.99) and 36 months (RR 0.8, 0.82:0.96) supported employment participants were more likely to be in employment. They were also likely to earn more (after 12 months, \$60.50 per month compared to \$26.90, p<0.05).</p> <p>5 RCTs showed that people in supported employment were more likely to be in competitive employment than those who received prevocational training at 4, 6, 9, 12,15 and 18 months. For example, at 12 months pooled employment rates were 34% to 12%, (RR 0.76, 0.69:0.84). 3 of 4 trials showed that supported employment had higher monthly earnings (\$127.1 v \$71.7, \$188.5 v \$59.9, \$41.9 v \$11.8). 2 trials found ns difference in self-esteem, QoL and symptom severity.</p> <p>Data on clinical outcomes were inconclusive, but suggested no sig. difference between supported employment and prevocational training.</p> <p><i>Implementation:</i> In the only trial which compared supported employment to standard care, the supported employment group also received assertive community</p>	<p>Trials only conducted in USA so research in other welfare systems such as the UK needed.</p>	<p>1 2 3 4 5 6 7</p>

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal** *
	treatment, making the results difficult to interpret.		

* total no of studies in review in parentheses

** Limited by details included in the reviews – these vary with some authors providing effect sizes etc and others not.

***Following the DARE quality guidelines employed in a recent umbrella review of tobacco control interventions (REF): 1= Is there a well-defined question? 2= Is there a defined search strategy? 3= Are inclusion/exclusion criteria stated? 4= Are study designs and number of studies clearly stated? 5= have the primary studies been quality assessed? 6= Have the studies been appropriately synthesised? 7= Has more than one author been involved in each stage of the review process?

Table 8: results tables for unemployment domain primary studies (4)

Study details	Main findings and implementation	Policy & Research Recommendations
<p>Citation: Abbot et al 2005 [41]</p> <p>Intervention(s): Welfare benefits advice delivered in primary care setting</p> <p>Population: Older benefit recipients with chronic health conditions</p> <p>Setting: England (variety of areas)</p> <p>Health outcomes: all domains of SF36, also health and QoL outcomes.</p> <p>Design: Prospective cohort with comparison group (those not eligible for income increase), follow-ups at 6 and 12 months.</p> <p>Final sample N: 201</p>	<p>At T2 the only significant improvement between intervention and control groups was in bodily pain: age and baseline scores adjusted mean difference = 7.83, CI 1.70 – 13.97, p= 0.013. Small improvements for intervention group in other SF36 domains were NS.</p> <p>At T3 there were significant improvements in the intervention group in emotional role: adjusted mean difference 16.37, CI 2.72-30.01, p=0.02 and in mental health: adjusted mean difference 6.85, CI 0.72-12.98, p=0.03. Other differences were NS, and earlier improvements had not been sustained.</p> <p>The concurrent survey of successful claimants found that over half reported improved ability to pay bills, use transport and purchase more or better food.</p> <p>The authors suggest that greater improvements in psychosocial health after 12 months are to be expected given that the physical effects of any income increase would occur over a much longer period.</p> <p>Authors conclude that health impact is modest</p> <p>Implementation: No comment on implementation.</p>	<p>Policy: Welfare benefits advice has a role to play in the delivery of holistic care.</p> <p>Research: No research recommendations</p>
<p>Citation: Adam et al 2006 [40]</p> <p>Intervention(s): Pathways to work, comprising: Mandatory Work Focused Interviews – attendance at a WFI 8 weeks after initial IB claim, agreement of Work Focused Action Plan with advisor, subsequent monthly WFIs, for selected claimants. Sanctions incurred by non-attendance.</p> <p>'Choices' various labour market programmes and condition management programmes plus New Deal for disabled people.</p> <p>Financial incentives: £40 per week in-work benefits for first year of employment if gross earnings > £15k; additional discretionary payments to assist in job-seeking.</p> <p>Population: Individuals living in the pilot areas who made a telephone enquiry about IB.</p> <p>Setting: Job Centre Plus (UK welfare benefits and employment agencies) – 6 pilot areas in UK.</p> <p>Health outcomes: Self-reported health problems which limit every day activities.</p>	<p>Health problems which limit everyday activities (self-reported): reduced by 2.87 percentage points post-intervention (p < .05). This was not a large difference, and the majority still reported limiting health problems (89%)</p> <p>Employment: after 10 months, number reporting having worked in week prior to interview increased by 9.4% in the intervention areas (from a base of 22.5%)</p> <p>Earnings: estimated net increase of £72 in monthly earnings, though authors state this is 'imprecisely estimated' and NS</p> <p>IB receipt: reduction of 8.2% in IB receipt –from a base of 57.6%</p> <p>Policy appeared to have greater impact on over 45s, and also to vary according to nature and number of an individual's health problems. Those with only one health problem were more likely to move into work (unless it was a mental problem)</p>	<p>Policy: No policy recommendations</p> <p>Research: No research recommendations</p>

<p>Design: Prospective cohort with comparison group. Pre-policy pilot follow up at 12 months, early policy pilot follow up at 9 months.</p> <p>Final sample N: unclear (baseline=8035)</p>	<p>Implementation: Data collected relatively soon after implementation, results of later studies based on data collected after longer bedding-in period may vary.</p> <p>This evaluation cannot differentiate between different aspects of this heterogeneous intervention.</p> <p>The launch of the pilots may have impacted on individual's decisions regarding timing of claim.</p>	
<p>Citation: Greasley 2003 [39]</p> <p>Intervention(s): Placement of welfare rights, debt advice and immigration advice workers in 30 Bradford general practices. Counsellors were also employed as part of the project</p> <p>Population: Residents of deprived areas in Bradford</p> <p>Setting: General practice (primary care) in Bradford, UK</p> <p>Health outcomes:</p> <p>Design: Prospective cohort, follow-ups at 6 and 12 months</p> <p>Final sample N: 22 (of relevant patients who completed all 3 questionnaires) (16.7% of T1 sample)</p>	<p>SF-36 (higher score = better functioning) T1, T2, T3 means and ANOVA F ratios</p> <p>There was a sig. improvement in general health and mental health between T1 and T3 (SF-36): General Health 22.90 (18.1) 31.09 (18.5) 33.59 (20.1) F = 15.33, p<.001*; Mental Health 37.14 (18.2) 42.85 (18.9) 47.86 (18.5) F = 5.83, p<.025*. NS reductions in anxiety, vitality and social functioning. Responses to open-ended questions also suggested that welfare rights advice had a positive impact on respondents.</p> <p>Implementation: No comment on implementation.</p>	<p>Policy: Author recommends that welfare advice should be provided in general practice.</p> <p>Research: No research recommendations</p>
<p>Citation: Mackintosh et al 2006 [38]</p> <p>Intervention(s): The intervention comprised a structured welfare rights assessment followed by active assistance with welfare benefit claims over the following 24 months. The control group received the intervention after a six month delay.</p> <p>Population: 60 years and over, resident in areas of high deprivation</p> <p>Setting: Newcastle upon Tyne, UK</p> <p>Health outcomes: In all, 20 outcome measures were used including SF36 physical and mental, Hospital Anxiety and Depression score (HAD) anxiety and depression, and a range of health behaviour and psychosocial measures</p> <p>Design: Single blind RCT, follow-ups at 6, 12 and 24 months.</p> <p>Final sample N: 109</p>	<p>At all follow ups, there was little significant change in health or any other outcomes across any of the measures used. The only sig. change, at T2 (6 months) was in financial vulnerability score among intervention group: (-1.6, CI -2.6 to -0.7). Lack of sig. changes may be due to issues with the study design described below.</p> <p>The accompanying qualitative study suggested that those who received a benefit increase were more able to participate in society and had greater 'peace of mind'.</p> <p>68% of intervention group received a welfare benefits award (including non-financial). Median financial award was £55 per week.</p> <p>Implementation: Mean intervention cost per case was £120.18</p>	<p>Policy: No policy recommendations</p> <p>Research: A future, definitive study which uses scales that are sensitive to small changes, which only includes those who had a successful welfare outcome in the intervention group, and with a longer gap between intervention and control group, is required.</p>

Table 9: methodological quality checklist for health domain reviews

	Anderson et al 2003 [42]	Gruen et al 2005 [44]	Lewin et al 2005 [47]	Pignone et al 2005 [46]
Is there a well defined question?	+	+	+	+
Is there a defined search strategy?	+	+	+	+
Are inclusion / exclusion criteria stated?	+	+	+	+
Are the primary study designs and number of studies clearly stated?		+	+	+
Have the primary studies been quality assessed?	+	+	+	+
Have the studies been appropriately synthesised?	+	+	+	+
Has more than one author been involved at each stage of the review process?	?	+	+	+

Key: + yes; - no; ? unclear

Table 10: results tables for healthcare services domain reviews (4)

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal***
<p><i>Citation:</i> Anderson et al 2003 [42]</p> <p><i>Objective:</i> to determine the effectiveness of interventions to improve cultural competence in healthcare systems.</p> <p><i>Intervention(s):</i> Interventions to make health care services more 'culturally competent': A. Programs to recruit and retain diverse staff; B. Use of interpreters; C. Cultural staff competency training; D. Use of linguistic and culturally appropriate health education materials; culturally specific health care settings.</p> <p><i>Population:</i> Lower income ethnic minority groups</p> <p><i>Health outcomes:</i> Client satisfaction with care, ethnic differences in use of services or treatment, health</p> <p><i>Relevant Study N:</i> 6, intervention studies.</p> <p><i>Database N:</i> 8</p> <p><i>Time/language/country restrictions:</i> Established market economies, English, 1965-2001</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funder:</i> Robert Wood Johnson Foundation</p>	<p>No evidence on health outcomes or health inequalities found.</p> <p>No studies found for interventions A or E.</p> <p>B. 1 study found that a follow up appointment was more likely amongst uninsured Latino patients if language competent staff (OR 1.79, 1.00: 3.23) or translators used (OR 1.92, 1.11 : 3.33), ns difference in compliance with future appointments.</p> <p>C. 1 study recorded greater satisfaction amongst lower income African-Americans with culturally trained counselors than controls (standard effect size 1.6, p<.001). Those assigned to intervention more likely to return for follow up appointments (absolute difference 33%, p<.001).</p> <p>D. 1 study of culturally competent health education videos recorded increased rates of health care access (185 increase after 2 weeks in HIV tests, p<.01). 3 other studies recorded positive increases in satisfaction with the relevance of materials.</p> <p><i>Implementation:</i> No comments on implementation.</p>	<p>Research is needed which looks at health outcomes, what works best, where and for whom. Studies which compare intervention effects by sub-group.</p>	<p>1 2 3 5 6</p>
<p><i>Citation:</i> Gruen et al 2005 [44]</p> <p><i>Objective:</i> to assess the effectiveness of specialist outreach clinics on access, quality, health outcome, patient satisfaction, use of services and cost.</p> <p><i>Intervention(s):</i> Specialist outreach clinics in primary care or rural hospital settings:</p> <p><i>Population:</i> Specialist care patients, primary care practitioners, specialists.</p> <p><i>Health outcomes:</i> Health service access.</p> <p><i>Relevant Study N:</i> 6 (9), RCT, interrupted time series.</p> <p><i>Database N:</i> 6</p> <p><i>Time/language/country restrictions:</i> Up to 2002; English; no country restrictions, relevant studies were from Australia, UK, USA, Holland.</p> <p><i>Synthesis method:</i> Meta-analysis and narrative</p> <p><i>Funder:</i> National Health and MRC Australia, Royal Australian College of Surgeons, Australasian Cochrane Centre.</p>	<p>Specialist outreach appears to improve: access to primary care and health outcomes.</p> <p>Service delivery: 1 RCT found a 19% decrease in costs, a 29% decrease in distance travelled and a 41% decrease in time taken. 1 interrupted time series found a 390% increase in specialist consultancies.</p> <p>4 RCTs of health outcomes: 1 reported ns differences in clinical or subjective symptoms except self-reported physical and mental health which improved in 35% of intervention v 23% of controls. 3 other RCTs reported an improvement in symptoms in the intervention group (RR 0.63, 0.52:0.77).</p> <p>Rural and disadvantaged populations most likely to gain most from specialist outreach.</p> <p><i>Implementation:</i> Multi-faceted outreach was most effective in rural or disadvantaged settings.</p>	<p>Rigorous evaluations of specialist outreach for rural and disadvantaged populations. RCTs or studies designed to minimise confounding. Clearer typology of outreach interventions.</p>	<p>1 2 3 4 5 6 7</p>
<p><i>Citation:</i> Lewin et al 2005 [47]</p> <p><i>Objective:</i> to assess the effects of lay health worker interventions in primary and community health care</p>	<p>Health outcomes reported: (all compared with usual care unless otherwise stated):</p> <p>Promoting immunisation: increased</p>	<p>Better quality studies needed. Research focused on identifying which</p>	<p>1 2 3 4</p>

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal***
<p>on health care behaviours, patient's health and well-being and satisfaction with care.</p> <p><i>Intervention(s):</i> Any intervention delivered by lay health workers and intended to promote health, manage illness or support people.</p> <p><i>Population:</i> Users of lay health worker services</p> <p><i>Health outcomes:</i> Morbidity and mortality, Treatment assessment measures, Health service uptake, Behaviour change, psychosocial measurements and quality of life.</p> <p><i>Relevant study N:</i> 35 (43), RCT, cluster RCT.</p> <p><i>Database N:</i> 8</p> <p><i>Time/language/country restrictions:</i> None stated, relevant studies were from 1972-2002 in USA, New Zealand, UK, Canada, Australia, Ireland.</p> <p><i>Synthesis method:</i> Meta analysis and narrative</p> <p><i>Funder:</i> German Technical Development, European Union, MRC of South Africa</p>	<p>immunisation uptake (RR 1.30, 1.14:1.48)</p> <p>Promoting breast cancer screening, pooled for 5 studies: RR = 1.05 (CI 0.99, 1.12) – little evidence for beneficial effect of intervention in increasing the uptake of screening.</p> <p>Treating hypertension: 1 study found NS difference. 1 study found an increase in patients attending follow up appointments (p<.001).</p> <p>Support for recovering alcoholics: 2 studies found NS difference in alcohol use measures.</p> <p>Support for mothers of sick children: 2 studies reported maternal anxiety significantly lower in intervention group.</p> <p>Home aid services for elderly: 1 study found a decrease in mortality, 1 found NS difference.</p> <p>Study contexts may differ from real-life intervention in ways that influence findings, e.g. scale may be much smaller, patients may be more carefully selected.</p> <p><i>Implementation:</i> the interventions were frequently poorly described, hampering investigation of which elements had beneficial effects.</p>	<p>component of the interventions deliver benefits. Coherent typology of interventions needed urgently. Economic studies. Studies comparing with other professional interventions rather than usual care.</p>	<p>5 6 7</p>
<p><i>Citation:</i> Pignone et al 2005 [46]</p> <p><i>Objective:</i> to evaluate interventions to improve health outcomes for patients with low literacy and reduce disparities in health outcomes associated with low literacy.</p> <p><i>Intervention(s):</i> Health education materials</p> <p><i>Population:</i> Patients with low literacy</p> <p><i>Health outcomes:</i> Health knowledge, health behaviours, biochemical/biomarkers e.g. blood pressure, measures of disease, self-reported general health, utilisation of health services, costs of care, disparities in health (ethnicity, culture, age)</p> <p><i>Relevant study N:</i> 20, RCT, non-random CT (NRCT), uncontrolled trials.</p> <p><i>Database N:</i> 7</p> <p><i>Time/language/country restrictions:</i> 1980-2003, English, Developed countries.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funder:</i> Supported by a contract to Agency for Healthcare Research and Quality.</p>	<p>Difficult to draw conclusions due to diversity of outcomes, interventions and quality of studies.</p> <p>Health knowledge (objective scale): 12 studies (8 RCTs). Mixed effects - some studies found increased knowledge, others found no effect.</p> <p>Health behaviours: 4 studies (1 RCT, 3 NRCT) with mixed outcomes e.g. one study found improvement in diet whilst another found no effect.</p> <p>Biochemical/biomarkers: 2 RCTs found no significant improvements in cholesterol levels.</p> <p>Measures of disease: 1 RCT found a reduction in depression amongst low income parents.</p> <p>No studies on self-reported general health or disparities in health.</p> <p>Implementation: Interventions are generally poorly described, and involve multiple elements, so that there is a lack of clarity about which elements are effective.</p>	<p>More intervention studies needed that examine whether the association between low literacy and adverse health outcomes is direct (so could be overcome by improved literacy) or indirect (and might therefore be better addressed by interventions that address poverty, racism etc). Studies need to stratify results by literacy levels. Studies should look at longer term health outcomes.</p>	<p>1 2 3 4 5 6 7</p>

* total no of studies in review in parentheses

** Limited by details included in the reviews – these vary with some authors providing effect sizes etc and others not.

***Following the DARE quality guidelines employed in a recent umbrella review of tobacco control interventions: 1= Is there a well-defined question? 2= Is there a defined search strategy? 3= Are inclusion/exclusion criteria stated? 4= Are study designs and number of studies clearly stated? 5= have the primary studies been quality assessed? 6= Have the studies been appropriately synthesised? 7= Has more than one author been involved in each stage of the review process?

Table 11: results tables for healthcare services domain primary study (1)

Study details	Main findings and implementation	Policy & Research Recommendations
<p><i>Citation:</i> Majumdar et al 2004 [43]</p> <p><i>Intervention(s):</i> Cultural sensitivity training; exact nature of intervention unclear.</p> <p><i>Population:</i> Health care providers and patients</p> <p><i>Setting:</i> Urban area of Southern Ontario, Canada</p> <p><i>Health outcomes:</i> mental and physical health outcomes</p> <p><i>Design:</i> Prospective cohort with control, follow-ups at 3,6 and 12 months</p> <p><i>Final sample N:</i> not stated (baseline patients N=133 providers N=114)</p>	<p><i>Patient outcomes:</i> no sig. differences between intervention and control in mental health or physical health outcomes, or 'activities of daily living' at periods T1-4.</p> <p><i>Implementation:</i> The brevity of the period between providers receiving training and the onset of the study may have limited the apparent impact of the training</p>	<p><i>Policy:</i> The authors conclude that the study findings support the implementation of cultural awareness training programmes.</p> <p><i>Research:</i> Longer study period. Identify alternative patient groups, as rate of attrition in cancer/palliative care patients is very high. More efforts to include minority patients in such studies.</p> <p>Larger samples and involvement of multiple agencies.</p>

Table 12: methodological quality checklist for transport domain reviews

	Bunn et al 2003 [51]	Egan et al 2003 [52]	Ogilvie et al 2004[50]	Pilkington & Kinra (2005) [67]	Shults et al 2001[49]
Is there a well defined question?	+	+	+		+
Is there a defined search strategy?	+	+	+		+
Are inclusion / exclusion criteria stated?	+	+	+		+
Are the primary study designs and number of studies clearly stated?	+	+	+		+
Have the primary studies been quality assessed?	+	+	+		+
Have the studies been appropriately synthesised?	+	+	+		+
Has more than one author been involved at each stage of the review process?	+	+	+		+

Key: + yes; - no; ? unclear

Table 13: Results tables for transport domain reviews (5)

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal***
<p><i>Citation:</i> Bunn et al 2003[51]</p> <p><i>Objective:</i> To assess whether area-wide traffic calming schemes can reduce road crash related death and injuries.</p> <p><i>Intervention(s):</i> Area wide traffic calming schemes e.g. creation of one ways, speed humps etc.</p> <p><i>Population:</i> No restrictions</p> <p><i>Health outcomes:</i> Road user deaths and injuries, traffic crashes</p> <p><i>Relevant study N:</i> 16, controlled before and after studies.</p> <p><i>Database N:</i> 10</p> <p><i>Time/language/country restrictions:</i> None stated but relevant studies were from Germany, UK, Australia, Netherlands, 1981-1993.</p> <p><i>Synthesis method:</i> Meta-analysis</p> <p><i>Funding source:</i> MRC (UK)</p>	<p>8 studies of road user deaths: pooled rate ratio 0.63 (95% CI 0.14 to 2.59). However, small number of events makes these results less precise.</p> <p>16 studies of user injuries: pooled rate ratio 0.89 (0.8 to 1.00).</p> <p>No significant reduction in crashes.</p> <p>Intervention has potential to reduce traffic injuries and deaths.</p> <p><i>Implementation:</i> Intervention heterogeneity may lead to variation in outcomes.</p>	<p>Rigorous evaluations of traffic calming schemes in low/middle income countries</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p>
<p><i>Citation:</i> Egan et al 2003 [52]</p> <p><i>Objective:</i> To synthesize evidence of the health effects of new road building.</p> <p><i>Intervention(s):</i> A. Major urban roads; B. Bypasses; C. Major connecting roads.</p> <p><i>Population:</i> Residents of areas affected by building of new roads</p> <p><i>Health outcomes:</i> Road injuries, respiratory health</p> <p><i>Relevant study N:</i> 12 (32), controlled before and after.</p> <p><i>Database N:</i> 37</p> <p><i>Time/language/country restrictions:</i> Up to 2002. No language or country restrictions but relevant studies were from Norway, New Zealand, USA, Denmark, UK, Australia, Sweden, Germany.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding source:</i> ESRC (UK), CSO (Scotland)</p>	<p>A. New major urban roads (4 studies): little evidence that they reduce incidence of injury. 2 studies found negligible decreases in injuries (4% and 1%), 2 others found significant injury decreases (19% and 8.5%). 1 study of respiratory health after the opening of a new road (M1) was inconclusive. 1 retrospective study found an increase of 17% in tiredness, headaches and nerves amongst residents after the building of a new road.</p> <p>B. Bypasses (5 studies): 4 studies found a reduction in injuries from accidents on main routes through/around towns. 3 studies found significant decreases of 33%, 25% and 19%. 1 other found a smaller decrease of 4% and another found no difference after the intervention.</p> <p>C. Major connecting roads (3 studies): 2 studies found significant decreases (range 19% - 32%) and another an ns decrease of 6%.</p> <p><i>Implementation:</i> No comments on implementation.</p>	<p>Studies of higher quality needed: non-random sampling, inadequate response rates, brief follow up periods, use of non-validated questionnaires, lack of controls and lack of longitudinal studies compromise quality of evidence.</p> <p>Studies of areas experiencing increase in traffic as result of intervention (i.e.: rural areas).</p> <p>Studies of impact of new roads on: access to health services; health inequalities; physical activity; specific pollutants.</p> <p>Studies of alternative interventions to reduce traffic in residential areas.</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p>

<p><i>Citation:</i> Ogilvie et al 2004[50]</p> <p><i>Objective:</i> To assess what interventions are effective in promoting a population shift from using cars towards walking and cycling and to assess the health effects of such interventions.</p> <p><i>Intervention(s):</i> Population level interventions to promote shift from using cars to walking and cycling: A. Engineering measures; B. Financial incentives; C. Providing alternative services.</p> <p><i>Population:</i> Urban populations</p> <p><i>Health outcomes:</i> modal shift in journey type, health, distribution of effects between social groups</p> <p><i>Relevant study N:</i> 9, RCT, NRCT, prospective with/without control, controlled retrospective.</p> <p><i>Database N:</i> 18</p> <p><i>Time/language/country restrictions:</i> None stated but relevant were from Netherlands, Germany, Norway, Finland, UK, Australia, Denmark, USA, 1980-2003.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding source:</i> ESRC (UK), CSO (Scotland)</p>	<p>A 2 studies of engineering measures reported positive shifts of 1% and 3%. A further 2 studies reported negative shifts of 3% and 5%.</p> <p>Financial incentives and providing alternative services had some success in changing journey type. A significant decrease of 1% in commuter car journeys was found in one intervention which offered subsidies to staff who used alternative transport. Car share clubs and telecommuting were associated with an increase in the percentage of journeys made by car. One study of the opening of a new train station found a positive shift of 5%.</p> <p>There is a risk that interventions which target motivated sub groups may increase health inequalities by encouraging those already physically active to become more so.</p> <p>Insufficient data to derive any robust conclusions on social distribution of health effects.</p> <p>Authors conclude there is an absence of evidence rather than evidence of no effect.</p> <p><i>Implementation:</i> No comments on implementation.</p>	<p>Further research on risk of targeted interventions increasing health inequalities.</p> <p>Well designed prospective (controlled if possible) studies of transport policy interventions using multiple evaluation methods to permit investigation of the causal relationship between complex interventions and their effects, in particular physical activity, well-being and injuries</p>	<p>1 2 3 4 5 6 7</p>
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<p><i>Citation</i> : Shults et al 2001[49]</p> <p><i>Objective</i>: To report the findings of systematic reviews of the effectiveness and economic efficiency of selected population based interventions to reduce alcohol-impaired driving.</p> <p><i>Intervention</i> : A Minimum legal drinking age laws (MLDA), B blood alcohol concentration (BAC) laws</p> <p><i>Population</i> : General</p> <p><i>Health outcomes</i> : Fatal and non-fatal crashes</p> <p><i>Relevant study N:38</i>: Before-and-after: time series, and with/out comparison group.</p> <p><i>Database N</i>: 6</p> <p><i>Time/language/country restrictions</i>: Earliest possible till 2000, no language or restrictions stated, included studies from USA, Canada, New Zealand, Australia, France and Holland.</p> <p><i>Synthesis method</i>: meta-analysis and narrative synthesis</p> <p><i>Funding source</i>: not stated</p>	<p>A. 7 studies of lowering MLDA to 18 found increases ranging from -2% to 38% in fatal and non fatal injury crashes.</p> <p>13 studies of increasing MLDA from 18 to 21 found decrease in injury crash outcomes ranging from -33% to -6%.</p> <p>BAC laws: 8 studies of decreasing BAC from 0.15 to 0.8 g/dL found decrease in fatal crashes of -15% to -4%. 1 found an increase of 45% but was not robust design.</p> <p>5 studies of decreasing BAC to 0.2 for young drivers found decreases in crash outcomes ranging from -24% to -3.8%</p> <p><i>Implementation</i>: implementation influenced by a range of factors including varying enforcement levels.</p>	<p>A wide range of research recommendations including economic evaluations, studies of how interventions interact, studies of the impact of enforcement levels and of publicity.</p>	<p>1 2 3 4 5 6 7</p>
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<p><i>Citation</i> : Pilkington & Kinra[53]</p> <p><i>Objective</i>: To assess whether speed cameras reduce the incidence of road traffic collisions and related casualties</p> <p><i>Intervention</i> : Fixed or mobile speed cameras</p> <p><i>Population</i> : General</p> <p><i>Health outcomes</i> : Road traffic collisions, injuries and deaths</p> <p><i>Relevant study</i> N:14 Observational studies, including controlled trials were eligible</p> <p><i>Database</i> N: 7</p> <p><i>Time/language/country restrictions</i>: Varied: searches ranged from 1966 in Medline, to 1980's for other databases. No language, country or date restrictions.</p> <p><i>Synthesis method</i>: Meta-analysis was not felt to be appropriate; narrative synthesis</p> <p><i>Funding source</i>: None</p>	<p>All studies reported a reduction in road traffic collisions and casualties, with the reduction in the vicinity of the camera ranging from 5%-69% for collisions, 12-65% for injuries, and 17-71% for deaths.</p> <p>No data on inequalities; all studies were conducted in high-income countries.</p> <p><i>Implementation</i>: No comments on implementation.</p>	<p>In countries where a large scale introduction of speed cameras is planned and the subject is not politicised, speed cameras could be introduced in a controlled fashion, randomising the allocation of cameras . However, this may not be feasible in most settings because of political and other local pressures. An alternative may be to carry out any planned introduction of speed cameras in a phased manner with collection of data on collisions and injuries, In either case, the research needs to be conducted as soon as possible, before the widespread introduction of cameras results in a permanent loss of such opportunities. Some evidence suggests that the effectiveness of speed cameras varies according to type of camera (visible or hidden), and questions remain about how the effectiveness of cameras is affected by location criteria (restricting cameras to collision black spots or not) and use of educational initiatives alongside enforcement.</p>	<p>1 2 3 4 5 6 7</p>
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* total no of studies in review in parentheses

** Limited by details included in the reviews – these vary with some authors providing effect sizes etc and others not.

***Following the DARE quality guidelines employed in a recent umbrella review of tobacco control interventions (REF): 1= Is there a well-defined question? 2= Is there a defined search strategy? 3= Are inclusion/exclusion criteria stated? 4= Are study designs and number of studies clearly stated? 5= have the primary studies been quality assessed? 6= Have the studies been appropriately synthesised? 7= Has more than one author been involved in each stage of the review process?

Table 14: methodological quality checklist for agriculture and food domain review (1)

See next table (final column)

Table 15: results tables for agriculture and food domain review (1)

Review details*	Main findings & Implementation**	Research Recommendations	Quality appraisal***
<p><i>Citation:</i> Wall 2006[55]</p> <p><i>Objective:</i> to assess the effectiveness of monetary incentives in modifying dietary behaviour.</p> <p><i>Intervention(s):</i> Incentives, including price decreases on vending machines, farmers' market coupons for fruit and vegetables, free food provision.</p> <p><i>Population:</i> Community based populations. People living in institutions or in hospital were excluded.</p> <p><i>Health outcomes:</i> Food purchases/consumption, weight loss, attitudes towards fruit and vegetable consumption and dietary measures such as food frequency.</p> <p><i>Relevant Study N:</i> 4 RCTs</p> <p><i>Database N:</i> 5</p> <p><i>Time/language/country restrictions:</i> none, all included studies were from US.</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funder:</i> Health Research Council of New Zealand, National Heart Foundation of New Zealand.</p>	<p>All 4 studies found a positive effect on the outcomes measured.</p> <p>Although an aim of the review none of the included studies assessed effects of the interventions according to socioeconomic or ethnic group. Although one study of coupons for use at farmers' markets recruited only low-income women, from existing community nutrition programmes.</p> <p><i>Implementation:</i> No comments on implementation. Further RCTs are needed of pricing strategies for dietary modification, particularly for socio-economically disadvantaged and ethnically diverse populations who typically experience higher rates of nutrition-related diseases.</p>	<p>Further RCTs are needed of pricing strategies for dietary modification, particularly for socio-economically disadvantaged and ethnically diverse populations who typically experience higher rates of nutrition-related diseases.</p>	<p>1 2 3 4 5 6 7</p>

Table 16: results tables for agriculture and food domain primary studies (3)

Study details	Main findings and implementation	Policy & Research Recommendations
<p><i>Citation:</i> Cummins et al 2004, 2005 [57, 58]</p> <p><i>Intervention(s):</i> Opening of retail hypermarket in community previously described as being in 'food-retail deficit'</p> <p><i>Population:</i> Residents of deprived community. (Carstairs-Morris Depcat 7)</p> <p><i>Setting:</i> Glasgow, UK</p> <p><i>Health outcomes:</i> Fruit and vegetable consumption, self-reported health and GHQ-12 psychological health.</p> <p><i>Design:</i> Quasi-experimental prospective cohort with comparison group, follow up at 10 months</p> <p><i>Final sample N:</i> 412 (293 intervention, 191 control)</p>	<p>There was little evidence for a positive effect of the intervention on F+V consumption, self-reported health worsened in the intervention group, and psychological health improved. None of these changes were significant.</p> <p>Adjusted odds ratios (intervention compared to control): Fruit and veg. consumption: -0.10 CI -0.59 to 0.40. Fair to poor self-rated health: 1.52 CI 0.77 to 2.99. Poor psychological health: 0.57 CI 0.29 to 1.11</p> <p>Changes among those in the intervention community who switched to the new superstore were also compared to those in the intervention community who did not switch. Switchers comprised a very small sample, so results not robust.</p> <p>Adjusted odds ratios (switchers compared to non-switchers): F+V: 0.35 CI -0.35 to 1.02. Self-rated health: 0.50 CI 0.19 to 1.32. Psychological health: 0.24 CI 0.09 to 0.66</p> <p>Evidence to support hypothesis that new retail outlets improve health is limited.</p> <p><i>Implementation:</i> Concurrent economic regeneration and other interventions may confound the effects of retail developments</p>	<p><i>Policy:</i> Locating large scale food retail outlets in deprived areas may not be the most effective means improving diet. However, there is some evidence of positive psychosocial impact.</p> <p><i>Research:</i> There is a need for controlled studies to assess the impact of new retail provision. Also, more studies in areas with a wider range of socio-economic characteristics, studies using face-to-face interviews and other methods to increase response rates.</p>
<p><i>Citation:</i> Wrigley et al 2003[56]</p> <p><i>Intervention(s):</i> 'retail-provision intervention' – opening of new superstore in previously underserved area.</p> <p><i>Population:</i> Residents of low income area defined as a 'food desert'</p> <p><i>Setting:</i> Seacroft, Leeds, UK</p> <p><i>Health outcomes:</i> Fruit and vegetable consumption (portions per day)</p> <p><i>Design:</i> Uncontrolled prospective cohort, follow-up at 12 months.</p> <p><i>Final sample N:</i> 615</p>	<p>There were significant increases in fruit and vegetable consumption (portions per day) pre/post intervention for those with low pre-intervention consumption, even if they did not switch to the new store Results stratified by level of consumption pre-intervention:</p> <p>Measure used was portions of fruit and vegetables consumed per day.</p> <p>Those who switched to new store: Change in F+V consumption 0.23, p=0.034</p> <p>Those who did not switch: Change= -0.13, ns</p> <p>On the basis of these results and further multi-variate analyses, the authors argue that there is evidence for a positive impact of the intervention on diet.</p> <p><i>Implementation:</i> Authors note that physical access to healthy foods</p>	<p><i>Policy:</i> Authors argue that the government's current focus on small-scale local developments to tackle poor retail access may be misplaced. Large-scale retail developments may be more effective at delivering the desired outcomes, as well as helping to regenerate areas in a broader sense. They argue against an either/or approach to policy in this area. Policy responses to retail access issues need to be guided by evidence-based research.</p> <p>Interventions focused solely on improving retail access are likely to deliver only marginal health improvements.</p> <p><i>Research:</i> They argue it is essential to monitor the effects of both large-scale retail access interventions and small-scale community based ones – as yet there is no evidence of effectiveness for the latter type of intervention. This is required to</p>

	does not automatically equate to economic or social access – residents in the area may still be constrained by lack of economic resources or by socio-cultural norms regarding diet.	demonstrate that they have the same positive impacts as those delivered by this large-scale intervention. Also, further studies of large-scale interventions to establish whether these positive findings are replicated.
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Table 17: Water and Sanitation

Review details	Main findings & Implementation	Research Recommendations	Quality appraisal*
<p><i>Citation:</i> Demos et al 2001[59]</p> <p><i>Review Objective:</i> To examine fluoride's effect on bone strength, mass and fracture rate.</p> <p><i>Intervention:</i> Changes in water fluoridation levels (artificial or natural). Typical levels were 0.05 to 1.5 ppm.</p> <p><i>Population:</i> General population (most included studies were of women aged 45-65).</p> <p><i>Outcomes:</i> Fracture incidence, bone mineral density (BMD), bone strength.</p> <p><i>Study N:</i> 15 (33): 3 cohort, 12 clinical trials - 7 placebo controlled, 3 no-treatment controls, 2 uncontrolled.</p> <p><i>Database N:</i> 1</p> <p><i>Time/language/country restrictions:</i> English language 1991-1998. Included studies from</p> <p><i>Synthesis method:</i> Narrative</p> <p><i>Funding:</i> Department of Human Services (Victoria, Australia).</p>	<p>A controlled cohort showed a significant increase in fracture incidence over a 5 year period associated with fluoridation levels of 4 ppm compared to the control group of 1 ppm (RR-1.81 95%CI 1.01:4.43). In contrast, one controlled cohort study showed a ns improvement in hip fracture rates in the intervention group after 5 years exposure to fluoride levels of 0.05-1.8 ppm.</p> <p>An uncontrolled cohort showed a ns improvement on lumbar spine or hip BMD after 20 years exposure at 1 ppm.</p> <p>10 of the 12 clinical trials showed an increase in BMD of the femoral neck, femoral condyle and lower spine associated with 9-22.6 mg FI per day for 1-4 years.</p> <p>No comments on implementation.</p>	N/S	1 2 3 4 6