

Is control in the living environment important for health and wellbeing, and what are the implications for public health interventions?

Final Report

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WHAT THIS STUDY ADDS

This project adds new insights by bringing a social determinants of health (SDH) perspective to bear on the question of the links between control in the living environment and health and wellbeing. In particular, the project questions whether control in the living environment (as opposed to the work environment) plays a role in bringing about the observed social patterning of health in the population which results in marked inequalities in health.

Using this SDH perspective, this project synthesises for the first time theories and empirical evidence concerning the pathways from control in the living environment and social inequalities in health encompassing three distinct levels. These levels are interrelated but rarely considered together in the disparate literatures in which they are located.

Our findings suggest that there are plausible pathways from control in the living environment to health inequalities and some empirical evidence to support the hypothesised pathways. There is a small, but consistent, literature on the health impacts of microfinance schemes to boost empowerment of women living in poverty. We analyse the different entry points and types of interventions that could be considered when seeking to influence control, and show how insights from the theory review can be used to structure thinking around possible lines of action. There is now a need for robust evaluations of the interventions that have a primary aim of improving the level of control that people in hard-pressed communities have over decisions that affect their daily lives.

ABSTRACT

Introduction

There is a sustained public policy focus in the UK on increasing the control that members of the public have over decisions that affect their daily lives. In the public health field, scientific debate has gone further to consider that control over decisions in daily life is a fundamental social determinant of health and lack of control is an underlying cause of observed inequalities in health. We set out to undertake a theory-driven evidence synthesis to inform future efforts to tackle inequalities in health generated in the living environment.

Methods

We conducted three interlinked reviews:

1. A critical review of theory on the relationship between control in the living environment and health and wellbeing;
2. A systematic review of empirical studies on the above relationship, and
3. A systematic review of interventions to increase control in the living environment and health-related impacts.

Alongside the reviews was a reflective analysis of possible intervention entry points and types of interventions to intervene in the pathways from control to inequalities in health. The reviews and reflective intervention analysis then fed into the synthesis of policy, practice and research implications.

Results

Our first conclusion is that control can be seen as an integral component of both personal and collective wellbeing, yet is rarely included as an indicator in surveys of wellbeing.

Our first review reveals well-developed theories about the potential pathways between control in the living environment and the generation of health inequalities which we categorised into three distinct explanatory levels: micro/personal; meso/community); and macro/societal level, which are inter-related from the overarching social determinants perspective. From our second review, there is some empirical evidence, of varying quality, to support the main linkages in the pathways from control to health inequalities at each of the three levels. Both the theory and the empirical evidence provide support for investigating in greater depth action on low control in the living environment as part of a strategy to tackle inequalities in health. Review 3, on the effectiveness of interventions, however, found few studies that aimed to increase control in disadvantaged groups and communities that also went on to assess the impact on health and wellbeing. Microfinance schemes in low and middle income countries were the exception, in that there was a body of evidence showing that women's membership of such schemes can increase empowerment and is associated with a range of health benefits from reduction in inter-personal violence against women to improvements in infant and child survival and nutrition. We drew on all three reviews and analysis of theories of change in potential interventions to consider implications for the UK context.

Discussion

Our findings suggest that there are plausible pathways from control in the living environment to health inequalities and some empirical evidence to support the hypothesised pathways. There is a small, but consistent, literature on the health impacts of microfinance schemes. There is now a need for robust evaluations of the interventions that have a primary aim of improving the level of control that people in hard-pressed communities have over decisions that affect their daily lives.

EXECUTIVE SUMMARY

Background/Introduction

Over the past decade there has been a sustained public policy focus in the UK on increasing the control that members of the public have over decisions that affect their daily lives. Promoting greater community control and empowerment is central to national strategies to tackle social exclusion and regeneration, as well as in the localism, patient choice and wellbeing agendas. Scientific debate in the public health field, however, has gone further to consider the hypothesis that control over decisions in daily life is a fundamental social determinant of health and lack of control is an underlying cause of observed inequalities in health. In making recommendations for tackling root causes of health inequalities in England, the 2010 Marmot Review stressed “the central aim is to create the conditions for people to take control over their lives...the Review puts empowerment of individuals and communities at the centre of actions to reduce health inequalities.” (Marmot, 2010).

Key questions remain, however, about the linkages between control and population health – what are the principal pathways through which control could influence health and health inequalities? What is the empirical evidence to support or refute these hypothesised pathways? What is the evidence on effectiveness of actions to boost empowerment and reduce related health inequalities? We set out to undertake a theory-driven evidence synthesis to inform future efforts to tackle inequalities in health generated in the living environment.

Aims

We aimed to synthesise the evidence on:

- whether and in what ways control in the living environment is important for health and wellbeing,
- what the potential intervention points are to improve health and wellbeing, and
- what has been the impact of the types of intervention approaches that have been tried so far.

Methods

To address the project objectives, this study comprised three interlinked reviews:

1. A critical review of theory on the relationship between control in the living environment and health and wellbeing;
2. A systematic review of empirical studies on the above relationship, and
3. A systematic review of interventions to increase control in the living environment and health-related impacts.

Alongside the reviews, and continuously drawing on their findings, was a reflective analysis of possible intervention entry points and types of interventions that could and have been tried to intervene in the pathways from control to inequalities in health. The reviews and reflective intervention analysis then fed into the synthesis of policy, practice and research implications.

Key findings

Our first review reveals well-developed theories about the potential pathways between control in the living environment and the generation of health inequalities which we categorised into three distinct explanatory levels. There are explanations that start with social position of individuals (micro/personal level); those that start with the place in which people live and its interaction with people (meso/community level); and those that start with the whole societal context (macro/societal level), interacting with other levels. Our classification

draws on the Dahlgren and Whitehead (1993) model, which conceptualises the main determinants of health as interacting layers of influence, one over the other, operating at the individual, community, system and macro-environmental levels.

Pathways between control in the living environment and health inequalities

At the micro level, the theories suggest mechanisms by which people in lower social positions experience lower control over their destiny, including a relative deficit of resources needed for health and wellbeing. This low control in turn causes chronic stress, which can lead to higher prevalence of physical and mental health problems than their more advantaged counterparts. There is empirical evidence in Review 2, from prospective cohort studies in the UK and The Netherlands, to support some links in the proposed causal pathways. These studies find, for example, that lower social positions are associated with both a) lower control beliefs about the home environment and b) poorer health outcomes, and that a substantial proportion of the association between low social position and mortality may be explained statistically by low control beliefs. In all the studies at this level, however, low control in the living environment is assessed by self-reports of control beliefs. No epidemiological studies so far have been able to distinguish between having low control beliefs and having actual low control over essential resources, which may have very different implications for policy. In this respect, the evidence base on control in the work environment is stronger, as objective scales of job demands and levels of control have been developed for this context. The complexity of the task of developing such scales for the living environment should not be underestimated.

At the meso/community level, the theories centre on the processes by which people interact with the places in which they live. The starting point in the explanation is therefore disadvantaged places, and the interaction between disadvantaged people and places that may produce a sense of collective threat and powerlessness. Together, these act as chronic stressors, which over time are damaging to health. Contrasting theories, on the other hand, maintain that the converse of powerlessness – community empowerment – may result from the interaction between people and place, when community members act together for mutual benefit and challenge unhealthy material conditions or attract resources to their neighbourhood to make it a better place to live. The empirical evidence for these meso-level processes in Review 2 is sparser, not least because of the difficulty of capturing processes operating at a collective level. Scales of neighbourhood disorder have been developed from self-reports and used in econometric analyses of US cross-sectional surveys to show that neighbourhood disorder was associated with increased mistrust, and there was higher mistrust among those who felt powerless to control their lives. Powerlessness and mistrust were in turn associated with increased psychological distress. Single cross-sectional surveys, however, provide only weak evidence, and of associations only. More robust longitudinal studies are needed to unpick the processes further. The empirical evidence on the pathways from community empowerment to health was similarly sparse, and studies were identified after extensive enquiries among active researchers in the field, rather than through the electronic database searches. One example identified through this method was a series of longitudinal ecological studies of First Nation young people in British Columbia investigated why some communities were doing better than others to protect their young people from suicide, with a hypothesis that strong cultural continuity, marked out by community empowerment, was protective. The findings supported the hypothesis.

The findings of the theory review led us to reflect on what type of evidence would demonstrate the impact of empowered communities on hypothesised health-related outcomes such as deflection of health-damaging threats to the local environment or attraction of resources to create better places to live. We found evidence in case studies of specific

communities who had faced and acted together on such challenges. Such case studies were identified through books and other non-journal publications, often associated with the theory literature and it was not possible to judge the comprehensiveness or quality of the cases. Devising ways of capturing this type of evidence remains a challenge for future research syntheses.

At the macro/societal level, theories recognised the importance of considering people in their societal context. People live in societies with varying degrees of exclusion and discrimination. These theories posit that cultural, social or political processes that exclude or discriminate against whole sections of society result in low status and hence low control of discriminated groups over access to the necessities for health. Observation of the debilitating lack of control over everyday life experienced by poor rural women in parts of South Asia was the inspiration for Amartya Sen's investigations in the world's 'missing women' and his notion of development as a form of freedom: freedom and capabilities to live a long and healthy life. In Review 2, we found a substantial body of evidence on women's low status/low control and health-related outcomes, largely from low and middle-income countries, and largely cross-sectional in nature. The empirical evidence comes from diverse literatures, including cross-country comparative studies showing that greater participation of women in decision-making in society is associated with better average population health, better child health, and higher life expectancy for men as well as for women. Single cross-sectional surveys provided weak, though consistent, evidence of associations between low control among women and a range of adverse health outcomes. Socio-demographic studies in countries with entrenched son preference provided strong evidence of the lower survival of girls and women into adulthood in these societies, attributed to sex bias in relative care and practices such as sex selective abortion.

Distinct theories about mechanisms operating at the macro/societal level also arise from observations of the health impact of the collapse of the former Soviet Union in the late 1980s. This brought with it sharp social and economic crises in the countries concerned across the whole population, coupled with declines in life expectancy on a scale unprecedented in European peacetime history in modern times. Debates about the potential causes of the decline in life expectancy as a result of this natural experiment have featured poor economic conditions, sharp disruption to health and social protection systems in society, and loss of perceived and actual control over daily life. Evidence comes from single cross-sectional studies only, showing high prevalence of perceived low control over their lives among the populations of the former Soviet Union. Differences in level of control and economic resources explained, statistically, between 10-30% the observed East-West health divide. There is a suggestion from the studies that perceived control might mediate the link between socioeconomic hardship and poor health in some of the former Soviet countries.

Evidence of effect of intervening in the pathways

Both the theory and the empirical evidence provide support for examining action on low control in the living environment further as part of a strategy to tackle inequalities in health. Review 3, on the effectiveness of interventions, however, found few studies that aimed to increase control in disadvantaged groups and communities that also went on to assess the impact on health and wellbeing.

There is a body of evidence, however on one highly relevant intervention – that of microfinance schemes in low and middle income countries, which cover 5 million poor rural women in Bangladesh alone. The microfinance initiatives are of particular interest for our research questions because they are clear examples of theory-led women's empowerment

interventions operating at the meso-level, while also attempting to confront the low status of women in these countries at the macro-level. The schemes work at multiple entry points: as part of a poverty-reduction strategy; as women's empowerment strategy and as part of a cultural shift strategy. They attempt to harness the collective power of mutual support, with members pooling savings and making small loans to each other to set up small businesses. There is evidence from a cluster RCT that women's membership of the scheme increased empowerment on nine indicators of status, economic power and autonomy in making decisions, and was associated with more than a 50% reduced risk of inter-personal violence against women. Other controlled studies found gains in infant and child survival and reductions in stunting for the children of members compared with non-members. Most strikingly, in some interlinked studies in Bangladesh there was evidence of a faster improvement in child health among the children of poor members, than among the rich non-members, resulting in a reduction in social inequalities in child survival between rich and poor. Gender differences between poor girls and poor boys were also reduced. Evaluations of such schemes hold lessons for the UK, where interest is spreading in tackling poverty and unemployment at the community level through a combination of the credit union concept linked to pump-priming for small employment enterprises.

Implications for future action in the UK context

We drew on all three reviews and analysis of theories of change for potential actions to influence control in the living environment to consider implications for the UK context. Potential intervention points and different types of intervention were identified at each of the three pathway levels: micro, meso, and macro. It is clear that there is, or has been in the recent past, a great deal of activity in the UK at most of these entry points, employing a variety of types of intervention. Examples are given in table 9. A number of implications for future research and strategy development emerge from the project findings:

- * There needs to be a theory-led overview of the disparate interventions that have been tried or are being proposed under the banner of improving the control that people in hard-pressed circumstances have in their day-to-day lives.
- * Any proposed action on the control agenda needs to be considered in the context of a comprehensive health inequalities strategy, rather than being seen in isolation.
- * There is a need for robust evaluations of the interventions that have a primary aim of improving the level of control that people in hard-pressed communities have over decisions that affect their daily lives. There are so many natural experiments going on, particularly in relation to local control, that may yield valuable insights if robust, policy-relevant evaluations were initiated.
- * There is a real tension in the UK between policies that are introduced with the stated aim of increasing local control and others that appear to be taking away local control. It may be that some theoretically promising initiatives are 'swimming against the tide' and may produce no net gain. They may even seem as though they are generating lower levels of control in the communities in which they are introduced, if their effects are overwhelmed by contrary policies. Evaluations need to be able to assess potential negative effects and differentiate them from the effects of other policies.
- * Evaluations need to incorporate measurement of changes in control/empowerment, rather than take for granted that the intervention will have an empowering effect. The health and wellbeing impacts should be incorporated into assessments.
- * More generally, further investigation could be undertaken on whether and how measures of control over decisions should be incorporated into measurement of wellbeing.

1 INTRODUCTION/BACKGROUND

There is a growing public policy focus on increased control and empowerment for members of the public. Increasing community control, in terms of promoting greater community engagement and empowerment, has been central to national strategies for tackling social exclusion and the regeneration of socio-economically disadvantaged areas over the last two decades (Electoral Commission, 2005; Communities and Local Government, 2010). The overarching aim of the Government's current flagship programme 'Building the Big Society' is "to put more power and opportunity into people's hands" and this is the responsibility of every department of Government, not just one or two (Cabinet Office, 2010).

A new imperative to extend the rights and powers of communities was heralded by The Localism Act (2011), which came into force in April 2012. The stated aim of the act was "to devolve more decision-making powers from central government back into the hands of individuals, communities and councils". Among others, these powers include the right to bid to take over local amenities that the communities value; the right for communities to draw up a neighbourhood plan (and the duty of local planning authorities to provide technical advice for this activity) and the right to be consulted and influence planning decisions. Local councils are experimenting with a variety of ways of giving people more power over how local resources are spent, including asset transfer, expanding citizen representation on decision-making bodies, and variations on the theme of participatory budgeting (Pratchett et al, 2009; Lowndes et al, 2006). The latest of such budget initiatives - *Our Place* (neighbourhood community budgets) - is currently being rolled out with the support of the Department of Communities and Local Government.

Alongside the community empowerment drive, is the Government's "Choice" agenda, offering greater individual choice to users of NHS, local and national government services. In this respect, key DH policy objectives, as emphasised in the NHS White Paper in July 2010, are shared decision-making - "*no decision about me without me*" - greater choice and control, and increased user/carer empowerment (DH, 2010; DH & Communities and Local Government, 2010). Finding ways of promoting genuine control and empowerment will be critical to the achievement of all these policy objectives. The disability rights movement increasingly stresses the right to self-determination, including patients' and carers' *autonomy, choice* and *control* over their own treatment. Questions remain about how these desired rights are best measured and how promoted.

The Wellbeing Agenda is also highly relevant here. There is the growing policy interest in improved subjective wellbeing (people's own evaluations of their happiness or life satisfaction) as an important objective of public policy across the board. Statutory duties are being placed on public bodies to measure and promote wellbeing as an outcome of all they do for the population they serve (Communities and Local Government, 2010). The Health and Social Care Act 2012 established health and wellbeing boards within each local authority, as a forum where key leaders from the health and care system "work together to improve health and wellbeing in their local population and reduce health inequalities. There is conviction that improved subjective wellbeing is intimately tied up with the achievement of greater control in one's day to day life, which in turn links to the public health agenda.

Most pertinent to the public health agenda is the growing recognition that lack of control and power may be fundamental causes of inequalities in health. The promotion of greater control in daily life, therefore, underpins many national and international strategies to promote

population health and reduce inequalities in health (CSDH, 2008; Dahlgren and Whitehead, 2007; Marmot 2010).

The theory of “demand and control” and the generation of health-damaging stress was originally developed in relation to the work environment (e.g. Karasek and Theorell, 1990). Observational evidence shows that employees who experienced the twin pressures of *high job demands* but *low control* in their work were at higher risk of psychosocial stress, which has been linked to physical conditions such as coronary heart disease (CHD) (Bosma et al, 1997; Kuper et al, 2003). There is also evidence that exposure to low job control increases with decreasing occupational status and may have contributed to the observed social variations in CHD incidence (Marmot et al, 1997). Subsequent evidence has emphasised the importance of job control and social support at work. This has led to the hypothesis that interventions to increase control at work and improve the quality of social support may reduce exposure to psychosocial stress and thereby improve health. As part of our evidence synthesis programme for the ESRC Centre for Evidence-based Public Health Policy and for the PHRC, we reviewed the evidence on the psychosocial and health effects of workplace reorganisation to improve control (Egan et al, 2007; Bambra et al, 2007 and 2008). We found that very few interventions had been evaluated for their health impacts and fewer still had examined whether there were differential effects for different occupational groups, which would have been needed to have an effect on health inequalities.

The concept of “control”, or lack of it, need not be restricted to the work environment, and may have value in understanding the determinants of health and health inequalities in the day-to-day living environment. More generally, the concepts of autonomy and choice have also been identified as potentially important factors in determining access to resources to promote and maintain health. These notions can also be traced back to Amartya Sen’s theories of “Freedom” and “capabilities” to live a long and healthy life, e.g. the substantive freedom to have opportunities and exercise choices over daily life – and the degree to which different groups in the population have that freedom (Sen, 1999). Sen contends that relative lack of control and powerlessness are fundamental causes underpinning the inequalities in health observed between different groups within the population. The Global Commission of Social Determinants of Health made a similar analysis in its final report, which concluded that health inequalities are “caused by the unequal distribution of power, income, goods and services, globally and nationally” (CSDH, 2008: p.1). In making recommendations for tackling these root causes in England, the 2010 Marmot Review stresses “the central aim of the Review is to create the conditions for people to take control over their lives...the Review puts empowerment of individuals and communities at the centre of actions to reduce health inequalities.” (Marmot, 2010).

Key questions remain, however, about the linkages between control and population health – what are the principal pathways through which control could influence health and health inequalities? What is the empirical evidence to support or refute these hypothesised pathways? What is the evidence on effectiveness of policies and interventions to boost empowerment and reduce related health inequalities? We set out to undertake a theory-driven evidence synthesis to inform future efforts to tackle inequalities in health generated in the living environment.

2 PURPOSE OF THE STUDY

Project aim:

We aimed to synthesise the evidence on:

- whether and in what ways control in the living environment is important for health and wellbeing,
- what the potential intervention points are to improve health and wellbeing, and
- what has been the impact of the types of intervention approaches that have been tried so far.

Project objectives:

1. To review the theoretical and empirical evidence on the link between control over the living environment and health-related outcomes, and whether there is evidence of differential impact by gender, SES, ethnicity.
2. To analysis the types of policies and actions that could potentially be taken to influence control in the living environment, to derive a typology of actions and articulate the theory of change/programme theory on which such actions are based.
3. To review the evidence of impacts of the different types of policies and interventions aimed at improving level of control in the living environment and whether there is evidence for differential impact of interventions by gender, SES and ethnicity.
4. To synthesis the body of evidence and interpret it for policy, practice and research communities.

The objectives 1 and 3 are addressed with three reviews: a critical review of theory on the pathways from control to health; a systematic review of the empirical evidence on the identified theoretical pathways (findings of theory and observational reviews reported in section 4); and a systematic review of the health and health inequalities impact of interventions to improve control in the living environment (findings reported in Section 5). Objective 2 is addressed by drawing on the three reviews to undertake a reflective analysis of potential intervention entry points along the identified pathways and an assessment of what types of interventions could and have been tried at different entry points, even if not evaluated for their health inequalities impact (findings reported in Section 6). Objective 4 is addressed by a synthesis and interpretation for policy, practice and research in Sections 6 and 8.

3 DESIGN & METHODS

To address the project objectives, this study comprised three interlinked reviews: 1. a critical review of theory on the relationship between control in the living environment and health and wellbeing; 2. a systematic review of empirical studies on the above relationship, and 3. a systematic review of interventions to increase control in the living environment and health-related impacts. Alongside the reviews, and continuously drawing on their findings, was a reflective analysis of possible intervention entry points and types of interventions that could and have been tried to intervene in the pathways from control to inequalities in health. The reviews and reflective intervention analysis then feed into the synthesis of policy, practice and research implications

3.1 Review 1: Critical review of theory on relationship between control in the living environment and health and wellbeing (meeting Objective 1)

Review Question

RQ1. What theories and conceptual frameworks have been put forward in the literature on the relationship between control in the living environment and health-related outcomes, and which include the generation of social inequalities in health?

Box 1: Definitions for reviews

Control: an individual's or group's power over decisions that affect their daily lives. Terms that are used in the literature to imply similar meanings to 'control' as defined above, include power, empowerment, autonomy, self-determination.

Health-related outcome: any outcome measuring an individual, group or population's physical, social or mental wellbeing.

Living environment: any aspect of an individual, group or population's everyday physical and social environment, excluding the work environment. Living environment includes both the socio-economic and psychosocial conditions in which people live.

Criteria for considering theories for this review

Included: Papers that put forward theories and conceptual frameworks concerning the relationship between actual control in the living environment and health-related outcomes, which included pathways to inequalities in health.

Excluded: Any theory not concerned with the relationship between control in the living environment and health. This excluded theories of perceived 'locus of control' which conceptualised 'locus of control' as a personality trait, without reference to actual control and command over socioeconomic and psychosocial conditions in which the study participants lived. 'Mastery' studies were excluded where mastery was conceptualised as self-control/mastery over one's own emotions. Non-English language studies were also excluded as were studies only exploring control in the work environment.

Review methods

We anticipated the need to search diverse literatures to find theoretical considerations on the relationship between control in the living environment and health-related outcomes. Thus, an iterative approach was adopted to identify studies. We identified three central literatures on which to focus our efforts: the public health/health inequalities/social determinants of health literature; the health development/global health literature; and the sociological/political science literature concerned with power relations. With the help of experts from each set of literature, we identified a small number of seminal works and employed a 'pearl-growing'

approach using the seminal papers as a starting point: hand searching the reference lists of each for other relevant publications, then widening the search further in an iterative process. Key informants (including project co-investigators and the authors of key papers) were asked to identify specialist websites and relevant papers in press, as well as books and book chapters where theoretical works may be more likely to be published. The identification of relevant publications entailed an iterative process whereby theoretical discourses found in the empirical studies identified in Review 2 and later in Review 3 were also recorded for further examination. We continued to add to our identification of theories until saturation was reached. Key theoretical elements of the works identified through the above methods and meeting the inclusion/exclusion criteria were summarised as a critical narrative review. The structure of this review was based on existing exemplars (e.g., Nutley 2002; Lorenc et al, 2012).

As our scoping of the theories progressed, we held a series of reflective sessions in which the team started to map out the hypothesised pathways from control in the living environment to health inequalities. During the sessions, we considered similarities and contrasts between the theoretical discourses and from this process developed a set of frameworks for grouping the potential pathways by the level at which they operated. The resulting frameworks were then used to structure the searches and inform the subsequent systematic reviews of empirical evidence and interventions.

3.2 Review 2: Systematic review of empirical evidence on the relationship between control in the living environment and health and wellbeing

Review Questions

RQ1. What is the empirical evidence of the extent and nature of the relationship between control in the living environment and health-related outcomes?

RQ2. Does this relationship differ by socio-economic status, gender or ethnicity and, if so, in what way?

RQ3. What indicators have been used to measure the key variables: actual and perceived control in the living environment; health; and wellbeing? What are their strengths and limitations?

Criteria for considering studies for Review 2

The criteria for making decisions on whether or not to include studies in the review are summarised in **Table 1**.

Table 1: Inclusion/exclusion criteria for Review 2: systematic review of empirical evidence on the relationship between control in the living environment and health and wellbeing

	Included	Excluded
Setting	All countries (high and low income). Studies conducted at the population level and exploring some form of interaction between people and their "living environment".	Studies exploring control in the work environment.
Time coverage	All dates.*	n/a.
Population	Studies in general populations that include data disaggregated	Highly selected samples without differentiation by SES,

	by some measure of socio-economic status (including studies in specific groups that are marked by some form of disadvantage).	for example: studies drawn from samples of patients in health care settings; or from other residential environments; studies on University/College student populations (as classified as of high educational level only, not disadvantaged).
Study design	Observational studies analysing the extent and nature of the relationship between control in the living environment and health-related outcomes (for example, cohort studies, case-control studies, ecologic studies). Qualitative studies that related to an included observational study.	Observational studies with a response rate below 30%.
Control Concepts	Studies that measured an individual's or groups power over decisions that affect their daily lives, as the independent variable. Terms in the literature that encapsulate this concept include 'control'; 'power'. 'empowerment', 'autonomy'.	Studies from the psychological literature that examined perceived 'locus of control' of individuals as a personality trait, without reference to the actual socio-economic or psychosocial conditions in which the individual lived. 'Mastery' studies where mastery is conceptualised as self-control/mastery over your own emotions.
Outcomes	Outcomes measuring an individual, group or population's physical, social or mental health and wellbeing.	Studies that do not measure a health-related outcome
Language	English-language studies.	Non-English language studies.
*One exception is the supplementary searches, detailed below, for which we applied pragmatic study date limits (studies must be published after 1980).		

Search strategy

Initial scoping of the literature revealed, as anticipated, problems with the use of the term 'control', which identified studies with 'control' groups. Even with alternative terms added, the studies that were identified were largely irrelevant and numerous. We therefore used the seminal studies already identified in our preliminary scanning of the literature (and in our review of theory) to design search strategies tailored to each specific electronic database, guided by information scientists at the Centre for Reviews and Dissemination (CRD, University of York).

We searched MEDLINE and MEDLINE In-Process; EMBASE; PsycINFO; Social Policy & Practice; Social Sciences Citation Index; Conference Proceedings Citation Index – Social Sciences and

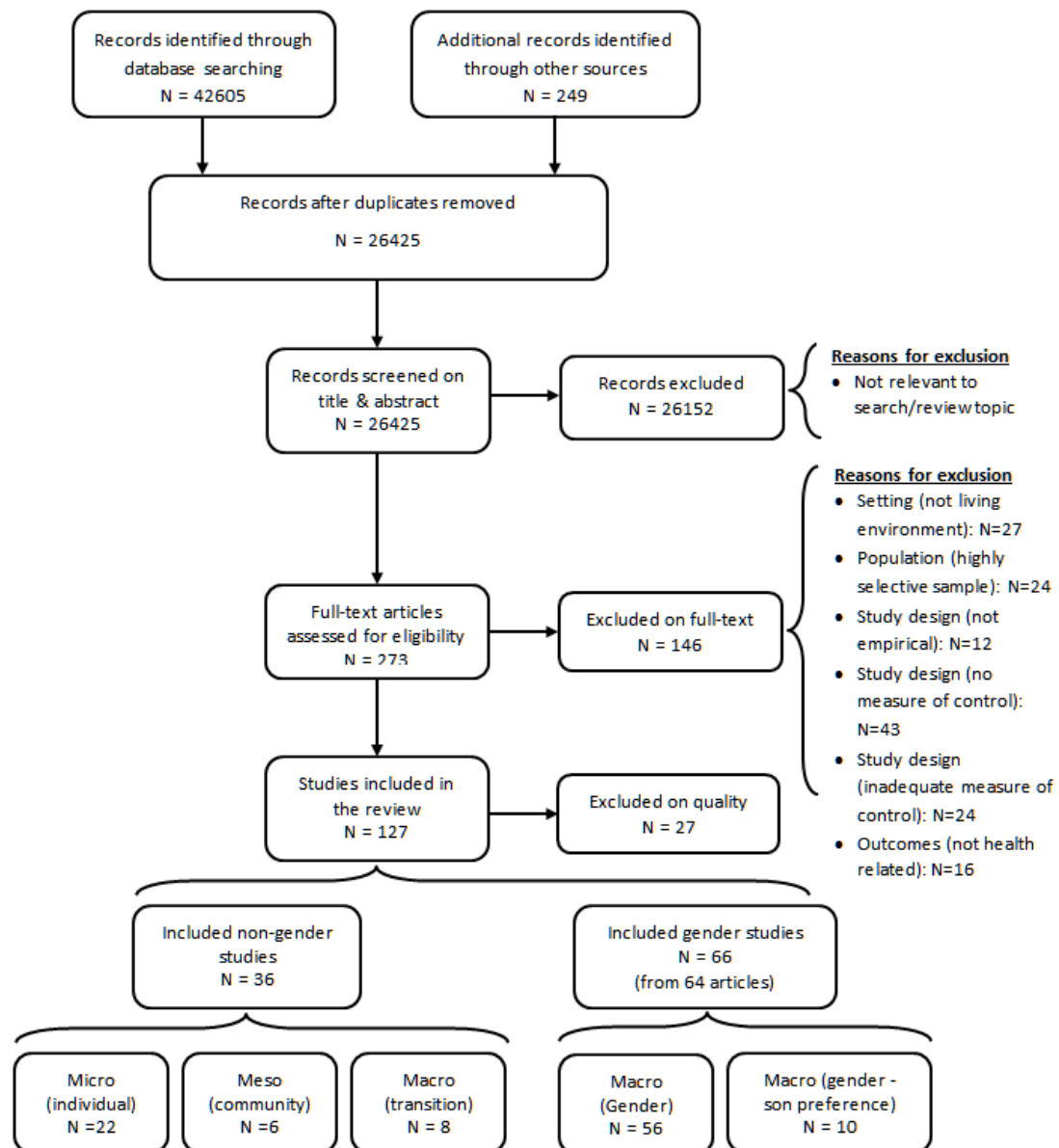
Humanities; and Conference Proceedings Citations Index – Science on 25th July 2012. The full MEDLINE strategy is included in Appendix 1.

The preliminary analytic frameworks developed following the review of theory led to the identification of an additional potential pathway between control and health relating to the low status of women in society, depicted in Figure 3. This was the consequences of marked son preference which, it was hypothesised could lead to lower female survival rates through mechanisms such as poorer nutrition/relative neglect of girl children and sex selective abortion. Thus, on 4th August 2013 we conducted a supplementary search for empirical studies in MEDLINE and MEDLINE In-Process to identify studies on son preference and sex selective abortion. The following search terms (restricted to title and abstract) were used: “sex preference”; “son preference”; “gender preference”; “selective abortion”. Only studies published after 1980 were retrieved.

Screening of potentially eligible studies

We sifted titles and abstracts of all items to identify potentially eligible studies based on the inclusion/exclusion criteria. The first 200 items were independently screened by four reviewers (LO, AP, AR and SN). Upon comparison, the rate of agreement was over 90% and the remainder were screened by just one reviewer. All articles deemed potentially eligible were retrieved in full text. Full text articles were independently screened for inclusion by two reviewers using a pre-designed and piloted eligibility assessment form (again, based on the inclusion/exclusion criteria). Reasons for exclusions were recorded. Disagreements were resolved by consensus or by recourse to a third reviewer (when necessary). We also made a record of all intervention studies identified that were deemed potentially eligible for the subsequent systematic review of intervention studies (Review 3). See Flowchart A for a diagram depicting the flow of studies through the review.

Flowchart A: Flow diagram for Review 2: systematic review of empirical evidence on the relationship between control in the living environment and health and wellbeing



Data extraction

A single reviewer extracted data for each study into pre-designed and piloted forms. Extractions were then checked for accuracy and completeness by a second reviewer. Extracted data include: study aims, study design, setting/country, main findings in relation to research questions. Owing to logistical and time constraints, it was not possible to contact study authors for unclear, missing or additional data.

Critical appraisal

Based on the review questions, the team identified a typology of appropriate observational study designs (following the approach outlined in Petticrew & Roberts 2003) in order to help organise the evidence:

- Longitudinal studies in individuals
- Longitudinal ecological studies
- Repeat cross-sectional studies
- Ecological comparative studies
- Case-control studies
- Single-point cross-sectional studies

Within these classifications, studies were then critically appraised. After reviewing a wide range of critical appraisal tools we decided to use a modified version of a set of questions devised by CRD and based on a range of pre-existing tools (CASP 2013; Polgar & Thomas 1995; Weightman 2000) (see Appendix 3) All included studies were critically appraised by one reviewer and each was checked by a second reviewer.

Data synthesis

We used narrative synthesis to summarise study findings. (Mays et al 2005; Popay et al 2003) The studies were analysed in relation to the four theoretical frameworks developed in the critical review of theory. Essentially whether they supported or refuted the theoretical pathways in the frameworks. Specifically, differential pathways, in relation to socio-economic status, gender or ethnicity, were explored. The strength of evidence for these pathways was summarised based on the hierarchy of study designs and the results of the critical appraisal.

3.3 Review 3: Systematic review of policies and interventions to influence control over the living environment (Objective 3)

We carried out a systematic review of the evidence for the health-related impacts of actions that have been used to influence control in the living environment (see Box 2 for definitions of key concepts used in these reviews). We were interested in actions that aim to tackle inequalities through improving the health of people suffering disadvantage, narrowing the health divide (between rich and poor, for example) or reducing the social gradient in health (Graham 2004). A key proviso, however, was that to be equitable they must achieve their goal by “levelling up, not levelling down” (Whitehead & Dahlgren 2007).

Box 2: Definitions for Review 3

Control: an individual's or group's power over decisions that affect their daily lives. Terms that are used in the literature to imply similar meanings to 'control' include power, empowerment, autonomy, self-determination. For this review, female literacy rates, women's status, women's economic empowerment/autonomy, political participation and civic/community engagement are indicators of control.

Health-related outcome: any change in an individual, group or population's physical, social or mental health status. This may include health determinants with clear links to outcomes, for example: uptake of screening and immunisation programmes. It may also include health-related behaviours (e.g., condom use), and individual and community wellbeing outcomes. We did not include studies of intentions (e.g., propensity for female genital mutilation).

Living environment: any aspect of an individual, group or population's everyday physical and social environment, excluding the work environment. Living environment includes both the socio-economic and psychosocial conditions in which people live.

Review Questions

RQ1. What is the evidence of the impact on health-related outcomes of policies and interventions to improve the level of control in the living environment?

RQ2. Is there a differential impact for different groups in the population, including by SES, gender, or ethnicity?

Criteria for considering studies for this review

The criteria for making decisions on whether to include studies in the review are detailed in **Table 2**. To be included, the interventions had to be centrally concerned with increasing control for those groups in society with relatively low power. We excluded interventions that did not address the lack of power/control in the theoretical pathways from control to health inequalities. Thus we excluded studies of the effectiveness of health promotion interventions that employed some form of community engagement as a strategy for improving effectiveness, i.e. where community engagement was used in a utilitarian way.

Table 2: Inclusion/exclusion criteria for Review 3 of policies and interventions to influence control over the living environment

	Included	Excluded
Setting	All countries (high and low income).	n/a.
Time coverage	Post-1980.	Pre-1980.
Population of interest	Free-living populations in community settings. Studies that include data disaggregated by some measure of socio-economic status (including studies in specific groups that are marked by some form of disadvantage).	Highly selective groups, such as patients without reference to their socioeconomic status, and university/college students (as classified as high educational level only).
Studies of interest	Experimental or quasi-experimental studies (including: RCTs, controlled observational studies, before and after studies, interrupted time-series studies and natural policy experiments) and systematic reviews that evaluate the health-related outcomes of policies and interventions to influence control in the living environment (to identify primary studies). Qualitative studies related to an included intervention study.	
Type of intervention	Actions to influence control in the living environment for a group marked out by some form of disadvantage (including women in cultures in which they are discriminated against, minority ethnic groups who occupy low social positions in the society in which they live, and entire populations in which there has been a sharp socio-economic or political transition).	Work-based interventions. Health promotion interventions in which the aim is to improve the delivery of health care, or health outcomes, using community engagement (rather than the aim of empowerment per se). Targeted education/training, for example for health promotion (unless the primary aim is to improve control/empowerment of specified disadvantaged groups). One-to-one counselling or advice to reduce low control beliefs of individuals without consideration of their social position/theoretical pathways from control to health inequalities
Outcomes	Any outcome measuring an individual, group or populations' physical, social or mental health and wellbeing.	Studies with no physical, social or mental health and wellbeing outcomes

	Determinants with clear links to outcomes (for example, contraceptive use). Individual and community wellbeing outcomes.	
Language	English language studies.	Non-English language studies.
* This is the date after which Karasek and Theorell's job stress model (Karasek 1979) triggered research into how control might be an important determinant of health in the workplace and beyond.		

Search strategy

The results of Reviews 1 and 2 revealed that policies and interventions aimed at increasing the level and nature of control in the living environment are to be found in a variety of fields. Thus, we searched literature in the fields of international development, gender and family studies, sociology and political science, citizens' rights, public health action on the social determinants of health, community development and empowerment, democratic renewal initiatives, civic design and urban planning, and the growing body of literature on wellbeing.

We developed our search strategies using key studies identified in our searchers for Reviews 1 and 2 and through our preliminary scanning of the literature. CRD information scientists guided the development of the search strategies. We searched MEDLINE and MEDLINE In-Process; EMBASE; PsycINFO; Social Policy & Practice; Social Sciences Citation Index; Conference Proceedings Citation Index – Social Sciences and Humanities; and Conference Proceedings Citations Index – Science on 1st February 2013. The full MEDLINE strategy is included in Appendix 2. The reference lists of included studies were scanned to identify further papers. Some additional intervention studies were also identified from the reference lists of studies included in Reviews 1 and 2.

We also consulted key informants (including policy makers as well as academics) in appropriate fields to help identify relevant papers in press and reports of evaluations commissioned by public and charitable bodies and unavailable in electronic databases. We searched organisational websites and liaised with relevant bodies to identify other sources of evidence.

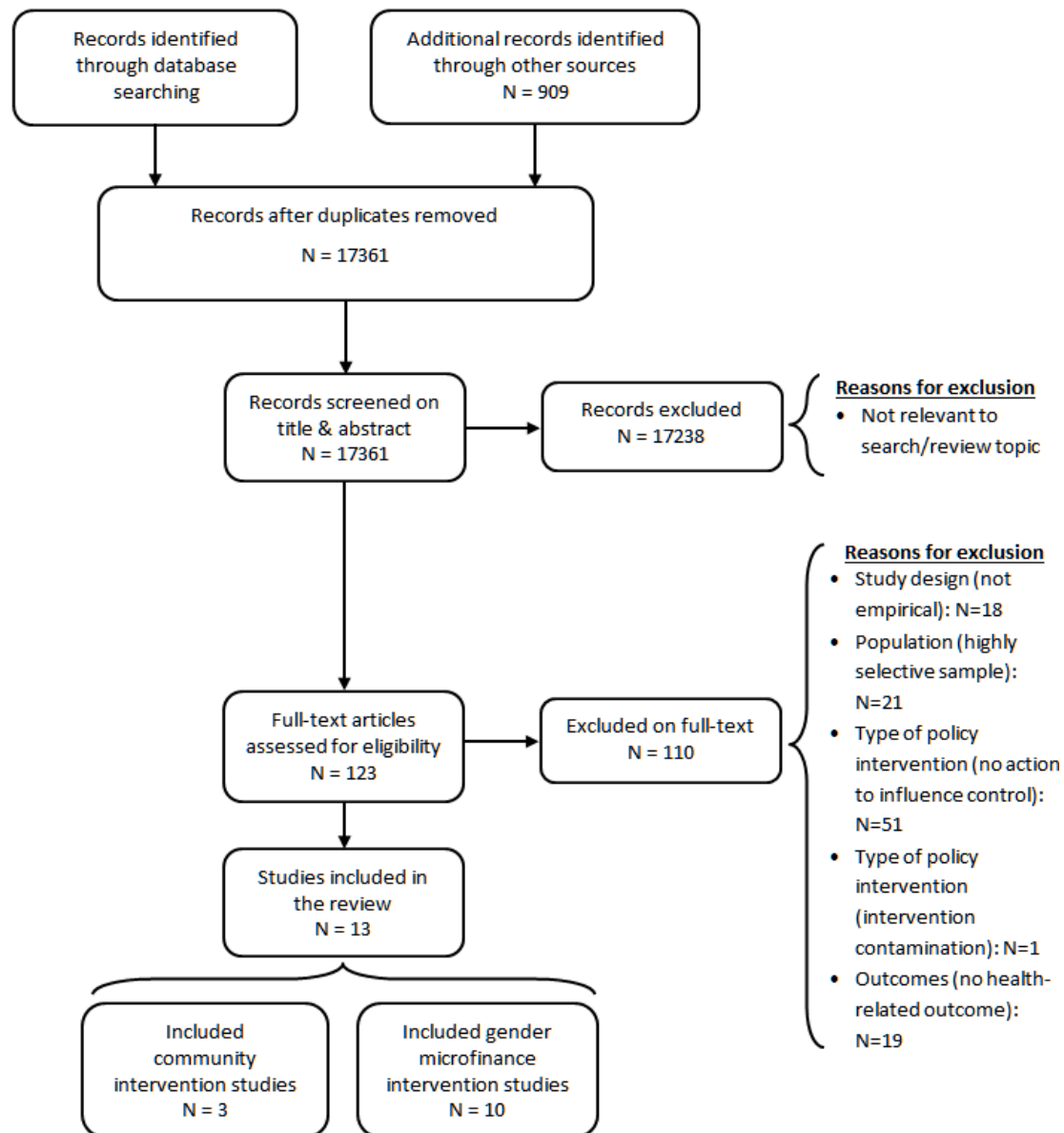
As the review of included studies progressed, we identified that microfinance schemes were prominent community empowerment interventions that had been evaluated for their health impact, but only in LMIC. We speculated that there may be studies in high-income countries, particularly the UK, of a similar type of intervention, but labelled "credit unions". Thus, on 9th October 2013 we conducted a supplementary search for empirical studies in MEDLINE, MEDLINE In-Process, the Science Citation Index, the Social Sciences Citation Index, the Arts and Humanities Index, PsycInfo and SCOPUS in order to identify evaluations of the health impact of credit union initiatives among disadvantaged communities. A total of 460 papers were identified from the search of "credit union", but after screening of titles and abstracts, none were identified that assessed health-related outcomes.

Screening of potentially eligible studies

We sifted titles and abstracts of all items retrieved to identify potentially eligible studies based on the inclusion/exclusion criteria. All articles deemed potentially eligible were retrieved in full text. Two reviewers screened full text articles using a pre-designed and piloted eligibility assessment form (again, based on the inclusion/exclusion criteria). Reasons for exclusion were recorded. Disagreements were resolved by consensus or by recourse to a third reviewer (when necessary). We also made a note of any studies that were deemed potentially eligible

for the Review 1 of empirical studies (on pathways between control and health). See Flowchart B for a diagram depicting the flow of studies through Review 3.

Flowchart B: Control in the living environment systematic review of intervention studies – flow diagram



Data extraction

A single reviewer extracted data for each study into pre-designed and piloted forms. Extractions were then checked for accuracy and completeness by a second reviewer. Separate forms were designed for experimental/quasi-experimental studies, systematic reviews and qualitative studies. Extracted data included: study aims, study design, setting/country and main findings in relation to research questions. Owing to logistical and time constraints, it was not possible to contact study authors for any unclear, missing or additional data.

Critical appraisal

The selection of critical appraisal tool was guided by expert advice from CRD. After careful consideration of a number of options we chose to use a modified version of the “Quality

assessment for the systematic review of effectiveness” tool developed by Lorenc et al (2013) in their review of environmental interventions to reduce fear of crime (see Appendix 4). One reviewer critically appraised all included studies and each was checked by a second reviewer.

Data synthesis

Evidence addressing the review questions was displayed as a narrative synthesis (Mays et al 2005; Popay et al 2003). Studies were grouped with reference to our theory frameworks in Figures 1-4, based on the level (micro, meso or macro) at which they attempted to intervene in the pathways between control and health and their underlying programme theory. The aim was to explore whether different types of intervention are more or less effective and for which groups, following an approach used in previous theory-driven reviews (Clayton et al, 2012). Differential impacts, particularly in relation to socio-economic status, gender or ethnicity, were explored. The strength of evidence was summarised based on study design and, for each type of study, on the results of the critical appraisal. Reporting was based on the PRISMA-E, equity extension (Welch 2012).

4 MAIN FINDINGS: THEORY AND OBSERVATIONAL EVIDENCE

4.1 The meanings of 'control' and links to wellbeing

Definitions of control

Control can operate at different levels – personal, community, and society – and can concern beliefs, perceptions, and senses, on the one hand, and processes and outcomes on the other. Some of the more common notions of control coming out of the theory literature are summarised in the box below.

Box 3: Definitions concerning the notion of control (or lack of it)

Individual:

Autonomy: freedom to act and make decisions for oneself.

Control of destiny: “the ability of people to deal with the forces that affect their lives, even if they decide not to deal with them.” (Syme, 2004). This notion is tied up with hope for the future - lack of ‘control over destiny’ engenders hopelessness/ no hope for the future.

Ontological security: “The confidence that most human beings have in the continuity of their self-identity and in the constancy of their social and material environments. Basic to a feeling of ontological security is a sense of the reliability of persons and things” (Giddens, 1991).

Sense of coherence: Part of having a sense of coherence is a) *comprehensibility*: knowing/expecting that there is some coherence or continuity to your life; b) *manageability*: a belief that things are manageable and within your control and that you have the resources and skills to do so; and c) *Meaningfulness*: a belief that things in life are worthwhile and that there is a good reason to survive and face challenges (Antonovsky, 1993).

Power: is the ability to exert one’s influence to effect change on the behalf of oneself or others (Phelan et al, 2010)

Powerlessness: “an objective phenomenon, where people with little or no political or economic power lack the means to gain greater control and resources in their lives” (Wallerstein, 1992). The converse is ‘empowerment’ – an outcome as well as a process.

Collective:

Community control/empowerment: “a social action process by which individuals, communities, and organisations gain mastery over their lives in the context of changing their social and political environment to improve equity and quality of life” (WHO, 1997).

Cultural continuity: has similarities with the notion of ontological security above: a sense of ownership of a collective past and stability in the future (Chandler and Lalonde, 2008).

Collective efficacy/ perceived neighbourhood control: “The belief of community members that they have the capacity to create change” (Sampson et al, 1997)

Power with (not power over): “a limitless expanding resource which comes from within and from collaborative work with others and leads to empowered communities as people empower themselves” (Wallerstein, 2002).

Social protective factors: defined as an interaction of: Community empowerment, community capacity, community competence, social cohesion, collective efficacy, sense of community, social capital (Wallerstein, 1992).

Note that Wallerstein (1992) makes a distinction between ‘community empowerment’ and ‘social capital’ seeing them both as separate but interacting social protective factors.

Appendix 5 and Appendix 6 give examples of how ‘control’ has been operationalised in the studies that we reviewed. At the micro/ personal-level, sense of personal control (n=6), and perceived control (n=5) were most commonly used. Other control measures included control beliefs; control over one’s life; sense of coherence; control at home; autonomy; and personal efficacy. In meso/community-level studies, control was operationalised as perceived control at multiple levels (organisational, neighbourhood, and beyond the neighbourhood); neighbourhood disorder linked to sense of powerlessness, and linked to loss of collective control; and perceived community participation. Macro-level studies included control measures as power relations; absolute and relative political power; women’s political representation; freedom; personal control; and social control.

Control and wellbeing

One of our first conclusions from our review of the theoretical literature is that control can be conceptualised not only as a determinant of health and wellbeing, but also as an integral aspect of wellbeing – an outcome in its own right.

The notion of control as an important experiential factor in people’s lives comes through in the health development literature, Amartya Sen, for example, expresses the view that:

“The success of a society cannot be separated from the lives that the members of the society are able to lead ...we not only value living well and satisfactorily, but also appreciate having control over our own lives” (Sen, 1999).

From the health inequalities literature, Michael Marmot sums up the conclusion:

“For people above a threshold of material wellbeing, another kind of wellbeing is central. Autonomy - how much control you have over your life – and the opportunities you have for full social engagement and participation - are crucial for health, well-being and longevity. It is inequality in these that plays a big part in producing the social gradient” (Marmot, 2004).

There is something about having a sense of control over destiny that contributes to overall subjective experience of wellbeing and of having a good quality of life. A related notion of *ontological security* – having the confidence and trust that there will be continuity in the world, so that people can feel in control of their environment – may also come into play, particularly in relation to the immediate living environment. Several authors have proposed, for example, that the home could provide ontological security:

“[the home may be] where people feel in control of their environment, free from surveillance, free to be themselves and at ease, in the deepest psychological sense, in a world that might at times be experienced as threatening and uncontrollable (Saunders, 1990).

Some current definitions of wellbeing in the policy literature touch on notions of control over destiny, without making it explicit. NHS Health Scotland, for example, defines mental wellbeing as:

“more than the absence of mental illness or pathology. It implies ‘completeness’ and ‘full functioning’. It includes such concepts as emotional wellbeing, satisfaction with life, optimism

and hope, self-esteem, resilience and coping, spirituality, social function and emotional intelligence”.(NHS Scotland 2008).

The previous Government’s white paper, *Real Power Real People* (2008) aimed to pass power into the hands of local communities to give control over local decisions and services, stating:

“when a citizen feels that they can have an influence over local decisions and that their voice will be heard and respected, this can improve their general sense of well-being and even levels of happiness”.

The latest public health white paper, *Healthy Lives, Healthy People* (2010) emphasised the importance of wellbeing to physical health and reduced mortality, and referred to improving health and wellbeing through strengthening self-esteem, confidence and personal responsibility. Public Health England is tasked with integrating a focus on wellbeing across its functions and work streams; the Public Health Outcomes Framework (that sets national and local outcomes) includes self-reported wellbeing as one of the key indicators in the health improvement domain (Wellbeing Policy and Analysis, 2013).

4.2 Measurement of control and wellbeing

Surveys of wellbeing, both at the personal and community levels, however, rarely, if ever, include ‘control’ as an indicator. The ONS wellbeing survey, for instance, rather refers to satisfaction, how worthwhile things are, and happiness.

The first wellbeing survey in the north west of England (Deacon et al, 2009) aimed to identify population groups with lower and higher levels of wellbeing, and better understand the different aspects of people’s lives that lead to better mental wellbeing. The survey defined mental wellbeing as having 2 main elements: feeling good and functioning well: *“This includes how we feel about ourselves, our future and the world around us and our ability to have positive relationships, a sense of control and purpose in life”.*

The survey questionnaire did not specifically refer to the concept of control, but included questions relating to satisfaction with life, the local area, and ability to influence decisions affecting the local area. A shortened seven item Warwick Edinburgh mental wellbeing scale was used, with the items:

- I’ve been feeling optimistic about the future
- I’ve been feeling useful
- I’ve been feeling relaxed
- I’ve been dealing with problems well
- I’ve been thinking clearly
- I’ve been feeling close to other people
- I’ve been able to make up my own mind about things

The full 14-item Warwick Edinburgh mental wellbeing scale (WEMWBS, 2006) also includes statements relating to interest in other people, having energy to spare, feeling good about one’s self, feeling confident, feeling loved, being interested in new things, and feeling cheerful. Control is not directly measured.

The National Wellbeing programme was launched by the Prime Minister in 2010, and led to the development of a wellbeing measurement framework (ONS, 2013). Questions on

subjective well-being were added to ONS household surveys in 2011, and were assessed by indicators of life satisfaction, how worthwhile things are, happiness rating and anxiety rating.

A New Economics Foundation report considering the issue of wellbeing measurement in policy, refers to a sense of individual autonomy as a core aspect of positive wellbeing (p16), and suggests a subjective measure of autonomy as a leading indicator (leading indicators are considered as those for which improving performance will lead to better health outcomes) (Thompson and Marks, 2008).

The neighbourhood and community empowerment strand of the Local Wellbeing Project aimed to increase understanding of ways in which local authorities can increase the wellbeing of their residents through their community engagement and neighbourhood working practices. The report stemming from this work considered a body of research and several case studies; these suggested that empowerment has the potential to improve wellbeing. The report concluded:

“an implicit, overarching theme from the evidence that has been presented is the notion of control” (Hothi, Bacon et al, 2008)

One intriguing answer to the question in our project title “Is control in the living environment important for health and wellbeing?” is that control is an integral part of wellbeing, whether or not it can be shown to have an impact on health. However, some ongoing surveys of wellbeing in the UK do not currently include control directly as an indicator. Many measurement, as well as conceptual, challenges are raised by the prospect that control is a component of both personal and collective wellbeing.

4.3 Pathways from control to social inequalities in health

Our critical review of theory paid special attention to theories about the generation and maintenance of social inequalities in health, not just average population health. By definition, these explanations needed to take into consideration the living environment and social context, not just internal psychology to explain a relational, societal phenomenon, i.e. the observed systematic differences in health outcomes between different socio-economic groups.

As our scoping of the theories progressed, we held a series of reflective sessions in which the team started to map out the hypothesised pathways from control in the living environment to health inequalities. During the sessions, we considered similarities and contrasts between the theoretical discourses and discerned that explanations were conceived as operating at three main levels:

- **Micro/personal level:** A person's social position influences the resources they have to control their destiny (in terms of money, power, information, prestige) and influence critical decisions affecting their lives
- **Meso/community level:** Notions of community/collective control go beyond individual circumstances to encompass the strength/power generated by joining together to have greater influence over material and social conditions in immediate neighbourhoods/living space.
- **Macro/societal level:** Cultural orientation towards different groups in the population (for example son preference and gender bias) and socio-political transitions (for example, experiences of former USSR countries) operate at the level of whole societies, influencing the degree of control that members of a society have over their lives

Our classification draws on the Dahlgren and Whitehead (1993) model, which conceptualises the main determinants of health as interacting layers of influence, one over the other, operating at the individual, community, system and macro-environmental levels. In the following sections, we outline the theoretical pathways at each level derived from Review 1, followed by the empirical evidence from our systematic review of observational studies (Review 2) at each level.

Micro level: theory and evidence

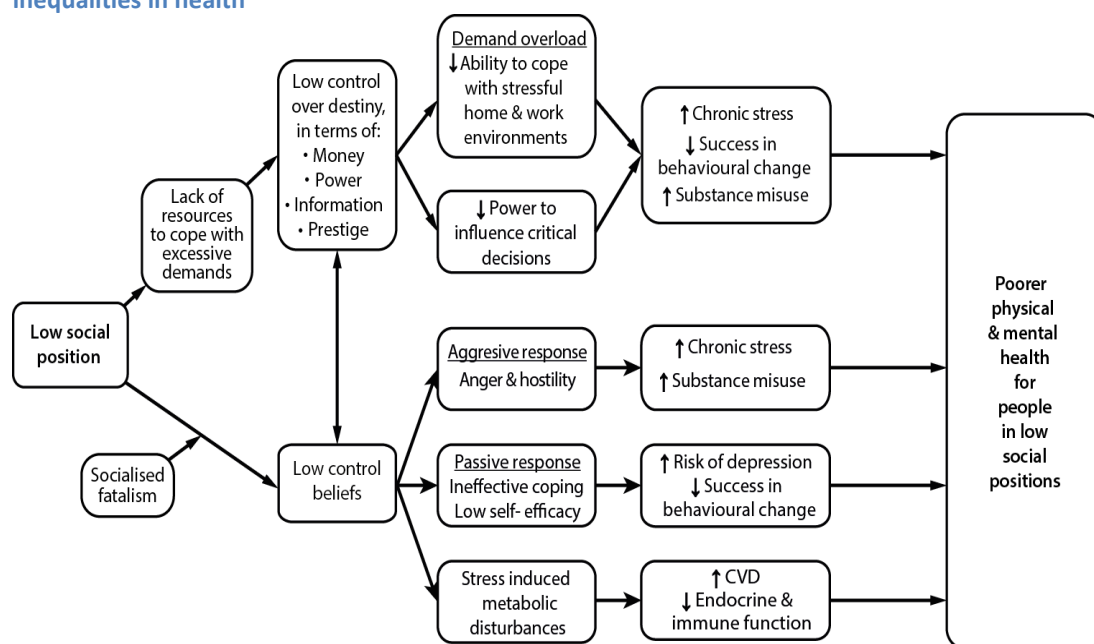
Theory

There are two, inter-related strands of theory connecting the experience of low social position with poorer physical and mental health, as depicted in Figure 1. The top strand corresponds quite closely to the workplace Demand-Control model (Karasek and Theorell, 1990) as it evokes demand overload coupled with lower control being more prevalent with declining social position and interacting to lead to psychological/somatic responses to chronic stressors and on to poorer health in poorer groups. The theory proposes that people in low social positions have fewer resources to cope with the excessive demands that their life entails compared with people in higher positions (Lundberg et al, 2007). This leads to low veridical or actual control over destiny, in terms of money, power, information, prestige (Syme, 1989 and 2004). With low control, demand overload goes up, causing a decline in ability to cope with stressful home and work environments, and a decline in ontological security, as the world is

experienced as an insecure, unpredictable place. It also leads to a decline in the power that an individual has to influence critical decisions affecting their lives. Both demand overload, powerlessness and insecurity induce chronic stress responses, which leads to poorer health in terms of both mental and physical conditions (Syme, 1989 and 2004; Marmot, 2004; Bosma, 2006; Phelan et al, 2010).

Charlton and White (1995) introduce the notion of differential “margins of resources” in the pathways to social inequalities in health. They hypothesise that access to resources, balanced by needs, results in a margin of resources, the size of which predicts the level of inequality. The size of this margin in turn influences the degree of autonomy/choice/control and time preference that people in different social positions have, which together influence health-related behaviours, access to health care, avoidance of health risks and so on.

Figure 1: Theoretical pathways at the Micro/personal level leading from low control to social inequalities in health



In the second strand depicted in Figure 1, theories concerning ‘perceived control’/control beliefs are invoked. Here, children growing up in families with low social positions are socialised into having lower control beliefs than their more privileged counterparts, and these low control beliefs continue and are amplified in adulthood (Wheaton, 1980; Zimmerman, 1990). They have low expectations of what they can achieve in life, in large part because they are subjected to the low-expectations for them of significant others, such as families, teachers, prospective employers, because of their low position. Low control beliefs may lead to contrasting psychological responses. Firstly, there may be an aggressive response involving anger and hostility, which can induce chronic stress and also lead to an increase in health-damaging behaviour, such as smoking and problem drinking. Secondly, low control beliefs may evoke a passive response, such as ineffective coping or low self-efficacy, which may go on to induce depression and reduce success in changing behaviour for the better – you have to have some hope for the future to successfully quit smoking (Charlton and White, 1995). Thirdly there may be a direct effect of low control beliefs on metabolic disturbance – induced by chronic exposure to stressors. These may lead on to such responses as higher risks of CVD, lower endocrine and immune function (Bosma, 2006; Marmot, 2004). All these pathways may result in poorer physical and mental health with declining social positions.

There is a two-way arrow connecting low control to low control beliefs, because one may induce the other: people who have low actual control may quite realistically hold low control beliefs – the beliefs reflect the reality of their day-to-day lives. Conversely, low control beliefs may lead children not to do as well as they could at school, going for lower paid jobs or failing to get jobs, all of which may put them in a position of low actual control over resources.

Observational evidence

We identified 24 studies that met Review 2's inclusion criteria and provided empirical evidence concerning some of the hypothesised links in the pathways in Figure 1. The studies covered varied populations from around the world: from Europe (UK, Netherlands, Germany, Sweden, Norway, Finland); Post-Soviet countries; North America (USA and Canada); Australia and multi-low and middle-income country study (see Table 3). They used a wide range of measures of control in the living environment (see Appendix 5).

Of the 24 studies, 5 papers from three high quality prospective cohort studies in the UK and The Netherlands, and one paper from a longitudinal study in Finland provide the most robust empirical evidence and are presented in more detail in the following pages. The British Whitehall II study was used to test whether low control at home predicts incidence of coronary heart disease (CHD) events, whether there are gender differences in this association, and whether low control at home explains part of the observed socioeconomic inequalities in CHD in both men and women (Chandola et al, 2004). The cohort was drawn from people who were all employed in different grades in the civil service, and so the study took account of the work environment as well as the home environment. The study found some evidence that low control at home predicts CHD among women but not among men. A larger proportion of women who reported CHD reported low control at home compared with women without CHD. Women from lower employment grades were more likely to report low control at home compared with those from higher grades, though even women with a relatively larger share of household income did not necessarily have a greater sense of control at home. Low control at home may explain part of the association between household social position and CHD among women. In addition, there was an indication from this study that low control at home among women may result from a lack of material and psychological resources to cope with excessive household and family demands. The authors concluded that psychosocial domestic conditions may have a greater effect on the health of women compared with men in the UK (Chandola et al, 2004).

The British Whitehall II study was also used to examine whether lack of control in the home and work environments has an impact on depression and anxiety and whether there are differential effects by occupational grade and gender (Griffin et al, 2002). Women and men with low control at home were at significantly greater risk for depression and anxiety, after adjusting for age and other potential confounders. However, low control and low employment grade did not operate in the same way in women and men. Women in the lowest grade with low control at home had a significantly higher risk for depression than women in the higher grades and than men across all grades. The findings for anxiety were quite different: men in the highest grade with low control at home were at highest risk of anxiety than men in the lower grades, while women in the lowest grade had a higher risk than women in the higher grades.

The Dutch Globe prospective cohort study of men and women aged 25-74 living in Eindhoven was used to examine the extent to which differences in control beliefs contribute to observed socioeconomic inequalities in mortality. Bosma and colleagues found that up to half the

association between low educational status and mortality in a 6-year follow-up was explained statistically by low control beliefs (Bosma et al, 1999a).

The GLAS prospective cohort study (Groningen Longitudinal Aging Study) of Dutch men and women aged 57 and older examined whether it is through low control beliefs that low SES groups are at greater risk of heart disease, and to examine if this mechanism is more substantial than, and independent of, the mechanism via classic coronary risk factors. They estimated that a 7% increased rate of heart disease for low SES groups was explained by classic risk factors, with an additional 29% of difference explained by control beliefs. “Low control beliefs may be a more important mechanism in the association between low SES and heart disease than classic risk factors” (Bosma et al, 2005).

There is some evidence from the Dutch Globe study that touches on the posited ‘socialised fatalism’ pathway by examining the role of childhood conditions in shaping adult control beliefs. Individuals in the cohort who reported that their fathers had a low SES had lower control beliefs in adulthood and were less likely to use active problem-focused coping than their counterparts with fathers with high SES (Bosma et al, 1999b). The effects were independent of the adults’ own SES and support the hypothesis that low control beliefs may be partially rooted in childhood social class. A longitudinal study on Finland also found that adult behaviours and psychosocial orientations (including ‘hopelessness’ and ‘sense of coherence’) are patterned to a certain degree by childhood SES (Lynch et al, 1997), though they see the observed patterning as a response to environmental conditions, not as ‘fatalism’ as such.

The remaining 17 single cross-sectional studies provided weak, but consistent, evidence across the varied country contexts regarding the first link in the pathway - low social position was associated with lower control beliefs - and the overall pathway - low control beliefs were associated with a variety of poorer health outcomes.

Summary

At the micro level, theories suggest mechanisms by which people in lower social positions experience lower control over their destiny, including a relative deficit of resources needed for health and wellbeing. This low control in turn causes chronic stress responses, which can lead to higher prevalence of physical and mental health problems than their more advantaged counterparts. There is empirical evidence in Review 2, from prospective cohort studies in the UK and The Netherlands, to support some links in the proposed causal pathways. These studies find, for example, that lower social positions are associated with both a) lower control beliefs about the home environment and b) poorer health outcomes, and that a substantial proportion of the association between low social position and mortality may be explained statistically by low control beliefs. In all the studies at this level, however, low control in the living environment is assessed by self-reports of control beliefs. No epidemiological studies so far have been able to distinguish between having low control beliefs and having actual low control over essential resources, which may have very different implications for policy. In this respect, the evidence base on control in the work environment is stronger, as objective scales of job demands and levels of control have been developed for this context. The task of developing such scales for the living environment would be much more complex.

Table 3 :Non-gender observational studies – micro-level included in Review 2

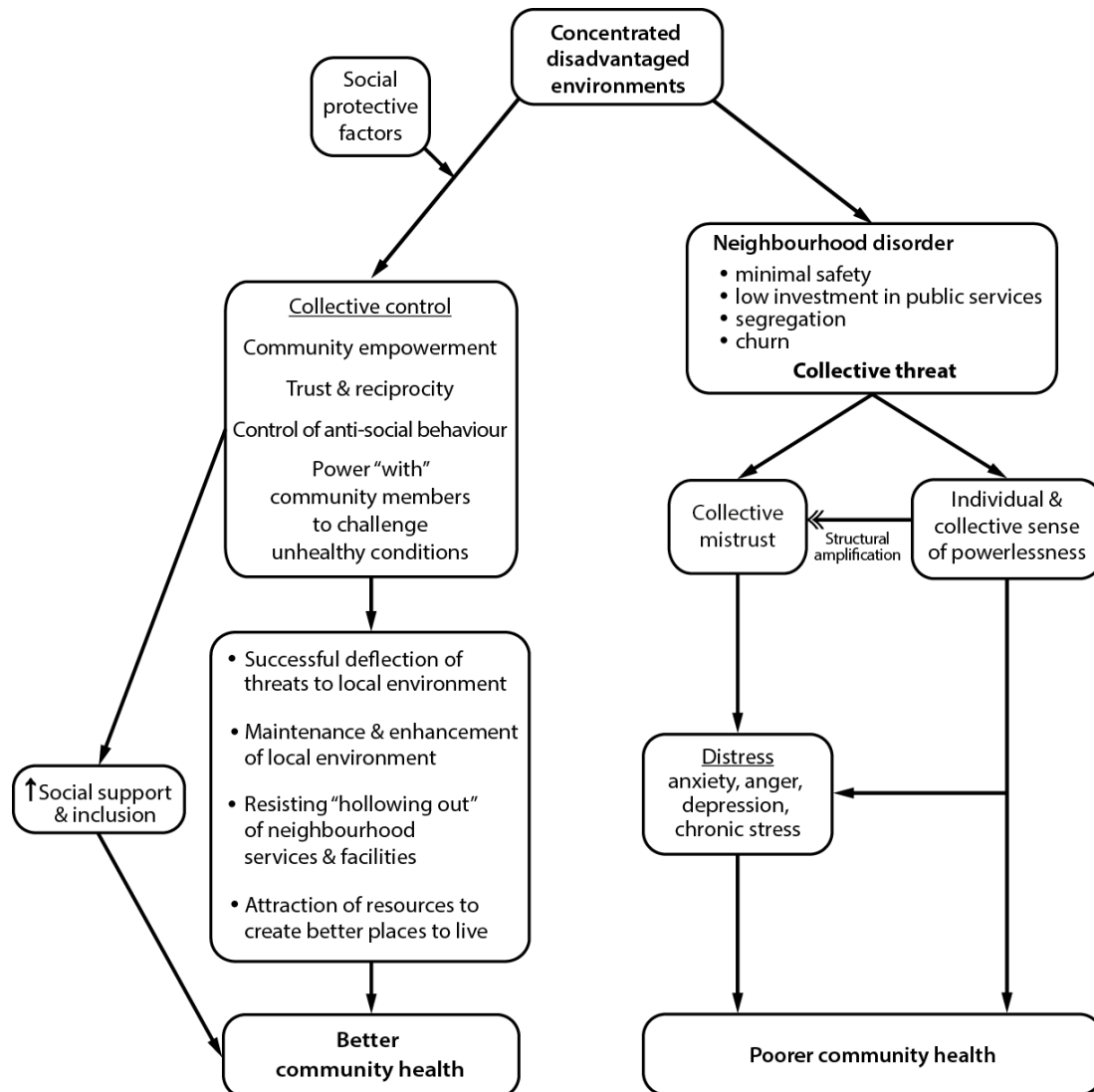
Study	Setting	Design	Outcome/s
Griffin et al (2002)	UK	Prospective cohort study	Depression & anxiety
Chandola et al (2004)	UK	Prospective cohort study	Fatal Coronary heart disease & non-fatal MI
Power 2001	UK	Prospective cohort study, analysed cross-sectionally	Low back pain
Poortinga et al 2008	UK	Single cross-sectional study	Self-rated health
Bosma et al 1999a	Netherlands	Prospective cohort study	Mortality
Bosma et al 1999b	Netherlands	Prospective cohort study	Childhood- Adult
Bosma et al 2005	Netherlands	Prospective cohort study	Congestive heart failure & acute MI
Lynch et al, 1997	Finland	Individual-level longitudinal study	Health behaviours
Infurna et al 2011	Germany	Individual-level Longitudinal study	Disability & mortality
Dalgard 2008	Norway	Single cross-sectional study	Psychological distress
Hakansson et al 2003	Sweden	Single cross-sectional study	Self-rated health
Ross & Wu 1995	USA	Prospective cohort study (and cross-sectional study)	Self-rated health & physical functioning
Lincoln 2003	USA	Single cross-sectional study	Psychological distress
Kiecolt 2009	USA	Single cross-sectional study	Mental health
Lachman& Weaver 1998	USA	Single cross-sectional study	Depressive symptoms, self-rated health & functional limitation
Umberson 1993	USA	Single cross-sectional study	Psychological distress
Mirowsky 1996	USA	Single cross-sectional study	Depression
Turner & Noh 1983	Canada	Single cross-sectional study	Psychological distress
Ing & Reutter 2003	Canada	Single cross-sectional study	Self-rated health
Lee et al 2009	Australia	Single cross-sectional study	Physical health & mental health
Lundberg et al 2007	Sweden & Russia	Single cross-sectional study	Self-rated health
Bobak et al 1998	Russia	Single cross-sectional study	Self-rated health
Gilmore et al 2002	Ukraine	Single cross-sectional study	Perceived health
Martin 2012	51 nations medium to low development	Single cross-sectional study	Individual life satisfaction
Note: studies are ordered by country context (UK, OECD then non-OECD) and then within each country the strength of study design (starting with the prospective cohort studies as the strongest observational designs in the reviewed studies).			

Meso/community level

Theory

There is a distinct class of theories on mechanisms conceptualised as operating at ecological level - the interaction of places with people, leading from some form of collective control to health, illustrated in Figure 2.

Figure 2: Meso/community pathways from low control to social inequalities in health



Neighbourhood disorder

One line of thinking, depicted in the right-hand column of Figure 2, stems from sociological studies of stressors at the neighbourhood level, leading to theories of neighbourhood disorder: concerning both the sociological processes that create neighbourhood disorder and the multiple effects on health and wellbeing of that disorder. The theories were developed predominantly, though not exclusively, from sociological studies of developments in US cities (Wallace and Wallace 1993; Pearlin, 1989; Hill et al 2005; Latkin and Curry, 2003; Mirowsky and Ross 2003). In environments of concentrated disadvantage – where both the places and the people suffer multiple disadvantages – conditions may interact to produce neighbourhood disorder, characterised by minimal safety, low investment or ‘hollowing out’ of public services including health, social welfare, fire and police protection; segregation; and high

transience/turnover of residents (high churn) (Wallace, 1993). Residents experience these neighbourhoods as dangerous and threatening, and collective threat is alienating and distressing even though few people get personally victimized (Ross, 2011).

In Figure 2, there can also be a direct pathway leading from neighbourhood disorder to powerlessness, as disorder may generate a widespread sense of powerlessness, which may lead to anger and depression. A common narrative is that collective threat is alienating and increases the sense of mistrust and powerlessness amongst residents, which in turn lead to psychological distress – anxiety, anger, depression, and other responses to chronic stressors – and on to poorer mental and physical health and wellbeing. Key interactions here are posited to be between collective mistrust and perceived powerlessness. The sense of powerlessness reinforced by a threatening environment may amplify the effect of that threat on mistrust, whereas a sense of control would moderate it.

Ross describes how widespread or collective mistrust in a neighbourhood develops:

“in places where resources are scarce and threat is common and among individuals with few resources and who feel powerless to avoid or manage the threat. Perceived powerlessness develops with exposure to uncontrollable, negative conditions such as crime, danger, and threat in one’s neighborhood. Thus, neighborhood disorder, common in disadvantaged neighbourhoods, influences mistrust directly and indirectly by increasing perceptions of powerlessness among residents, which amplify disorder’s effect on mistrust. The very thing needed to protect disadvantage residents from the negative effects of their environment – a sense of personal control – is eroded by that environment in a process called ‘structural amplification’.” (Ross, 2011).

Collective control/empowerment pathway

The left-hand side of Figure 2 depicts pathways from collective control/empowerment to health drawn from the health promotion, community development and poverty-reduction literatures. These Meso-level pathways start with environments of concentrated disadvantage or poverty, as with neighbourhood disorder theories, but asks the positive question about whether there are social protective factors in any given community which interact with its capacity to challenge unhealthy material conditions, “even in the face of concentrated disadvantage or poverty” (Wallerstein, 2002). In the social determinants of health literature, powerlessness has begun to be seen as a core risk factor for disease and, conversely, that empowerment can be an important strategy for improving a population’s health (Syme, 1989; Marmot, 2004; Popay, 2010).

Powerlessness, or lack of control over one’s destiny, is seen as a chronic stressor, growing out of the day-to-day experience of hard-pressed communities, living in hardship over a long period of time. The hypothesis is that “lack of control over destiny produces a susceptibility to ill-health for people who live in high demand or chronically marginalized situations and who lack adequate resources, supports, or abilities to exert control over their lives” (Wallerstein, 1992).

The converse of powerlessness is seen as community empowerment, which is a strategy to develop ‘power with others’ (rather than ‘power over others’) to bring about social and political change (Rifkin, 2003). Community empowerment is seen as “a multi-level construct that involves people assuming control and mastery over their lives in the context of their social and political environment; they gain a sense of control and purposefulness to exert political power as they participate in the democratic life of their communities for social change. It is an ecological construct that applies to interactive change on multiple levels: the individual,

organization, and community. A study of empowerment, therefore, implies not just studying individual change, but also change in the social setting itself" (Wallerstein, 1992).

The notion is that community empowerment in Figure 2 is both an outcome and a process. It is an outcome of the interaction of place with social protective factors operating in the community such as social cohesion, community capacity, ontological security or sense of continuity (Hiscock et al, 2001) , which help to create the conditions for community empowerment. But community empowerment could be considered a social protective factor in its own right – forming part of the process that results in greater community control over decisions that affect residents' daily lives. Recently, the notion of social protective factors has been elaborated to include 'health assets' that communities possess (Morgan et al, 2010).

The positive health impacts achieved when community members act together for mutual benefit are proposed to operate through both direct and indirect pathways. The potential direct pathways include a reduction in exposure to environmental toxins as a result of collective control, and the garnering of resources to prevent or mitigate risks to health (Popay, et al, 2007; De Vos et al, 2009). There may also be indirect pathways – through improving social supports and supportive networks which combat social isolation and foster a sense of community and community competence. These in turn may help foster trust in the neighbourhood and neighbours, reducing alienation and distress.

One potentially negative pathway leading from community empowerment to greater distress/ill-health has been posited by some commentators (Hunt, 1987, Popay, 2010) This stems from the reality that there is only so much that communities can do, even if working together highly effectively, to change the larger political, socioeconomic and cultural forces that are shaping their disadvantaged environment. There is a risk of 'burn-out' or disillusionment among community activists when heightened awareness leads them to realize the limits of their influence. In these circumstances, instead of heightening control over destiny, the process may add to a sense of powerlessness - in a vicious circle that is harmful for health.

Observational evidence on meso level pathways

Eleven observational studies were identified which provided empirical evidence concerned with one or more of the hypothesised meso-level pathways in Figure 2: one set in Scotland; seven in the USA, two in Canada and one in Sri Lanka (see Table 4). There was a wide range of study designs, including: two ecological longitudinal studies (Hill et al, 2005; Chandler and Lalonde, 2008)); two repeat cross-sectional surveys (Ross et al, 2001; Ross and Mirowsky, 2009); a single-point cross-sectional study (Becker, 2000); a case study based on analysis of routine data and area public policy (Wallace and Wallace, 1990); and one exploited a natural experiment in the aftermath of the Tsunami in Sri Lanka to compare two sets of villages (Wickrama, 2011).

In addition, we identified several case studies of the impact of empowered communities on health-related outcomes for those communities. These cases provided evidence related to the community control/empowerment pathways in Figure 2. These latter case studies were identified through books and other non-journal publications reviewed for the theory review, as well as from descriptive accounts in review articles. As we cannot claim to have identified all such case studies, we present two in the following section as exemplars only.

Table 4: Non-gender observational studies – meso-level included in Review 2

Study	Setting	Design	Outcome/s
Kearns et al 2000	UK	Single cross-sectional study	Psychosocial benefits (haven & autonomy)
Hill et al 2005	USA	Longitudinal ecological study	Self-rated health
Ross et al 2001	USA	Repeat cross-sectional study	Mistrust
Ross & Mirowsky 2009	USA	Repeat cross-sectional study	Anxiety, anger & depression
Wallace & Wallace 1990	USA	Ecological comparative study	TB, gonorrhoea, hepatitis, salmonellosis, homicide, life expectancy, infant mortality, LBW
Hill & Leighley 1992	USA	Ecological comparative study	state spending on welfare
Zimmerman & Rappaport, 1988	USA	Single cross-sectional study	Psychological empowerment
Becker 2000	USA	Single cross-sectional study	Self-reported general health & depressive symptoms
Chandler & Lalonde 2008	Canada	Ecological longitudinal study	Youth suicide
Lalonde 2006	Canada	Ecological comparative study	Youth suicide
Wickrama 2011	Sri Lanka	Single cross-sectional study	PTSD & depressive symptoms
Note: studies are ordered by country context (UK, OECD then non-OECD) and then within each country section, studies are ordered by strength of study design.			

Studies of neighbourhood disorder and powerlessness

The effect of powerlessness on community health and wellbeing, in the context of neighbourhood disorder, has been investigated in several US studies. A formal test of the theory of structural amplification in the pathway on the right of Figure 2 was conducted by Ross and colleagues in follow-up Community, Crime and Health cross-sectional Surveys in Illinois in 1995 and 1998. Key aspects of the theory were supported by the empirical evidence, though causality could not be inferred. Neighbourhood disorder was associated with increased mistrust, and there was higher mistrust among those who felt powerless to control their lives. That is, there was a significant interaction between disorder and powerlessness. This worsened the detrimental effects of disorder on trust, thereby confirming a structural amplification effect. Powerlessness and mistrust were in turn associated with increased psychological distress (Ross et al, 2001 and 2009).

In a repeat cross-sectional study of 2,400 poor mothers in low-income households in Boston, Chicago, and San Antonio in 1999 and followed up in 2001, perceived neighbourhood disorder was taken as a measure of loss of collective control (Hill et al, 2005). The analysis suggested that the impact of neighbourhood disorder on self-rated health was mediated through psychological (anxiety and depression) and physiological (physical symptoms) stress responses.

Wallace and Wallace (1990) investigated other aspects of neighbourhood disorder in Figure 2 – the low investment or deliberate ‘hollowing out’ of public services in urban minority neighbourhoods in New York City in the 1970s and 1980s. They treat the policy of planned withdrawal of municipal services as an externally imposed stressor and modelled its effect on sociogeographic network structure in the communities. Their models predict a very rapid onset of community fragmentation once a threshold of externally imposed stressors is exceeded – so sharp that it represents a ‘kind of community meltdown’, leaving the community disempowered and unable to function collectively for the community good.

Observational evidence on community empowerment and health

Empirical evidence on the pathways from community empowerment to health comes from poverty-reduction strategies in low and middle-income countries, as well as low-income communities in industrialized countries of the North. Although there is a growing body of evidence surrounding the interaction of social protective factors and environment to promote greater community control (near the beginning of the pathway in Figure 2), we found only a few that had measured health-related outcomes.

In terms of the protective effects of ontological security, a West of Scotland study of the psycho-social benefits of home, identified home as a haven, as a locus of autonomy and as a source of status for the occupants (Kearns et al, 2000).

The ontological security/cultural continuity linkage to community empowerment and on to health outcomes, outlined in the left side of Figure 2 has also been investigated in series of studies of suicides of First Nation young people in British Columbia, Canada (Chandler and Lalonde, 2008; Chandler et al, 2000; Lalonde, 2006). Overall, First Nation communities have exceedingly high suicide rates among young people compared with other cultural groups in Canada, but the rate is not uniformly high – some communities achieve much lower rates. A longitudinal ecological study from 1987 to 2000, investigated why some communities were doing better than others to protect their young people from suicide, with a hypothesis that strong cultural continuity, marked out by community empowerment, was protective. Available records on the 197 Aboriginal communities in British Columbia were sifted at baseline to locate community-level variables that were indicative of common efforts to preserved links to a cultural past and to forge a common future. Markers of cultural continuity were identified, including indicators of whether communities had:

- achieved a measure of self-government;
- litigated for Aboriginal title to traditional lands;
- accomplished a measure of local control over health education and policing services;
- created community facilities for the preservation of culture;
- achieved local control over child welfare services;
- involved women in band governance (band councils composed of more than 50% women).

Follow-up of suicide rates, showed that Aboriginal communities that had all of these cultural continuity factors had no youth suicides during 1987-92, while bands with none of these ‘protective’ factors suffered youth suicide rates many times the national average. The same pattern was seen for the period 1993-2000, for both youth and adult suicide levels (Chandler and Lalonde, 2008).

A cross-sectional survey of African-American women living in a segregated community of concentrated poverty in Detroit in 1996 looked at the stress-buffering effects of perceived control at the organizational and neighbourhood levels. High perceived control was associated with a lower level of depressive symptoms at the neighbourhood level (but not beyond the neighbourhood) and with satisfaction with control at the organizational and neighbourhood level. There was no association between perceived control and general self-perceived health at any level (Becker, 2000). This type of cross-sectional study, which collected data by self-completion questionnaire on mental health (depressive symptoms) and control variables, may be subject to 'plaintive-set response bias'. This form of bias encapsulates the notion that some questionnaires or interview schedules deployed in such studies are probably not able to fully separate aspects of the dependent variables describing subjective mental health from aspects of perceived control over one's life. Measuring both subjective and objective indices of ill-health may partially counteract this problem (Stansfeld et al, 1993).

US studies of protective factors have shown evidence of a mutually reinforcing process: participation in decision making and community actions can enhance psychological empowerment, with empowered individuals more likely to participate in community settings, which in turn feeds back to boost empowerment (Zimmerman and Rappaport, 1988; Zimmerman, 1990). There may be an element of self-selection bias in these comparisons of participants versus non-participants.

A cross-sectional survey of women living in poor rural villages in Sri Lanka following a tsunami in 2005, compared those who had or had not been involved in 'collective grassroots organizations' to help with the tsunami-recovery process. Helping with the tsunami-recovery in a collective way was associated with significantly reduced levels of both depressive and post-traumatic stress disorder symptoms. Such collective participation was also associated with more positive family functioning, which in turn was associated with a reduced level of mothers' depressive symptoms (Wickrama, 2011). Comparisons of participants and non-participants in specific activities, such as in this tsunami-recovery process, suffer from particular weaknesses in design: that of self-selection among participants for many other potential confounders of the activity under study, which have not been taken into account in this evaluation, but should be.

Evidence on the direct pathway from community empowerment to health – the ability of communities to garner resources for themselves and to improve their level of wellbeing – comes mainly from case studies. There is evidence in such case studies for all the outcomes listed in Figure 2: reducing health-damaging environmental risks; dealing with natural disasters; attracting resources to the neighbourhood; strengthening public services in the area, making their area a better place to live. See Box 4 for examples of this case study evidence. In addition, there is some evidence from comparative analyses that residents of poor communities working together can attract more health-enhancing resources. Hill and Leighley (1992), for example, examined the relationship between the voting turnout rate of the poor (as a measure of exercising power conveyed in the vote) and the level of state spending on welfare programmes. They found a clear positive relationship between higher voting rates among poorer residents and greater level of resources attracted to their area, resources that enhanced the operation of police and fire services that in turn would make their neighbourhood safer and better places to live.

Box 4: Case studies of communities whose members act together to challenge unhealthy material conditions

Case study 1: Industrialized hog production (Farquhar and Wing, 2008)

Setting: South-eastern Halifax County, Eastern North Carolina, 1998 - 2007

Issue: Expansion of industrialized hog production in North Carolina from mid-1980s has disproportionately affected rural, African American communities. Community members became concerned about the impact on air pollution, noxious odours and water contamination. Residents also felt they had been targeted for this industry because of the perception that they lacked political power.

Community involvement: A concerned group of residents, the Concerned Citizens of Tillery (CCT) worked with county officials to impose stricter local environmental regulations than state controls (influenced by hog producers); assisted other communities and sought assistance from environmentalists, social activists and researchers who could help them document economic, social, environmental and public health issues for communities living near industrialized hog production. This led to a partnership between CCT, Halifax County Health Department and the University of North Carolina School of Public Health in 1996. The partnership, Community Health and Environmental Reawakening (CHER), received funding from the National Institute of Environmental Health Sciences to conduct research into the extent to which industrialised hog operations are located disproportionately in areas of low-income and communities of colour (primarily African American). CHER worked state-wide.

Action(s) taken: Community members participated in all aspects of the research, which found that these operations were far more common in low-income areas and communities of colour, especially for those operations owned by large corporations. Research into the health effects of industrialized hog operations found that residents near hog operations reported more headaches, runny noses and sore throats and increased incidents of excessive coughing, diarrhoea and burning eyes than residents from communities not close to hog operations.

Policy outcomes: Invited to present its findings to the North Carolina general assembly's agricultural committee and the study was considered in a governor's office policy paper on the future of the hog industry. The findings of the health effects study prompted a request for all research data and outputs from the attorneys for the North Carolina Pork Council. As of 2007 the Pork Council had not refuted the findings in any way. Community members and researchers have used the findings to draw attention to the public health consequences of industrialized hog production and the study findings have been considered by health departments, funding for further research has been supported and plaintiffs in civil suits against industrial hog operations have cited the study findings. There have been no major changes in the operation of hog production.

Case study 2: Disaster relief following Hurricane Floyd (Farquhar and Wing, 2008)

Setting: North Carolina coast in 1999

Issue: 16 September 1999, Hurricane Floyd hit rural eastern North Carolina; 7,000 homes were destroyed, 17,000 homes were left uninhabitable and more than 47,000 residents were in public shelters. The African American communities were affected disproportionately. Two years after the hurricane more than 1,000 people were still without permanent homes. The survivors were largely excluded from influencing local and state decisions about community recovery efforts, leaving them feeling vulnerable, discriminated against and disempowered.

Community involvement: A coalition of community organisations formed to facilitate the empowerment of flood survivors in their fight for environmental and social justice. This organisation, The Workers and Community Relief and Aid Project (RAP) included flood survivors and representatives from its partner organisations. RAP held meetings at temporary housing sites and encouraged flood survivors to contribute to the development of its action plan, focusing on the survivors' most pressing needs, such as health threats and housing quality, allowing swift action. Because of CHER, RAP was able to quickly establish research partnerships.

Action(s) taken: The research collaboration undertook two research projects: one identified that a large number of African American flood survivors had been housed on an industrial coal ash landfill site

without their knowledge; the second identified the experiences and needs of the flood survivors. The second study emerged from concerns about discrimination by local and state agencies, unmet needs and frustration at the slow recovery expressed by flood survivors at bimonthly RAP meetings. The researcher and RAP members agreed to document survivors' experiences, mobilise survivors for action and give the survivors a voice. The survey highlighted dissatisfaction with the temporary accommodation provided, difficulties in finding or affording permanent housing, deteriorating health and feelings of loss over the destruction of important community buildings.

Policy outcomes: RAP members, including flood survivors, attended rallies and visited state legislatures to promote fair treatment of all flood survivors as they sought to rebuild their lives. They also advocated for the building of affordable low-income housing. The survey findings were valuable in these meetings as supporting evidence and the flood survivors who had been active in the research had gained the confidence to tell the survivors' stories effectively. The findings were also presented at the Hurricane Floyd Survivors Summit. Press coverage of the summit led to the director of the state emergency management division granting survivors an additional six months to find permanent housing. RAP did not survive as an organisation but individuals involved with it have been able to transfer the skills they gained to work with other community organisations. However, there was one all black community that never received adequate financial assistance.

Case study 3: The Camelford water poisoning incident, England (Kelleher et al, 2006)

Issue: In 1988, a lorry driver accidentally tipped 20 tonnes of aluminium sulphate solution into the treated water reservoir of the Lowermoor Water Treatment Works supplying 20,000 residents of Camelford in north Cornwall. The solution broke down and produced sulphuric acid that stripped chemicals and metals from water pipes which created additional contamination. Local residents attributed symptoms to the contamination including vomiting, headaches, fatigue and rashes.

Residents' response: When local authorities claimed there was no risk to health, residents organised themselves into two groups: the Lowermoor Support Group and the Camelford Scientific Advisory Group (CSAP), a local group that included a number of people with relevant expertise.

Actions taken: The residents monitored the incident and its effects. They carefully collated evidence of their own experiences – evidence which would later contradict highly technical toxicological reports and experts.

Following pressure from residents and media coverage, two government-backed reports were produced by an expert group (the Clayton Committee) within three years. Although their first report attributed many of the symptoms reported by CSAP to the contamination incident, the committee dismissed analysis of the evidence from CSAP because of potential data collection issues (self-selection bias). A long-running dispute centred around arguments over the limitations and validity of both the (expert) Clayton Committee reports and CSAP group's evidence then ensued.

Following continued pressure from local people, through individual legal action and collective protest, the Government reconvened the Clayton Committee. It reached similar conclusions to the initial report: that the available evidence indicated that the effects were only short-term, despite a range of evidence to the contrary from the CSAP and the District Health Authority, and implied that some of the evidence collated by CSAP was the result of mass hysteria.

By 1994, 148 victims accepted damages totalling almost £400,000, but a decade on from the incident people were still complaining of chronic symptoms such as memory loss and joint pains.

The residents campaigned on, and in 2001 the environment Minister initiated a new expert inquiry. The Minister did not initiate a full public inquiry on the grounds that the events of the initial incident were not disputed and there had been major changes to the regulation and organisation of the relevant bodies. The inquiry concluded there was no conclusive link between the incident and chronic symptoms years later, but further research was needed. Investigations continued but reached similar conclusions. In 2013, after 25 years of campaigning, the people of Camelford received an unreserved apology from the UK government (BBC News, 2013).

Policy and related outcomes: The residents' actions had far reaching influence on the activities of local and national authorities and the water industry through the initiation of inquiries and changes to regulations and practice. Victims also received some recognition of damage and compensation through

the courts. The benefits of their collective action extended beyond the local victims/residents to the wider public.

Summary

At the meso/community level, the theories centre on the processes by which people interact with the places in which they live. The starting point in the explanation is therefore disadvantaged places, and the interaction between disadvantaged people and places that may produce a sense of collective threat and powerlessness. Together, these act as chronic stressors, which over time are damaging to health. Contrasting theories, on the other hand, maintain that the converse of powerlessness – community empowerment – may result from the interaction between people and place, when community members act together for mutual benefit and challenge unhealthy material conditions or attract resources to their neighbourhood to make it a better place to live. The empirical evidence for these meso-level processes in Review 2 is sparser, not least because of the difficulty of capturing processes operating at a collective level. Scales of neighbourhood disorder have been developed from self-reports and used in econometric analyses of US cross-sectional surveys to show that neighbourhood disorder was associated with increased mistrust, and there was higher mistrust among those who felt powerless to control their lives. Powerlessness and mistrust were in turn associated with increased psychological distress.

There are several potential limitations of the included studies. Single cross-sectional surveys provide only weak evidence, and of associations only. Ecological studies have two major weaknesses – the well-known ecological fallacy (where individual level causal inferences are erroneously drawn from aggregate/group level data), and the potential for unidentified confounding by major economic, cultural and historical differences in the territories under comparison. The potential for self-selection bias is also an inherent weakness of studies that make comparisons between programme participants and non-participants whose opportunity or choice to participate may be, for example, constrained by factors such as fear/oppression, motivation or poor health. More robust longitudinal studies are needed to unpick the processes further.

The empirical evidence on the pathways from community empowerment to health was similarly sparse, and studies were identified after extensive enquiries among active researchers in the field, rather than through the electronic database searches. One example identified through this method was the series of longitudinal ecological studies of First Nation young people in British Columbia which investigated why some communities were doing better than others to protect their young people from suicide, with a hypothesis that strong cultural continuity, marked out by community empowerment, was protective. The findings supported the hypothesis. The findings of the theory review led us to reflect on what type of evidence would demonstrate the impact of empowered communities on hypothesised health-related outcomes such as deflection of health-damaging threats to the local environment or attraction of resources to create better places to live. We found evidence in case studies of specific communities who had faced and acted together on such challenges. Such case studies were identified through books and other non-journal publications, often associated with the theory literature and it was not possible to judge the comprehensiveness or quality of the cases. Devising ways of capturing this type of evidence remains a challenge for future research syntheses.

Macro/societal level

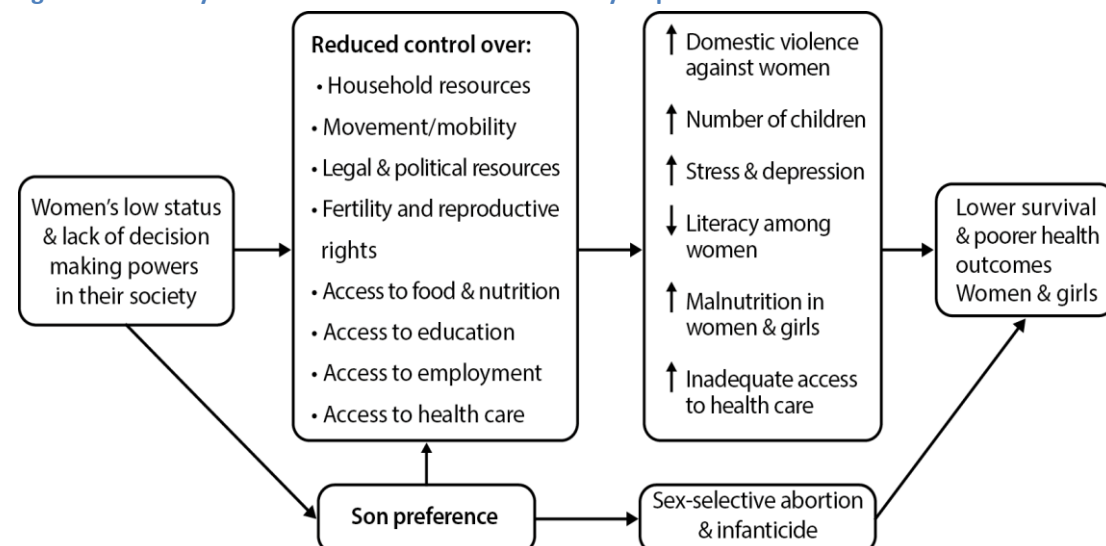
Theory

Cultural orientation towards different groups in the population (for example son preference and gender bias) and socio-political transitions (for example, during the macro-economic transitions experienced by former USSR countries) operate at the level of whole societies, influencing the degree of control that members of a society feel they have, and actually do have, over their lives. Mechanisms concerning the position of women in society and the effects of massive social transitions, in particular, can only really be understood at the societal level, as follows.

Gender discrimination and the low status of women

Amartya Sen's theories of "freedom" and "capabilities" to live a long and healthy life have been influential in shaping thinking about the importance of control in human development. In particular, Sen's work has focused attention on the lack of freedom and its health consequences for women in contexts where there is sex bias in relative care (Sen 1999a and 1999b). **Figure 3** illustrates the hypothesised pathways between the low status of women in societies with overt gender discrimination and health and wellbeing outcomes. Low female status in particular societies may lead to reduced control for women over their access to food and nutrition, health services, education and employment opportunities as well as reduced access to household resources and fertility and reproductive rights. These processes may lead to poorer population health outcomes through higher rates of domestic violence against women and girls and of malnutrition; lower rates of access to essential health care, reduced schooling and subsequent income, which leads on to poorer health outcomes compared with women in societies without such a degree of gender discrimination. In addition, in societies with marked son preference, a further mechanism is posited as coming into play: lower female survival rates through mechanisms such as infanticide of girl babies, poorer nutrition/relative neglect of girl children and, in recent decades when technologies have developed, the practice of sex selective abortion (Banister, 2004).

Figure 3: Pathways from women's low status in society to poorer health outcomes

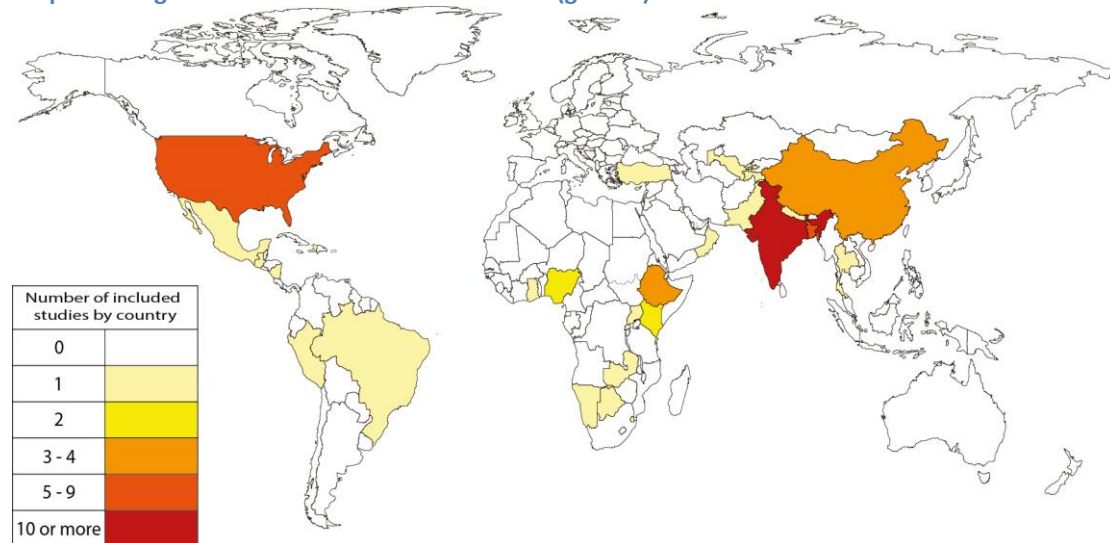


Observational evidence on low status of women in society and health

Our systematic review (Review 2) identified 66 observational studies providing empirical evidence relating to the theoretical mechanisms in Figure 3. Here, we only discuss the higher quality studies in any detail. Review 2 included 56 studies (from 54 records) on women's low

status/low control and health-related outcomes, listed in **Table 5**, and 10 studies on the population health impact of son preference, listed in **Table 6**. All but 9 are from non-OECD countries (low and middle-income countries), with the spread and density of studies illustrated in Map 1. Nine of the 56 studies in Table 5 are cross-jurisdiction ecological comparative studies, five of which are cross-country and four of which compare jurisdictions within single countries. Five have an individual-level longitudinal component, one is a case control study, while the remainder (41) are single cross-sectional studies, providing the weakest evidence on associations. Countries with marked son preference include: China, India, Pakistan, Bangladesh, Nepal and the countries of West Asia (Middle East). All 10 studies concerning son preference in Table 6 are demographic studies of trends in observed and expected sex ratios.

Map 1 Settings of included observational studies (gender)



Indicators of control/status of women in society included:

Indicators of control

Level of female:

- Political participation
- Property ownership and economic autonomy
- Household decision making
- Reproductive decision making
- Acceptance of wife beating
- Sexual and reproductive decision making
- Freedom of movement
- Control over decisions to seek healthcare

The five cross-country comparative studies provide evidence that greater participation of women in decision-making in society is associated with better population health overall (Yodanis, 2004; Swiss et al, 2012; Young, 2001; Ahmed et al, 2010; Scanlan, 2010). In a study of 27 countries in Europe and North America, for instance, a Status of Women Index was used to analyse associations with prevalence of sexual and physical violence. In countries where women's status was higher, prevalence of sexual violence against women was lower, as was fear among women relative to men. There was no association between status of women and physical violence (Yodanis, 2004). Across 102 developing countries, an increase in women's legislative representation was associated with improved child health, which remained significant when adjusted for developmental and political factors, when a critical mass of

women in parliament reached 20% and over: adjusted increased rates of measles immunizations (10.4 percentage points), infant survival (0.7 percentage points) and child survival (1.1 percentage points) ($p < .05$) (Swiss et al, 2012). In one comparative study of 152 countries, the association between higher status of women and higher life expectancy applied to men as well as women (Young, 2001). The identified associations found in cross-sectional studies do not prove causation, of course, and need to be treated with caution.

Three studies compared jurisdictions within countries (Kawachi, 1999: States in the US; Gleason et al, 2001: rural districts in India; and Deb 2011: regions in Bangladesh). In the US, a comparison between the 50 American states examined the status of women in relation to both women's and men's health. Women's status was measured by women's political participation, economic autonomy, employment and earnings, and reproductive rights, and showed statistically significant correlations with each of the health outcomes at state level. Higher political participation by women was correlated with lower female mortality rates ($r = -0.30$) and lower activity limitations (-0.47). A smaller wage gap between women and men was associated with lower female mortality rates (-0.30) and lower activity limitations (-0.31). Indices of women's status were also strongly correlated with male mortality rates. The indices of women's status persisted in predicting female mortality and morbidity rates after adjusting for state income inequality, poverty rates and median household income (Kawachi et al, 1999). The authors conclude that American women experience higher mortality and morbidity in states where they have lower levels of political participation and economic autonomy, and that living in such states has detrimental consequences for the health of men as well. In contrast, Gleason et al (2001) found no statistically significant differences in childhood mortality between rural electoral districts in India and an index of female political participation and empowerment. The authors noted that female political participation was low in all districts and none may have achieved the necessary threshold for change (Gleason et al, 2001). As previously mentioned, cross jurisdictional/ecological comparative studies have two major weaknesses – the ecological fallacy, and the potential for unidentified confounding by major economic, cultural and historical differences in the territories under comparison. These contextual confounders need to be taken into account in the observational studies.

Table 5: Gender observational studies

Study	Setting	Design	Outcome/s
Yodanis (2004)	27 countries in Europe and North America	Ecological comparative	Physical and sexual violence; fear
Swiss et al (2012)	102 developing countries	Ecological comparative	Measles & DPT immunisations; infant survival; under-five survival
Young (2001)	152 less developed countries	Ecological comparative	Life expectancy
Ahmed et al (2010)	31 developing countries	Ecological comparative	Maternal health care utilization
Scanlan (2010)	68 less industrialized countries	Ecological comparative	Childhood mortality
Pearson (2006)	USA	Individual-level Longitudinal study	Contraceptive risk (not using condoms)
Kawachi (1999)	USA	Ecological comparative	Self-reported morbidity; all and cause-specific mortality
Yllo (1983)	USA	Ecological comparative	IPV

Study	Setting	Design	Outcome/s
Coleman (1986)	USA	Single cross-sectional	Marital conflict; marital violence
Jaeyop (1999)	USA	Single cross-sectional	IPV
McLaughlin (2011)	USA	Single cross-sectional	Mood and anxiety disorder
Chen et al (2005)	USA	Single cross-sectional	Depression
Sturke (2008) (a)	India	Cross-sectional and longitudinal study of individuals	Attitudes towards the acceptability of Intimate Partner Violence (IPV)
Sturke (2008) (b)	India	Cross-sectional and longitudinal study of individuals	Experience of IPV
Sturke (2008) (c)	India	Cross-sectional and longitudinal study of individuals	Experience of IPV
Gleason (2001)	India	Ecological comparative	Childhood mortality
Bloom et al (2001)	India	Single cross-sectional	Maternal health care utilization
Krishnan (2005)	India	Single cross-sectional	IPV
Maitra (2004)	India	Single cross-sectional	Use of health care; childhood mortality
Mogford (2011)	India	Single cross-sectional	IPV
Shroff (2011)	India	Single cross-sectional	Infant growth
Shroff et al (2009)	India	Single cross-sectional	Child (growth) stunting
Sudha et al (2007)	India	Single cross-sectional	Reproductive Tract Infections
Hossain et al (2007)	Bangladesh	Cross-sectional and longitudinal study of individuals	Neonatal, post-neonatal and childhood mortality (1 – 5 years)
Deb (2011)	Bangladesh	Ecological comparative	Contraceptive use
Haque et al (2012)	Bangladesh	Single cross-sectional	Antenatal care utilization
Khandoker (2006)	Bangladesh	Single cross-sectional	HIV/AIDS prevention
Rahman (2011)	Bangladesh	Single cross-sectional	IPV
Sambisa (2011)	Bangladesh	Single cross-sectional	IPV
Story (2012)	Bangladesh	Single cross-sectional	Antenatal and delivery care utilization
Qadir et al (2011)	Pakistan	Single cross-sectional	Psychological morbidity
Fantahun et al (2007)	Ethiopia	Case-control	Childhood mortality; childhood vaccination
Hogan (1999)	Ethiopia	Single cross-sectional	Family planning
Mabsout (2011)	Ethiopia	Single cross-sectional	BMI; anaemia scores
Woldemicael & Tenkorang (2010)	Ethiopia	Single cross-sectional	Health seeking behaviour
Castro et al (2008)	Mexico	Single cross-sectional	IPV
Yuksel-Kaptanoglu (2012)	Turkey	Single cross-sectional	IPV

Study	Setting	Design	Outcome/s
Do (2012)	Uganda, Zambia, Ghana, Namibia	Single cross-sectional	Contraceptive use
Shannon (2012)	Botswana and Swaziland	Single cross-sectional	Sexual decision making; rape; transactional sex; infidelity
Brunson et al (2009)	Kenya	Single cross-sectional	Childhood nutritional status
Fotso (2008)	Kenya	Single cross-sectional	Place of delivery
Antai (2012)	Nigeria	Single cross-sectional	Childhood vaccination
Doctor (2011)	Nigeria	Single cross-sectional	Childhood mortality
Crissman (2012)	Ghana	Single cross-sectional	Contraceptive use
Allendorf (2007)	Nepal	Single cross-sectional	Child malnutrition
Furuta & Salway (2006)	Nepal	Single cross-sectional	Antenatal and delivery care utilization
Lau (2006)	China	Single cross-sectional	Sexual Dysfunction
David (1999)	Egypt	Single cross-sectional	Risk of dying in childhood
Riyami (2011)	Oman	Single cross-sectional	Contraceptive use
Gage & Hutchinson (2006)	Haiti	Single cross-sectional	IPV
Grabe (2010)	Nicaragua	Single cross-sectional	IPV
Becker (2006)	Guatemala	Single cross-sectional	Emergency planning during pregnancy; delivering in a health facility; postpartum check-ups
Kamiya (2011)	Tajikistan	Single cross-sectional	Antenatal and delivery care utilization
Hadley et al (2010)	Uzbekistan	Single cross-sectional	Depressive symptoms; systolic and diastolic blood pressure
Xu (2011)	Thailand	Single cross-sectional	IPV
Gomez (2011)	Brazil	Cross-sectional + qualitative	IPV
Note: studies are ordered by country context (UK, OECD then non-OECD) and then by strength of study design within each country			

The 41 single cross-sectional studies provide weak, but consistent, evidence of associations between measures of low control among women and more adverse health outcomes, as summarized in Box 5. At the population level, low control among women was associated with increased anxiety and depression, increased childhood malnutrition, higher fertility, poorer reproductive health and higher levels of mental, physical and sexual violence/abuse of women, with the most harmful effects experienced by the poorest in those societies. Examples include higher control of household decision making was associated with lower post-neonatal mortality in Bangladesh (RR=0.88, $p<0.05$) (Hossain et al, 2007). Lower decision making capacity of women was associated with higher under-five mortality in Ethiopia (OR=3.2 95% CI 2.0, 5.0) (Fantahun et al, 2007).

Box 5: Associations between low control among women and health-related outcomes

<ul style="list-style-type: none"> • <u>Higher rates of:</u> • Infant, child & maternal mortality • Fertility • STIs, HIV/AIDS • Depression and anxiety • Malnutrition (infants, children & women) • Sex-selective abortion • Blood pressure* • Intimate partner violence (physical and sexual)* • <u>Lower rates of:</u> • Contraceptive use • Breastfeeding • Life expectancy (women) • Childhood immunization
Note: * some conflicting evidence, showing both higher and lower rates associated with low control among women.

Table 6: Son preference studies

Study	Setting	Design
Klasen (1994)	China, India, Pakistan, Bangladesh, Nepal, West Asia, Egypt	Socio-demographic analyses
Klasen and Wink (2002)	China, Taiwan, South Korea, India, Pakistan, Bangladesh, Nepal, Sri Lanka, Turkey, Syria, Afghanistan, Iran, Egypt, Algeria, Tunisia, Sub-Saharan Africa	Socio-demographic analyses
Klasen and Wink (2003)	China, India, Pakistan, Bangladesh, West Asia, Egypt, Sub-Saharan Africa	Socio-demographic analyses
Sen (1992b)	China, India, Pakistan, Bangladesh, Nepal, West Asia, Egypt	Socio-demographic analyses
Sen (2003)	Asia, North Africa	Socio-demographic analyses
Sudha and Rajan (1999)	India	Socio-demographic analyses
Gupta (2005)	Asia	Socio-demographic analyses
Banister (2004)	China	Socio-demographic analyses
Coale and Banister (1994)	China	Socio-demographic analyses
Heketh et al (2005)	China	Socio-demographic analyses

The 10 socio-demographic studies of countries with entrenched son preference (**Table 6**) provide strong evidence of the lower survival of girls and women into adulthood in these societies. The analyses are based on calculations of the difference between the observed sex ratio in the population and the expected sex ratio, using comparable countries without overt son preferences as the standard. In humans, the sex ratio, defined as the number of males per 100 females, is determined by the fact that more males than females are conceived and more males than females miscarry spontaneously. At birth, therefore, a 'normal' sex ratio falls within quite a narrow range of between 105 and 107. The sex ratio declines further in childhood, as more boys than girls die in each age range, so that by adulthood, the normal range for the population sex ratio is between 94 and 102. Population sex ratios for 'normal' regions, for example are 96 for Europe, 97 for North America; 100 for Africa and 100 for Southeast Asia (Banister, 2004). For countries with abnormal shortages of females, however, the population sex ratio is much higher: China's stands at 106.7 and India's at 106.5. Estimates

of the number of ‘missing women’ (a phrase coined by Amartya Sen to indicate the shortfall of women in the population) in son preference countries, based on observed and expected sex ratios, have ranged from 60 – 107 million missing women in 1989-94 (Sen 1989; Coale 1994; Klasen 1994); and an increase from 88.9 in 1994 to 92.8 in 2003 (Klasen and Wink 2003) (see **Table 7**).

Table 7: Estimates of the shortfall in women in son preference countries

	Missing women (millions)
China	40.9
India	39.1
Pakistan	4.9
Bangladesh	2.7
Nepal	0.1
West Asia	3.8
Sub-Saharan Africa	5.5
Total	92.8
Total (world)	101.3
Source: Klasen and Wink, 2003.	

Even though there appears to have been a decline from the 1990s to the 2000s in rate of missing women expressed as a percentage of a country’s population, the total numbers have increased, due to the general increase in the world’s population. There is evidence to suggest that progress in bringing female death rates down in some son preference countries has been counterbalanced by a rise in the practice of sex selective abortion in some countries (Sen, 2003).

Summary

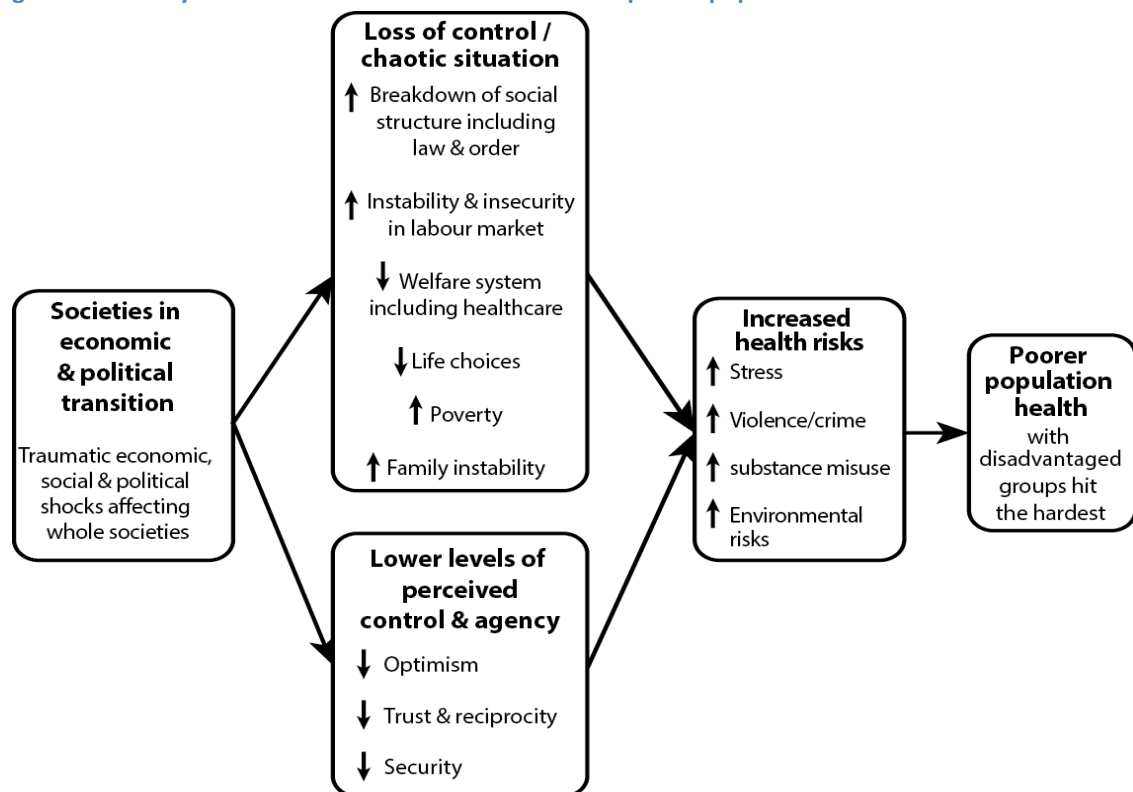
At the macro/societal level, theories recognised the importance of considering people in their societal context. People live in societies with varying degrees of exclusion and discrimination. These theories posit that cultural, social or political processes that exclude or discriminate against whole sections of society result in low status and hence low control of discriminated groups over access to the necessities for health. Observation of the debilitating lack of control over everyday life experienced by poor rural women in parts of South Asia was the inspiration for Amartya Sen’s investigations in the world’s ‘missing women’ and his notion of development as a form of freedom: freedom and capabilities to life a long and healthy life. In Review 2, we found a substantial body of evidence on women’s low status/low control and health-related outcomes, largely from low and middle-income countries, and largely cross-sectional in nature. The empirical evidence comes from diverse literatures, including cross-country comparative studies showing that greater participation of women in decision-making in society is associated with better average population health, better child health, and higher life expectancy for men as well as for women. Single cross-sectional surveys provided weak, though consistent, evidence of associations between low control among women and a range of adverse health outcomes. Socio-demographic studies in countries with entrenched son preference provided strong evidence of the lower survival of girls and women into adulthood in these societies, attributed to sex bias in relative care and practices such as sex selective abortion.

Theories about the loss of control and health during rapid socioeconomic transition

Distinct theories about mechanisms operating at the macro/societal level arise from observations of the health impact of the collapse of the former Soviet Union in the late 1980s.

This brought with it sharp social and economic crises in the countries concerned across the whole population, coupled with declines in life expectancy on a scale unprecedented in European peacetime history in modern times (Shkolnikov et al, 2001). Furthermore, the impact on life expectancy was not evenly spread across the population, but affected the worst-off in society the most (Shkolnikov et al, 1998). Debates about the potential causes of the decline in life expectancy as a result of this natural experiment have featured the change in material factors, such as an increase in poverty and unemployment, and psychosocial factors including an increase in both stressful life events and the feeling that everyday life is being turned upside down and spinning out of control (Cornia and Panizza, 2000). A further reaction to such stressors in some former Soviet Union countries, at least in Russia, has been posited to be through behavioural pathways, such as people, particularly men, turning more and more to alcohol to cope with overwhelming stressors, with resulting effects on mortality and morbidity (Moskalewicz et al, 2000)). The hypothesised pathways are depicted in Figure 4, starting with the rapid social, economic and political transition in the former Soviet Union causing insecurity, and in some cases a breakdown, in the systems that people rely on in their everyday life: insecurity in the labour market, unemployment, decline in social protection and health care systems, breakdown in law and order, increases in poverty and family instability. All these insecurities/loss of control contribute to an increase in health risks cross the population, including rises in chronic stress, violence, substance misuse as a form of coping, and exposure the environmental hazards as safety standards decline. These in turn lead to physical and mental health problems. The social fabric of the society also suffers in such conditions, with lower levels of perceived control and agency causing a loss of optimism/hope for the future, trust and perceptions of security, which in turn feed into increase health risks and ultimately poor population health and wellbeing.

Figure 4: Pathways from traumatic societal transitions to poorer population health.



Observational evidence on loss of control in socioeconomic transitions

We identified 6 studies that explored the relationship between loss of control in the post-Soviet Republics in transition and health outcomes (Abbott, 2007; Abbott and Sapsford, 2006; Bobak et al, 1998 and 2000; Gilmore et al, 2002; Lundberg et al, 2007), as well as a cross-country comparison of the East and West health divide (Carlson, 1998). All were single cross-sectional studies, from which causality cannot be inferred. They do, however, shed light on some of the potential linkages in Figure 4, confirming some of the hypothesised associations.

In a comparison of 23 East-West countries using 1992 survey data, Carlson (1998) found that higher levels of life control was associated with better self-rated health for people within each of the 23 countries. In the former Soviet countries, however, people did not feel that they had the same level of control over their lives as did people in the West. Differences in level of control and economic resources explained, statistically, between 10-30% the observed East-West health divide.

In the Ukraine, which was particularly hard hit, Gilmore and colleagues (2002) hypothesised that given the poor economic conditions and recent disruption to society, material situation, 'change' per se, and loss of perceived and actual control over daily life, would be important influencing factors on both mortality and morbidity at the population level. They conducted a cross-sectional study in the Ukraine in 2000, to explore the extent to which control mediated the impact of material and social status on health and whether social networks buffered the impact of psychosocial and economic stressors on health. The study found that the likelihood of poor self-rated health was almost double among people reporting loss of perceived control compared with those who did not, this association remained after adjustment for other relevant factors. The study also implies that control accounts entirely for the negative impact of social position on health and mediates to a much smaller extent the impact of material deprivation, employment and deterioration in social position on health. They identified a link between deprivation and control, with the proportion reporting low perceived control ranging from 19% in the least deprived group to 44% in the most deprived group. Material status and deterioration in social position had impacts on self-rated health that were independent of control, and there was an indication that change itself may be health damaging. The authors speculated that "a decrease in control, arising from an increasingly uncertain political and economic environment, a reduction in wealth and the stress of change may all have contributed to the decline in life expectancy seen with transition" (Gilmore et al, 2002). This study may suffer from plaintive-set response bias in not being able to fully separate aspects of the dependent variables describing subjective mental health from aspects of perceived control over one's life. This is especially true for questions that relate to mood which capture symptoms of depression. This bias could be a threat to validity of some studies and would be partially addressed by the measurement of objective as well as subjective variables.

Bobak and colleagues (1998), in a cross-section survey of the Russian adult population in 1996, found that both self-rated general health and physical functioning were strongly associated with perceived control over life; material deprivation; attitude to economic changes and types of social network capital. The effects of low perceived control and deprivation were strong and independent, and led the authors to conclude that these two factors may be important mediators between the overarching social environment and health in populations undergoing transition. Following up on from that study, in a cross-sectional study of seven post-communist countries in the early 1990s– Russia, Estonia, Lithuania, Latvia, Hungary, Poland, Czech Republic – Bobak and colleagues (2000) found declining education and increased material deprivation were strongly related to poor self-rated health. Perceived control appeared statistically to mediate some of the effects of material deprivation and inequality.

A cross-sectional comparison between Russia and Sweden in 2003/04 found that levels of reported good health were much lower in Russia than in Sweden (10.3% versus 32.4% respectively), and that levels of perceived control were also lower in Russia than in Sweden (Lundberg et al, 2007). Socio-economic gradients in perceived control were found in both countries, with lower SES, women and younger ages more likely to report low control. Logistic regression analyses revealed that the odds ratios of poor self-rated health were two to four-fold higher in men and women with low perceived control in both countries. The conclusion of the authors was that perceived control influences health, and that it might mediate the link between socioeconomic hardship and health.

Summary

Distinct theories about mechanisms operating at the macro/societal level arise from observations of the health impact of the collapse of the former Soviet Union in the late 1980s. This brought with it sharp social and economic crises in the countries concerned across the whole population, coupled with declines in life expectancy on a scale unprecedented in European peacetime history in modern. Debates about the potential causes of the decline in life expectancy as a result of this natural experiment have featured poor economic conditions, sharp disruption to health and social protection systems in society, and loss of perceived and actual control over daily life. All these insecurities/loss of control may contribute to an increase in health risks across the population, including rises in psychological and somatic responses to chronic stressors, violence, substance misuse as a form of coping, and exposure to the environmental hazards as safety standards decline. Evidence comes from single cross-sectional studies only, showing high prevalence of perceived low control over their lives among the populations of the former Soviet Union. Differences in level of control and economic resources explained, statistically, between 10-30% the observed East-West health divide. There is a suggestion from the studies that perceived control might mediate the link between socioeconomic hardship and poor health in some of the former Soviet countries.

5 MAIN FINDINGS: INTERVENTION STUDIES TO ENHANCE CONTROL IN THE LIVING ENVIRONMENT

5.1 Review 3: Systematic review of the health impact of policies and interventions to influence control in the living environment

We conducted a systematic review according to the methods described on pages 18-22. The two, interrelated review questions were:

RQ1. What is the evidence of the impact on health-related outcomes of policies and interventions to improve the level of control in the living environment?

RQ2. Is there a differential impact for different groups in the population, including by SES, gender, or ethnicity?

From an initial 17,361 records identified after removal of duplicates (see Flowchart B on page 17), a total of 13 studies met our inclusion and quality criteria and were included in the review, listed in **Table 8**. All the included studies are from LMIC, and study designs include one cluster RCT; four controlled before and after studies; two uncontrolled before and after studies; and six post-intervention only studies, one of which constructed a statistical control using the instrumental variable technique.

Table 8: Intervention studies to improve control in the living environment

Microfinance			
Study	Setting	Design	Outcome/s
Kim et al (2007)	South Africa	Cluster randomized trial	Intimate Partner Violence
Bhuiya et al (2001)	Bangladesh	Controlled before and after study	Childhood mortality rates
Bhuiya & Chowdhury (2002)	Bangladesh	Controlled before and after study	Infant and childhood mortality rates
Khatun et al (2004)	Bangladesh	Controlled before and after study	Child nutritional status/stunting; nutritional status gender inequalities; childhood nutritional status inequalities between poor and non-poor groups
Schuler & Hashemi (1994)	Bangladesh	Controlled before and after study	Contraceptive use
Ahmed et al (2000)	Bangladesh	Post-intervention study	Acute illness; healthcare seeking
Schuler et al (1997)	Bangladesh	Post-intervention study	Contraceptive use
Chin (2012)	Bangladesh	Post-intervention study	Intimate partner violence
Nanda (1999)	Bangladesh	Post-intervention study – instrumental variable technique	Formal healthcare seeking

Hamad & Fernald (2012)	Peru	Post-intervention study	Nutritional status of women: haemoglobin levels; food insecurity; BMI
Other community initiatives			
Study	Setting	Design	Outcome
Semenza et al, 2007	USA	Before and after study	Mental health; sense of community
Itzhaky and York, 2002	Israel	Before and after study	Mastery; self-esteem; family violence
Eng et al, (1990)	Indonesia & Togo	Post-intervention study	Use of primary health care (childhood DTP immunisation)
Note: studies are ordered by country context and then by strength of study design within each country			

All 13 studies evaluated interventions that operated at the meso/community control level in our study framework, 10 of which - the microfinance studies - also sought to influence the macro/societal level. The microfinance intervention studies are therefore reviewed as a distinct block in the following.

The microfinance initiatives are of particular interest for our research questions because they are clear examples of theory-led women's empowerment interventions operating at the meso-level, while also attempting to confront the low status of women in these countries at the macro-level.

The schemes work at multiple entry points: as part of a poverty-reduction strategy; as women's empowerment strategy and as part of a cultural shift strategy (Ngo and Wahhaj, 2010). They attempt to harness the collective power of mutual support, with members pooling savings and making small loans to each other to set up small businesses.

The aim of this type of initiative is to improve women's economic power and employment opportunities in their immediate community, while at the same time confronting engrained discriminatory attitudes to women in those countries, through, for example, facilitating the attendance of girls at school and attitudes to paid employment of women outside the home. Box 6 outlines an example from Bangladesh.

Box 6: An example of microfinance schemes in Bangladesh

Roughly 5 million poor rural women in Bangladesh are involved in microcredit programmes, prominent among these are the Grameen Bank and BRAC (Rural Development Programme).

The logic of these programmes is that they reduce women's economic dependence on men, strengthen their positions within their families, draw them into the public sphere and expose them to new ideas and education. In doing so, the theory is that the programmes may influence health in many different ways, e.g. improve reproductive health (increase demand for family planning services and reduce the social costs of fertility regulation, leading to fewer, healthier children and better maternal health); improve the care of girl children, including nutrition, and thereby reduce child mortality, particularly the high rates among girls.

The BRAC programme is targeted at the 'landless poor', using eligibility criteria of participants owning less than 0.5 hectares of land and relying on wage labour income for 100+ days per year. It involves the formation of women's groups for saving and credit, training and skills development, functional literacy including legal and social awareness, and technical and marketing support.

Loan money is used for income generation activities. 5 most common are: agriculture, small business, transport (rickshaws and hand carts), cottage industry, and goat/chicken rearing.

Sometimes combined with 'bolt on' public health programmes, e.g. concerned with maternal and child health and family planning. (Schuler et al, 1997)

As outlined in Box 6 the microfinance initiatives largely target poor rural women. Over 90% of members are women, with some initiatives only permitting female membership. They all involve the formation of groups for saving and credit combined and varying levels of training and skill development which included literacy, legal, social and empowerment training, and technical and marketing support. Loan money has typically been utilised for income generating activities in agriculture, cattle rearing, transport and cottage industries.

Microfinance schemes have become very popular, particularly in low-to middle-income settings as a means of promoting rural development (Sengupta 2008). Such was the enthusiasm for these schemes that in 2006, the Nobel Peace Prize was awarded jointly to Muhammed Yunus and Grameen Bank - a microfinance scheme which Yunus founded in 1983. The potential of microfinance to improve health was also recognised and programmes – often with an additional health promotion component - were designed to cover HIV, malaria, TB, gender violence and child health (for example: Leatherman et al, 2012; Caldas et al, 2010; Dworkin and Blankenship, 2009).

Outcome of searches

Our initial searches identified 10 evaluations of the health impact of microfinance initiatives, all in LMIC. Knowing that variants of such schemes - credit unions - have had a long history in high-income countries, notably the UK in which the notion originated, we conducted a supplementary search for health impact evaluations of credit unions in OECD countries. The purpose of credit unions in the UK is not specifically on women's empowerment, but rather on the reduction of poverty and debt through mutual support and community empowerment. We identified 460 studies, but none evaluated health-related impacts. This is a major evidenced gap.

Findings on the health impact of microfinance schemes

Ten studies were identified that assessed the health-related impact of microfinance initiatives among poor rural women and were included in the review: one in rural South Africa (IMAGE

intervention) and one in Peru (PRISMA microcredit). Eight microfinance initiatives were set in Bangladesh, involving the Grameen Bank, BRAC (formally known as Bangladesh Rural Development Programme) and ASHA microcredit (see **Table 8**).

One cluster randomized trial and four controlled before and after intervention studies were included in the review (Kim et al, 2007; Bhuiya et al 2001; Bhuiya and Chowdhury 2002, and Khatun et al 2004; Schuler and Hashemi, 1994).

Cluster randomised trial

The study in rural South Africa (Kim et al 2007) has a more robust design, involving a prospective, matched, cluster-randomised trial with, in addition, a strong qualitative component. The aim was to assess whether participation in microfinance contributes to a reduction in inter-personal violence (IPV) against women. The quantitative analysis compared 430 matched pairs of women (members versus non-members of the IMAGE scheme) in 4 intervention and 4 comparison villages, followed up for two years. After two years, levels of IPV decreased in all 4 intervention villages while they stayed the same or increased in the four control villages. Women's membership in the IMAGE intervention was associated with a more than 50% reduced risk of physical or sexual violence by an intimate partner compared to non-members (adjusted RR= 0.45; 95% CI = 0.23, 0.91). Impacts on all nine indicators of women's empowerment were observed, from self- and financial-confidence; autonomy in decision-making and household communication to challenging gender norms. The qualitative component explored what plausible pathways could explain these positive impacts on IPV. The women explained how reduction in IPV resulted from a range of developments, including greater say over household decision-making; enabling women to challenge the acceptability of violence; to expect and receive better treatment from partners, to leave abusive relationships, and to raise public awareness of IPV in their village (Kim et al, 2007).

Controlled before and after intervention studies

Four controlled before and after intervention studies were all based in Bangladesh and all explored the health impact of the BRAC RDP, which combined microfinance with other development initiatives, including in some cases maternal and child health programmes:

In the Matlab area of Bangladesh (which has an unparalleled demographic surveillance system), Bhuiya & Chowdhury (2002) carried out a controlled before-after study of infant and child mortality rates using randomly sampled data on 9,853 women and 13, 549 children born alive during 1988-92 and 1993-97 – following the introduction of the BRAC RDP in 1992. The study compared the mortality outcomes for children of mothers who were poor members, poor non-members, and non-poor (rich) non-members. Post-intervention, the decline in the risk of infant death over a period of ten years was greatest (53%) for infants of mothers who joined BRAC followed by infants of rich non-members (41%), and poor non-members (31%). The authors attributed the difference between the gains among infants of BRAC member mothers and that of poor non-members (22 percentage points) to the beneficial effect of the BRAC programme. A striking finding in this study was the reduction in socioeconomic inequalities in infant mortality: the risk of infant death for poor BRAC members declined to the level for rich non-members. There was a lack of impact on child survival, however, after the first year of life, i.e. for the second to fifth year of life, which was investigated further in Bhuiya et al (2001) below.

In the same Matlab area of Bangladesh, Bhuiya et al (2001) conducted a controlled before-after study of child mortality rates using data collected between 1982 and 1996 on randomly sampled children (1-4 yrs) from 12,000 households. BRAC RDP membership (1992 onwards)

was associated with a higher survival probability/lower mortality for children of members than for the children of poor non-members (cumulative child survival probability by household: BRAC RDP member = 92.5%, poor non-member = 89%) ($p = 0.0002$). BRAC membership combined with access to the maternal and child health and family planning programme was associated with a greater survival improvement (94% cumulative child survival probability) than BRAC membership without the extended intervention (91% cumulative child survival probability). There was also marked decline in socioeconomic inequalities in child mortality between the poor BRAC members and the rich non-members, but a widening of inequalities between the poor BRAC members and poor non-members for child mortality outcomes. The differences in cumulative child survival probability rates (commonly used in these studies) may appear to be small, for example the 3% difference between the 94% and 91% survival probabilities above. However, when expressed as a relative risk (e.g. $RR = 1.5$ for the BRAC members without the extended intervention compared to those with it) it represents a difference in relative risk of mortality of 50%.

Impact of BRAC membership on child growth and stunting was the focus of a third Matlab study by Khatun et al (2004). This study followed a cohort of 576 children aged 6-72 months (random and purposively sampled) at 3 time points between 1995-1996 (i.e. after BRAC RDP was introduced in 1992), conducting a three-way comparison of BRAC RDP members, poor non-members and rich non-members. Stunting was much higher (84.6%) among the children of poor non-members than among BRAC members (67.3%) and rich non-members (69.4%), and higher among girls and among boys in all three groups. Stunting decreased among all children except BRAC boys at the end of the third round, with the largest declines among BRAC girls. At the end of the third round, the nutritional status of BRAC girls was almost equal to that of BRAC boys, while stunting remained much higher among girls than among boys in the non-member households, whether rich or poor. The interpretation is that the BRAC initiative appeared to contribute to a significant equity gain in the health of girls, as well as decreased differences in ill-health between the poor and the non-poor.

A final comparative study in Bangladesh investigated impact of programmes on contraceptive use. A repeat cross-sectional study of two time points in 1991 and 1993 of ($n_1 = 1045$; $n_2 = 1305$) randomly sampled married women (<50 yrs) who were either members of BRAC RDP or Grameen Bank in villages which had one or other programme running. At follow-up, a third comparison group was added: non-members who met the eligibility criteria for membership of their respective schemes. Women in Grameen Bank villages were found to be more empowered than women in non-Grameen villages ($p < 0.01$), and had an 11 percentage point higher rate of contraceptive use (59% vs 43%, $p < 0.01$). No significant association was found between BRAC RDP membership and contraceptive use (Schuler and Hashemi, 1994). The associated ethnographic study suggested that credit programmes were affecting contraceptive use partly by strengthening women's economic roles and contributing to their empowerment, and partly by promoting family planning directly and by influencing community norms.

Post-intervention only studies

Five studies employed post-intervention only measures. Three were studies in Bangladesh (Schuler et al, 1997; Ahmed et al, 2000; Chin, 2012) used single time point cross-sectional designs ($Ns = 1,124$ to 3817 randomly selected) to make post intervention comparisons between members and eligible and/or non-eligible non-members. One study used an instrumental variable technique to analyse a 1992 Bangladesh survey (Nanda, 1999), and one study in Peru made a comparison between ($n = 1593$ purposively sampled) long and short duration members (Hamad and Fernald, 2012).

In Bangladesh, Schuler et al (1997), in an extension of Schuler and Hashemi 1994 above, found that Grameen Bank membership was associated with increased odds of contraception use (OR 1.75, CI 1.24 - 2.48; $p < 0.05$); whereas for BRAC RDP membership there was no significant association. The study did find, however, that for both programmes, contraceptive use increased with duration of involvement in the programmes. Three of the eight measures of women's empowerment were associated with increased contraceptive use: women's economic security and contribution to family support (OR 1.53); freedom of mobility (OR 1.21); and relative freedom from domination by the family (OR 1.4, $p < 0.05$). These empowerment variables, however, accounted for little of the effect of the micro-credit programmes on contraceptive use.

Ahmed et al (2000) found that BRAC RDP membership was associated with lower morbidity (12.5% vs 20.4% illness episodes for males, and 13.3% vs 20.3% for females; $p < 0.001$). Chin (2012) made a post-intervention comparison of participation in one of three microfinance schemes (Grameen Bank, BRAC RDP and the ASHA micro-credit programme) and non-participation, in Bangladesh in 2004. The study found no statistically significant associations between microcredit programme participation and current violence experience. However, membership was associated with a 0.1 *higher* probability of ever experiencing violence during marriage compared to non-participation ($p < 0.01$).

The final Bangladesh study used an Instrumental Variable technique to analyse a 1991/92 cross-sectional household survey to estimate the effect of participation in credit programmes on the probability that women use formal health services (as opposed to informal or no health services) (Nanda, 1999). It is worth examining this analysis in some detail because of the big assumptions built into it. The authors hypothesise that as a result of participation in the programme, women will control a greater proportion of the household budget. They will therefore invest more in their health and use formal health services to a greater extent. The main exposure was the interaction between participation and household expenditure. The main outcome was the probability of using formal health services (self-reported). The Instrumental Variable technique was used, employing a two stage probit regression model. The instrument used to identify the effect of participation on the outcomes was - 'whether a household owned more or less than 0.5 acres of land'. Households which own more than 0.5 acre of land were not eligible for participation in a micro-credit programme. The potentially strong assumption is that this threshold of land ownership can only be associated with formal health care as a result of its effect on participation in the programme. The study found that women's participation in micro-credit programmes increased the positive effect of income on their use of formal health care. (This was of borderline significance $p > 5\% < 10\%$). This is interpreted to mean that female participants were more likely to use formal health care than non-participants *as a result* of a higher control over household resources. Women's participation in micro-credit programmes increased the proportion of all adults using formal health, not just women. In fact the effect on all adults was greater and significant ($p < 5\%$). The authors estimate from their results that increasing participation of women in credit programmes by 20% would result in a 3.7% increase in the proportion of adults consulting formal health services. The assumptions have to be questioned in this study when interpreting any results.

In one Peruvian study of the PRISMA programme, Hamad and Fernald (2012) found that longer PRISMA microcredit participation (compared to shorter) was associated with higher haemoglobin levels ($\beta = 0.03$, $p < 0.04$) and lower food insecurity after adjustment for

confounders ($\beta = -0.08$, $p < 0.01$) but was not associated with improvements in BMI ($\beta = 0.05$; $p = 0.06$).

Summary and commentary on microfinance studies

All the studies measured health-related outcomes. Nine of the ten studies provide evidence of some positive association between participation in micro-finance schemes and improvement in health-related outcomes when compared with non-participation. The odd one out (Chin, 2012) found a higher probability of ever experiencing interpersonal violence among participants compared to non-participants. This fits with the hypothesis that attempting to empower women may, at least initially, exacerbate the risk of violence by challenging established gender norms and thereby provoking conflict in the household (Kim et al, 2007).

The studies in Bangladesh are of particular importance because they provide rare evidence of the impact of purposeful interventions on reducing inequalities in health, both gender and socioeconomic inequalities. As such, the studies by Bhuiya et al 2001; Bhuiya and Chowdhury, 2002 and Khatun et al 2004 have been heralded as amongst the most striking examples globally of reduction in inequalities in health through theory-based intervention. Understanding how the interventions brought about change requires an examination of the societal context in which they were introduced. The impacts on child survival and nutritional status, with differential gains for poor girls in particular, suggests that these interventions may work not only through improvements in economic status of the mothers (allowing them to provide the necessities for their children etc), but also through cultural changes in the way girls are valued and nurtured, in line with the theoretical pathways in Figure 3.

Microfinance, however, is not without its critics. Some have argued that enthusiasm has outstripped evidence of effectiveness (Adams and Raymond, 2008). Whilst schemes may have originally been set-up with the intention of poverty reduction and empowerment amongst the most vulnerable in society, they have been accused of suffering from “mission drift”, whereby - as with normal credit systems – in order to secure financial sustainability they end up favouring those who are able to take out larger loans whilst excluding the ultra-poor (Serrano-Cinca and Gutierrez-Nieto, 2014, Ghalib 2013, Nawaz 2010, Mersland and Strom, 2009, Hishigsuren 2007). Thus, rather than reducing inequalities they actually end up exacerbating them. Others have argued that imposing neoliberalism as “best practice” has led to debt, repayment stress, and the exploitation of the poor (Bateman 2012, Taylor 2012) - again, worsening inequalities rather than alleviating them.

Van Rooyen, Stewart & de Wet (2012) conducted a systematic review exploring the impact of microfinance among poor people in sub-Saharan Africa. Various social and economic outcomes were considered, including: income, savings, expenditure, the accumulation of assets, education, child labour, women’s empowerment, housing and job creation. Taken together, evidence from the 15 included studies suggests that microfinance schemes do harm as well as good. For example, microfinance was found to both increase and decrease income at the household level while having a consistently positive impact on savings levels, expenditure and the accumulation of assets. Evidence for an impact on school enrollment/spending on education is contradictory. Whilst some studies show a positive effect, others show either no effect or even a negative effect (with microfinance actually reducing schooling levels in some studies). A gender bias was also present, with boys benefitting from increased enrollment more than girls. Evidence for women’s empowerment is weak and inconsistent (largely due to difficulties in isolating impacts of microfinance within

complex interventions). Further, it is complicated by differences in household structure between settings.

The potential for self-selection bias is a weakness of studies that make comparisons between programme participants and non-participants whose opportunity or choice to participate may be, for example, constrained by factors such as fear/oppression, motivation or poor health. All of the microfinance studies are subject to this potential limitation.

Most of the studies suffer from the limitation that it is very difficult to disentangle the effect of the microfinance components from the effect of other components of what are often multi-faceted development programmes. This is particularly the case for the BRAC interventions in Bangladesh, which typically involve the provision of preventive health services and some form of skills training to the intervention villages, alongside the microfinance initiative. Some of the observed impacts on reproductive and child health, for example, could be the direct result of improving access to maternal and child health services, rather than an indirect result of women's economic and social empowerment as such. The study by Bhuiya et al 2001, did attempt to disaggregate the effects on child survival of BRAC and greater access to preventive health services, and found a separate effect of BRAC membership, which was enhanced by the extended maternal and child health and family planning programme.

Even without the complication of added health services, it is still not clear from the evidence which strands of the microfinance schemes themselves contributed to observed impacts. The IMAGE microfinance intervention in South Africa, for example, combined a financial dimension with participatory training on understanding HIV infection, gender norms, domestic violence and sexuality (Kim et al, 2007). The quantitative RCT identified a reduction in intimate partner violence for the programme as a whole, but could not differentiate the impact of the financial from the participatory training component. This is where the value of having a qualitative component to the evaluation was demonstrated. The face-to-face interviews with participants revealed how reductions in violence resulted from a range of responses, some linked to increasing confidence and empowerment of the women in handling potential flash points for domestic violence. The studies in Bangladesh by Schuler and Hashemi (1994) and Schuler et al (1997) also incorporated an ethnographic component which was able to describe how the credit programmes empowered women to influence contraceptive use and also generated theories about other paths through which participation in the programmes may have had an effect.

It was noticeable that only a very few studies measured women's empowerment outcomes directly and investigating whether increased empowerment due to the programme resulted in improved health-related outcomes. There was an assumption that the programmes did lead to greater empowerment for participants and that it was the empowerment that was the 'active ingredient'. When Schuler et al (1997) measured the effect, they found a complex picture. Although three of the eight measures of women's empowerment had statistically significant effects on contraceptive use, these variables accounted for little of the effect of microcredit on contraceptive use. Others have also cautioned that providing credit to women does not guarantee their control over its use, and may also lead to excess anxiety from the pressure to pay back loans, diminishing, rather than increasing control over destiny (Kim et al, 2007). It is essential to incorporate actual measurement of control/empowerment into intervention studies, not just assume that the interventions will automatically lead to a positive enhancement, and to assess potential negative as well as positive impacts.

There are two further methodological limitations that need to be borne in mind in interpreting these studies. First, all the intervention studies struggle with potential bias in the selection of both intervention and comparison groups. In addition to the potential for self-selection bias, in some (possibly all) of the microfinance schemes, poor women who are non-members may be poorer than the poor members of the schemes, simply because they have been excluded due to their extreme poverty – they are too poor to be ‘credit-worthy’ even with the very modest sums involved. Some of the studies attempted to take account of this form of bias, and explored alternative interpretations of results. Second, very few studies have employed robust study designs. Too few have comparison groups and before and after measurements, for example. There is a need for future studies that employ appropriate comparisons, that understand and take account of country context, that assess if the programmes have brought about the desired increase in empowerment, and that examine differential health impact by gender and socioeconomic status.

As the renewed focus on introducing microfinance schemes in the UK grows, (and reinvigorating traditional credit union schemes) there is a need to learn from these evaluations in LMIC, as well as from past UK efforts that have been evaluated for other economic and social outcomes, if not for health.

Studies to increase community empowerment through participation in urban renewal programmes

Three studies (**Table 8**) were identified that explored whether increased community empowerment through participation in urban renewal programmes had an effect on health outcomes. Two before and after studies (Semenza et al, 2007; Itzhaky and York, 2002) and one post-intervention study (Eng et al, 1990) were included in the review.

Before and after studies

Semenza et al (2007) conducted a longitudinal before and after study of the health and wellbeing effects of a community development programme that was based around participation, empowerment, and collective action. The programme involved community members in decisions and activities which restored public squares in Portland, USA. They found post intervention reductions in (CESD-11) depression ($p = 0.03$), increased sense of community ($p=0.01$), and an overall expansion of social capital ($p = 0.04$). No effect sizes were stated.

Itzhaky and York (2002) conducted a series of cross-sectional surveys during and after an intervention to improve community services and empower a deprived and stigmatised community in Israel. Participant’s (mean) levels of mastery increased by 19% (from 2.52 to 3) between 1990 and 1993 and self-esteem increased by nearly 18% from 2.04 in 1990 to 2.40 in 1993 ($p<0.01$). Mean levels of family empowerment increased by nearly 27% (from 2.24 in 1992 to 2.84 in 1997, $p<0.01$), service delivery empowerment increased by 8% (from 3.49 in 1992 to 3.78 in 1997, $p<0.01$) and community empowerment increased by nearly 5% (from 3.73 in 1992 to 3.91 in 1997).

Post-intervention only studies

Eng et al (1990) conducted a cross-sectional study in intervention and control villages in Togo and Indonesia to explore the effect of community action for the resolution of local health problems. The intervention consisted of community participation in decision making during a water supply project. This was compared with communities in which similar water projects had been implemented with no participation in decision making, or where there were no water projects. Between 25 and 30% more children were immunized in villages with

community-based water projects than in villages with non-participatory or no water projects. In Indonesia, 60% of the children aged 3-14 months in the villages participating in decision-making had completed the DPT series, compared to 49% in project villages with no participation in decision-making, around 49% villages with no water projects. In Togo, 55% of the children aged 12-36 months in the villages with participation in decision-making had completed the DTP series, compared with 40% in the villages with no participation in decisions.

Substantial limitations

The three uncontrolled studies on urban renewal above have an inherently very weak study design for assessing causation/effectiveness of interventions because of the absence of comparator groups. The absence of comparators also leaves such studies open to considerable non-specific 'attention bias', in which the mere process of being investigated triggers behaviour change among the research participants.

6 MAIN FINDINGS: Intervention types and health impacts

6.1 The nature of the existing evidence-base on impacts of interventions

An immediate question raised by the results of systematic Review 3 is why there was so few intervention studies identified for inclusion in the review? One reason is that although there may be a great deal of activity reported in the literature, the evaluations stopped short of assessing health and health inequalities impacts. Sixteen percent of the full text articles assessed for eligibility had no health-related outcome and were therefore excluded. This is in line with an earlier systematic review for the NICE review of community engagement interventions in the UK addressing the wider social determinants of health, which found no studies reporting health outcomes as such, though it did find impacts on social determinants (Popay et al, 2007).

Another substantive reason is that we excluded interventions that did not address the lack of power/control in the theoretical pathways from control to health inequalities. To be included, the interventions had to be centrally concerned with increasing control for those groups in society with relatively low power. Just under a half of the full text articles assessed for eligibility were excluded because the interventions were not primarily concerned with influencing control or empowerment.

In contrast, there is a substantial literature on the effectiveness of health promotion interventions that employ some form of community engagement as a strategy for improving effectiveness. This is essentially an instrumental or utilitarian approach which employs community engagement as a means to an end – the end being success in bringing about health-related behaviour change. A recent systematic review and meta-analysis of community engagement to reduce health inequalities, for instance, included 319 evaluations from OECD countries of interventions involving community engagement (widely defined) with disadvantaged groups that also measured health-related outcomes (O'Mara-Eves et al, 2013). Of the 319 studies identified in the mapping exercise, 131 were entered into a meta-analysis. Almost all the included studies, however, were lifestyle/single risk factor health promotion initiatives targeted at disadvantaged groups that employed community engagement to some degree to enhance effectiveness (i.e. a utilitarian/instrumental approach). The study found that there was solid evidence that this type of health promotion/disease prevention programme, which incorporated a community engagement component, has a positive impact on a range of health outcomes, across various conditions (O'Mara-Eves et al, 2013). It was not able to distinguish whether the level of community engagement (from consultation through to full involvement) made a difference to effectiveness.

6.2 Pointers from the results of Review 3 of effectiveness of interventions

The results of the O'Mara-Eves et al (2013) study serve to reinforce our conclusion from Review 3 about the extent and nature of the evidence base. There is a relative scarcity of evaluations of the health and health inequalities impact of interventions that have a primary aim of improving the level of control in the living environment.

Our Review 3, however, did find an emerging body of evidence on one particular type of community empowerment intervention that addressed the theoretical pathways at the meso and macro levels. This is the microfinance programme. The aim of this type of initiative is to improve women's economic power and employment opportunities in their immediate community, while at the same time confronting engrained discriminatory attitudes to women in those societies, through, for example, facilitating the attendance of girls at school and attitudes to paid employment of women outside the home. Nine of the ten studies provide

evidence of some positive association between participation in micro-finance schemes and improvement in health-related outcomes when compared with non-participation.

A number of pointers for future intervention studies emerged from the review of microfinance schemes. First, much of the literature reviewed had inherently weak study designs, as discussed in Section 5. This must be remedied in future studies if progress is to be made in this important field.

Second, it is essential to incorporate actual measurement of control/empowerment into intervention studies, not just assume that the interventions will automatically lead to a positive enhancement, and to assess potential negative as well as positive impacts.

Third, there is a need for future studies to employ appropriate comparisons, to understand and take account of country context, to assess if the programmes have brought about the desired increase in empowerment, and to examine differential health impact by gender and socioeconomic status.

Fourth, as the renewed focus on introducing microfinance schemes in the UK grows, (and reinvigorating traditional credit union schemes) there is a need to learn from these evaluations in LMIC, as well as from past UK efforts that have been evaluated for other economic and social outcomes, if not for health.

6.3 What types of actions could influence control in the living environment?

Despite the dearth of relevant evaluations, it is still instructive for future planning to identify types of intervention that have or could be made in this field, even if evaluations have yet to be made of their health impacts. **Table 9** summarises potential entry points and different types of intervention, drawing on our reviews and analysis of theories of change underpinning proposed actions.

Note: section 6.3 is largely conceptual in nature, identifying possible entry points and different types of intervention that could address the theoretical pathways mapped out in our logical models of the micro, miso and macro levels depicted in Figures 1, 2 and 3.

Table 9: Intervention entry points and types

Entry Point and type	Example
<p>Micro/ personal</p> <ul style="list-style-type: none"> Intervening on low control beliefs and self-efficacy Intervening on the low expectations of others Opening up life chances – increasing provision with increasing deprivation 	<p>Youth empowerment schemes, e.g. YES!</p> <p>Good quality early years education and childcare, Lifelong learning Opportunities, Welfare rights advice schemes</p>
<p>Meso/ community</p> <ul style="list-style-type: none"> Facilitating collective action Increasing community control through asset transfer Creating new channels for democratic participation 	<p>Microfinance; Regeneration schemes; Tenant Management; Participatory budgeting; Localism Act powers</p>
<p>Macro/society</p> <ul style="list-style-type: none"> Legislation/sanctions on discrimination Improving the rights of powerless members of population Improving access to universal education and healthcare Equitable resource allocation and social protection 	<p>Anti-discrimination laws; Increasing representation of underserved groups in national decision-making fora; Extending coverage of education and healthcare systems; Boosting social protection rights, e.g. Living Wage, Minimum Income for Healthy Living.</p>

Intervening in the micro/personal level pathways

There are several potential entry points for intervention in the pathways to health inequalities at the micro level depicted in Figure 1.

Influencing low control beliefs/hope for the future

One entry point is working on low control beliefs, low self-efficacy and low expectations of more disadvantaged young people. There are some educational programmes that have as their central rationale the aim of empowering disadvantaged young people with low self-esteem and low expectations to greater expectations and hope for the future. **Box 7** gives an illustration of one such intervention, the YES! Project in California, designed to give ‘hope’ to young people living in hard pressed circumstances (Syme, 2004; Wilson et al, 2007). We contacted the developers of this programme for evaluation results, but they reported that there had been no evaluation of the empowerment impacts, due to lack of funding (Leonard Syme, personal communication, March 2013) – a missed opportunity. Nevertheless, we include the YES! Project in box 7 as a promising example of the type of theory-based empowerment intervention that operates at the micro/personal level – in this case attempting

to influence low control beliefs/lack of hope for the future among more disadvantaged young people.

A Campbell Collaboration systematic review of youth empowerment programmes to improve self-efficacy and self-esteem in adolescents identified 68 studies of this type of programme, only 3 of which met their quality criteria. The review concluded that there was insufficient evidence to substantiate the expectation that such programmes would raise self-esteem and self-efficacy (Morton and Montgomery, 2011). The authors recommended not only more rigorous impact study designs, but also the further development of methods and measures for high-quality, mixed-methods process studies to complement impact studies, and to provide more useful evidence for practitioners and policy-makers (Morton and Montgomery, 2011).

Box 7: The YES! Youth empowerment project in California, 2003-4.

An example of a youth empowerment intervention on hope that is theoretically sound, but was not evaluated for health impact includes the YES! Project in California schools in 2003-04. The stated aim was to give disadvantaged people 'hope'. YES!

It consisted of an after-school empowerment programme and research project that used empowerment education and participatory action approaches. They provided underserved early adolescents with opportunities for civic engagement with other youth around issues of shared concern in their schools and neighbourhoods. Goals were to work collaboratively on topics important to the youth groups, and to exercise power and control as individuals and as a group within the community. The participants lived and attended school in low-income areas.

The groups met weekly for 90 minutes after school, for approximately 25 sessions during the 2003/2004 school year. Each (YES!) group typically worked with a pair of co-facilitators who were recruited from local high schools and from the University of California at Berkeley's graduate student population. A graduate student and a high school student were paired for each group. The facilitators received a sequential curriculum to cover the first 25 YES! sessions. This included use of Photovoice and designing and implementing a social action project (Syme, 2004; Wilson et al, 2007).

A related entry point is intervening on the low expectations of others. Low control beliefs/low expectations of children living in disadvantaged circumstances may be compounded by the attitudes and low expectations of influential people around them, who stereotype the children from disadvantaged backgrounds as without hope. Parents, teachers, and the education and social welfare system as a whole may be imposing their own low expectations on children, in which case interventions to influence those adult expectations of children may be considered.

This type of intervention, aimed at influencing low control beliefs and attitudes through educational programmes of one kind or another, is concerned primarily with the role of learning in bringing about improvements in sense of control among disadvantaged groups in the population. There is a wider role for learning through access to education more broadly, in opening up life chances as explained below.

Opening up life chances

One criticism of interventions aimed at influencing low control beliefs and low self-efficacy is that they may not help if the problem is low actual control in day-to-day life and little chance of improving the situation by individual action. The may even be damaging. An intervention entry point for low control in the long run is at the point of improving life chances, through access to education, for example. The logic is that access to high quality education has many

benefits throughout life, including improving chances of having a higher income and job prospects, contributing to greater control in day-to-day life in the long-term. Examples are ensuring access to early years education, improving school readiness, and SureStart-type provision, with extra provision in areas of greatest need, for which there is evidence of long-term social and health benefit (Marmot et al, 2013). Opening up life chances could also include improving access to financial resources, through, for example, welfare rights schemes to help people claim all the welfare benefits that they are entitled to. One of the co-investigators on this project (Martin White) is leading an RCT of welfare advice in primary care, that will measure health wellbeing outcomes and will report in 2015 (Moffatt et al 2006; Haighton et al, 2012)

Intervening at the Meso/community level

At the Meso/collective level in Figure 2, there are at least two distinct entry points: facilitating collective action within communities and creating channels for the transfer of centralized power to local communities.

Facilitating collective action

In terms of the first entry point, community empowerment activities work on the premise that there is added 'power with' others that can be gained from joining together to change everyday conditions in which community members live. Interventions can range from improving access to amenities where community members can meet and socialize, to helping to create the sort of infrastructure and pump-priming that may be required for the successful start-up of the type of microfinance schemes or social enterprises described in section 5.1. Wallerstein's synthesis of community empowerment initiatives for WHO asked "what is the effectiveness of empowerment to improve health?" It presents evidence of impacts on self- and community-efficacy; improvements in community cohesion and some improvements in mental and physical health outcomes (Wallerstein, 2006). What is clear from the WHO synthesis and our review, however, is that a much greater understanding is needed of what the active ingredients are for conducting effective community empowerment aimed at reducing health inequalities.

Increasing community control through transfer of assets and power

Asset transfer schemes have an entry point directly into the community control box in Figure 2. These schemes aim to transfer ownership or management of public resources (often local authority resources in the UK setting) directly to the community in which they are located. It is claimed that they are "a genuine means of achieving popular control over decision making and empowering citizens by enabling them to positively influence the development of resources and services in their area" (Pratchett et al, 2009). The assets can range from communal facilities, such as community or leisure facilities to the management of social housing by tenant organizations (Cairncross et al, 2002; Tunstall (2001).

A systematic review of these and other local government initiatives (Pratchett et al, 2009), together with our searches, did not find any evaluations of health-related outcomes, and so were not included in our review of effectiveness of community empowerment interventions. The systematic review by Pratchett et al 2009, did, however, find that asset transfer could have other positive outcomes, including making a contribution to community empowerment through increased political efficacy and skills; enhanced activity on the part of the community anchor organization; providing a resource for increased activity by other community, social and/or private sector enterprises. There are, however, downsides, including the risk that the 'asset' can become a liability for the community. All sections of the community may not benefit equally. In particular, it is not clear from the evidence base to what extent marginalised

social groups participate in or benefit from transfer activities and, therefore, what effect this type of initiative has on inequalities within and between communities.

In the UK context, there are currently many initiatives to transfer decision-making powers, and these are set to increase under the Localism agenda. These include:

- **Citizen governance:** giving citizen or community representatives a seat at the table in decision-making boards and forums concerning public services and policy;
- **Participatory budgeting:** creating ways in which communities can participate in deliberations about how to spend devolved budgets;
- **E-participation and petitions:** for citizens to raise concerns and participate in decisions about public policies that affect them.

A systematic review of the evidence for the then Department of Communities and Local Government flagged up both benefits and risks of initiatives to transfer decision-making powers, identifying components which improved or hindered success. The authors identified an evidence gap –the question of whether there were differential impacts and benefits, and, if so, how could hard-to-reach groups be included? (Pratchett et al, 2009). We would add a further evidence gap to that list: what is the impact of these types of community empowerment initiatives on health and health inequalities?

Many of the area generation projects that have been introduced over the past 15 years in the UK by national government have operated at this meso-level. These have incorporated strategies to provide extra financial resources to the most disadvantaged areas with varying degrees of community engagement. A prominent experiment of this kind has been the New Deal for Communities, a 10-year regeneration programme in 39 areas in England with the worst health and socioeconomic disadvantage. As it was set up with matched comparator areas, and the community engagement approaches vary, there is scope for evaluation of health inequalities impacts of different community engagement approaches with the initiative. This evaluation is currently underway, led by Jennie Popay, but results will not be available until later in 2014. In addition, an evaluation has just begun of the Big Local, a 10-year initiative in 150 disadvantaged areas in England, funded by the Lottery, as a natural experiment in asset transfer. The Big Local is set up to provide each community with £1 million over which they have direct control to use it for whatever they decide is best to make their neighbourhood an even better place to live. An evaluation of impacts on social determinants and health inequalities has just started, again led by Popay on behalf of the NIHR School of Public Health Research, and involving several authors of this report: MMW, Martin W, MP, LO.

Intervening at the macro/societal level

There are a range of potential intervention points at the macro-level in Figure 3, from increasing human and democratic rights of powerless groups to legislation against discrimination and promoting cultural shifts in society.

Increasing representation

This includes giving more people a seat at the table where national decisions are made – improving voting rights and opportunities for representation at the highest level. Review 2 identified, for instance, evidence that greater participation of women in decision-making in society is associated with better population health overall (Yodanis, 2004; Swiss et al, 2012; Young, 2001; Ahmed et al, 2010; Scanlan, 2010).

There is also the strategy of increasing rights to education and to effective health care across the population, both of which are needed to realise other citizens' rights.

Legislating against discrimination

Legislation against discrimination, and regulation of discriminatory practices, such as sex selective abortion in the case of 'missing women' (Sen, 2003), are types of intervention that would potentially improve the social status of powerless groups in society.

Equitable resource allocation and social protection

Improving rights to social protection, for example introducing national standards such the Minimum Income for Healthy Living, or the Living Wage, would potentially make a contribution at societal level to improving control over resources for people on the lowest income.

7 CONTRIBUTION TO CONSORTIUM THEMES

7.1 Health inequalities and Living conditions

This project combines a focus on two of the three Consortium themes: 'health inequalities' and 'living and working conditions'. It provides a synthesis of evidence on theory, observational and intervention studies on the relationship between control in the living environment and the generation of health inequalities, and then draws out implications for future policy, practice and research to take the policy-relevant questions forward. It extends investigations of the impact of control on health, that have largely been carried out in the work environment, to the living environment.

7.2 Capacity Building

Like the previous Consortium project on return-to-work interventions led by Liverpool, this current project provided the opportunity for a research attachment for a clinical trainee on the North West NHS Postgraduate Specialist in Public Health Training Scheme. Dr Shilpa Nayak has spent part of her clinical lectureship while on the scheme contributing to the Consortium research team. The arrangement, as before, has been mutually beneficial.

8 CONCLUSIONS

8.1 Adopting a social determinants of health perspective

This project adds new insights by bringing a social determinants of health (SDH) perspective to bear on the question of the links between control in the living environment and health and wellbeing. In particular, the project questions whether control in the living environment (as opposed to the work environment) plays a role in bringing about the observed social patterning of health in the population which results in marked inequalities in health.

Using this SDH perspective, this project synthesises for the first time theories and empirical evidence concerning the pathways from control in the living environment and social inequalities in health encompassing three distinct levels. These levels are interrelated but rarely considered together in the disparate literatures in which they are located.

Our first review reveals well-developed theories about the potential pathways between control in the living environment and the generation of health inequalities which we categorised into three distinct explanatory levels. There are explanations that start with social position of individuals (micro/personal level); those that start with the place in which people live and its interaction with people (meso/community level); and those that start with the whole societal context (macro/societal level). The levels should not be considered in isolation, but as part of a comprehensive whole – clearly there are mechanisms at each level that interact with other levels. Our classification draws on the Dahlgren and Whitehead (1993) model, which conceptualises the main determinants of health as interacting layers of influence, one over the other, operating at the individual, community, system and macro-environmental levels.

8.2 Pathways between control in the living environment and health inequalities

At the micro level, the theories suggest mechanisms by which people in lower social positions experience lower control over their destiny, including a relative deficit of resources needed for health and wellbeing. This low control in turn causes chronic stress, which can lead to higher prevalence of physical and mental health problems than their more advantaged counterparts. There is empirical evidence in Review 2, from prospective cohort studies in the UK and The Netherlands, to support some links in the proposed causal pathways. These studies find, for example, that lower social positions are associated with both a) lower control beliefs about the home environment and b) poorer health outcomes, and that a substantial proportion of the association between low social position and mortality may be explained statistically by low control beliefs. In all the studies at this level, however, low control in the living environment is assessed by self-reports of control beliefs. No epidemiological studies so far have been able to distinguish between having low control beliefs and having actual low control over essential resources, which may have very different implications for policy. In this respect, the evidence base on control in the work environment is stronger, as objective scales of job demands and levels of control have been developed for this context. The task of developing such scales for the living environment would be much more complex.

At the meso/community level, the theories centre on the processes by which people interact with the places in which they live. The starting point in the explanation is therefore disadvantaged places, and the interaction between disadvantaged people and places that may produce a sense of collective threat and powerlessness. Together, these act as chronic stressors, which over time are damaging to health. Contrasting theories, on the other hand, maintain that the converse of powerlessness – community empowerment – may result from

the interaction between people and place, when community members act together for mutual benefit and challenge unhealthy material conditions or attract resources to their neighbourhood to make it a better place to live. The empirical evidence for these meso-level processes in Review 2 is sparser, not least because of the difficulty of capturing processes operating at a collective level. More robust longitudinal studies are needed to unpick the processes further. The empirical evidence on the pathways from community empowerment to health was similarly sparse, and studies were identified after extensive enquiries among active researchers in the field, rather than through the electronic database searches. The findings of the theory review led us to reflect on what type of evidence would demonstrate the impact of empowered communities on hypothesised health-related outcomes such as deflection of health-damaging threats to the local environment or attraction of resources to create better places to live. We found evidence in case studies of specific communities who had faced and acted together on such challenges. Such case studies were identified through books and other non-journal publications, often associated with the theory literature and it was not possible to judge the comprehensiveness or quality of the cases. Devising ways of capturing this type of evidence remains a challenge for future research syntheses.

At the macro/societal level, theories recognised the importance of considering people in their societal context. People live in societies with varying degrees of exclusion and discrimination. These theories posit that cultural, social or political processes that exclude or discriminate against whole sections of society result in low status and hence low control of discriminated groups over access to the necessities for health. Observation of the debilitating lack of control over everyday life experienced by poor rural women in parts of South Asia was the inspiration for Amartya Sen's investigations in the world's 'missing women' and his notion of development as a form of freedom: freedom and capabilities to life a long and healthy life. In Review 2, we found a substantial body of evidence on women's low status/low control and health-related outcomes, largely from low and middle-income countries, and largely cross-sectional in nature. The empirical evidence comes from diverse literatures, including cross-country comparative studies showing that greater participation of women in decision-making in society is associated with better average population health, better child health, and higher life expectancy for men as well as for women. Single cross-sectional surveys provided weak, though consistent, evidence of associations between low control among women and a range of adverse health outcomes. Socio-demographic studies in countries with entrenched son preference provided strong evidence of the lower survival of girls and women into adulthood in these societies, attributed to sex bias in relative care and practices such as sex selective abortion.

Distinct theories about mechanisms operating at the macro/societal level arise from observations of a natural experiment - the health impact of the collapse of the former Soviet Union in the late 1980s. This brought with it sharp social and economic crises in the countries concerned across the whole population, coupled with declines in life expectancy on a scale unprecedented in European peacetime history in modern. Debates about the potential causes of the decline in life expectancy as a result of this natural experiment have featured poor economic conditions, sharp disruption to health and social protection systems in society, and loss of perceived and actual control over daily life. All these insecurities/loss of control may contribute to an increase in health risks across the population, including rises in psychological and somatic responses to exposure to stressors, violence, substance misuse as a form of coping, and exposure to environmental hazards as safety standards decline. Evidence comes from single cross-sectional studies only, showing high prevalence of perceived low control over their lives among the populations of the former Soviet Union. Differences in level of control and economic resources explained, statistically, between 10-30% the observed East-

West health divide. There is a suggestion from the studies that perceived control might mediate the link between socioeconomic hardship and poor health in some of the former Soviet countries.

8.3 Intervening in the pathways

Both the theory and the empirical evidence provide support for investigating further actions on low control in the living environment as part of a strategy to tackle inequalities in health. Review 3, on the effectiveness of interventions, however, found few studies that aimed to increase control in disadvantaged groups and communities that also went on to assess the impact on health and wellbeing.

There is a body of evidence, however, on one highly relevant intervention – that of microfinance schemes in low and middle income countries, which cover 5 million poor rural women in Bangladesh alone.

The microfinance initiatives are of particular interest for our research questions because they are clear examples of theory-led women's empowerment interventions operating at the meso-level, while also attempting to confront the low status of women in these countries at the macro-level. There is evidence from the strongest study that women's membership of the scheme increased empowerment on nine indicators of status, economic power and autonomy in making decisions, and was associated with more than a 50% reduced risk of inter-personal violence against women. Other controlled studies found gains in infant and child survival and reductions in stunting for the children of members compared with non-members. Most strikingly, in some interlinked studies in Bangladesh there was evidence of a faster improvement in child health among the children of poor members, than among the rich non-members, resulting in a reduction in social inequalities in child survival. Gender differences between poor girls and poor boys were also reduced.

Evaluations of such schemes hold lessons for the UK, where interest is spreading in tackling poverty and unemployment at the community level through a combination of the credit union concept linked to pump-priming for small employment enterprises.

Implications for future action in the UK context

We drew on all three reviews and analysis of theories of change for potential actions to influence control in the living environment to consider implications for the UK context. Potential intervention points and different types of intervention were identified at each of the three pathway levels: micro, meso, and macro. It is clear that there is, or has been in the recent past, a great deal of activity in the UK at most of these entry points, employing a variety of types of intervention. Examples are given in table 9. A number of implications for future research and strategy development emerge from the project findings:

- There needs to be a theory-led overview of the disparate interventions that have been tried or are being proposed under the banner of improving the control that people in hard-pressed circumstances have in their day-to-day lives.
- Any proposed action on the control agenda needs to be considered in the context of a comprehensive health inequalities strategy, rather than being seen in isolation.
- There is a need for robust evaluations of the interventions that have a primary aim of improving the level of control that people in hard-pressed communities have over decisions that affect their daily lives. There are so many natural experiments going on,

particularly in relation to local control, that may yield valuable insights if robust, policy-relevant evaluations were initiated.

- There is a real tension between policies that are introduced with the stated aim of increasing local control and others that appear to be taking away local control. It may be that some theoretically promising initiatives are 'swimming against the tide' and may produce no net gain, or even look as though they are generating lower levels of control in the communities in which they are introduced if their effects are overwhelmed by contrary policies. Evaluations need to be able to assess potential negative effects and differentiate them from the effects of other policies.
- Evaluations need to incorporate measurement of changes in control/empowerment, rather than take for granted that the intervention will have an empowering effect. The health and wellbeing impacts should be incorporated into assessments.
- More generally, further investigation could be undertaken on whether and how measures of control over decisions should be incorporated into measurement of wellbeing at the individual, community and societal levels.

9 DISSEMINATION/OUTPUTS

Focussed workshop with policymakers

Our project includes the provision for a focussed workshop with policy advisers, which will be held in Spring 2015. To be organised in consultation with the DH Policy Research Programme, the aim of this workshop is to present and test out our interpretation of the project findings with UK policy advisors/analysts and gain their insights into how our interpretation can be developed further to better inform efforts to tackle inequalities in health.

Papers presented

Is control in the living environment important for health and wellbeing, and what does that mean for public health interventions? Start of project presentation: PHRC Project Management Group Meeting 11 May 2012, York, UK.

How are health inequalities affected by control in the living environment? A critical review of theory [moderated poster presentation]. Orton LC, Pennington AJ, Nayak S, Petticrew M, White M, Sowden A, Whitehead M. EUPHA European Public Health Conference 7 – 10 November 2012, St Julian's, Malta.

Is control in the living environment important for health and wellbeing, and what does that mean for public health interventions? Project update: PHRC Project Management Group Meeting 29 November 2012, London, UK.

Is control in the living environment important for health and wellbeing, and what does that mean for public health interventions? Project update: PHRC Project Management Group Meeting 3 May 2013, Newcastle, UK.

How could “control over destiny” lead to social inequalities in health? Mapping theories and mechanisms [poster presentation]. Orton LC, Pennington AJ, Nayak S, Petticrew M, White M, Sowden A, Whitehead M. Annual Scientific Meeting of the Society for Social Medicine 11 – 13 September 2013, Brighton. UK.

Missing women? The health inequalities impact of low control and gender discrimination: a theory-led systematic review of observational studies [oral presentation]. Pennington AJ, Orton LC, Ring A, Petticrew M, White M, Sowden A, Fox D, Whitehead M. Annual Scientific Meeting of the Society for Social Medicine 11 – 13 September 2013, Brighton. UK.

Missing women? The health inequalities impact of low control and gender discrimination: a theory-led systematic review of observational studies [oral presentation]. Pennington AJ, Orton LC, Ring A, Petticrew M, White M, Sowden A, Fox D, Whitehead M. EUPHA European Public Health Conference 13 – 16 November 2013, Brussels, Belgium.

Is control in the living environment important for health and wellbeing, and what does that mean for public health interventions? End of project presentation: PHRC Project Management Group Meeting 8 November 2013, London, UK.

Do microfinance initiatives improve women's health? A systematic review of women's empowerment interventions [poster presentation]. Orton LC, Pennington AJ, Nayak S, Petticrew M, White M, Sowden A, Whitehead M. Society for Social Medicine Annual Scientific Meeting 10-12 September 2014, Oxford, UK.

The health inequalities impact of low control in the living environment. A theory-led systematic review of observational studies [moderated poster presentation]. Orton LC, Pennington AJ, Nayak S, Petticrew M, White M, Sowden A, Whitehead M. EUPHA European Public Health Conference 19-22 November 2014, Glasgow, UK.

Full manuscripts in preparation

How could “control over destiny” lead to social inequalities in health? Mapping theories and mechanisms. Target journals: The Milbank Quarterly/Social Science & Medicine/Health & Place.

Does control in the living environment contribute to the social gradient in health and wellbeing? A theory-driven systematic review of observational evidence. Target journal: The Milbank Quarterly.

Missing women? The health inequalities impact of low control and gender discrimination: a theory-led systematic review of observational studies. Target journal: Social Science & Medicine.

Actions to influence control in the living environment: systematic review of evidence for impacts in reducing health inequalities [working title]. Target journals: American Journal of Public Health/Preventive Medicine.

The health-related impacts of women’s empowerment through micro-finance initiatives [working title]. Target journal: The Lancet.

The conceptualization and measurement of “control” as a social determinant of health and wellbeing [working title]. Target journal: Preventive Medicine.

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All Web-links were active 05/11/2014

APPENDICES

Appendix 1

Review 2 – MEDLINE search

MEDLINE and MEDLINE In-Process

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1946 to Present>

Searched via OVID 25/07/12. Restricted to English language only.

Strategy;

- 1 (social adj3 (disparit\$ or inequal\$ or inequit\$ or equit\$ or exclude\$ or exclusion or include\$ or inclusion or status or equality or gradient or hierarchy or class or determinant\$)).ti,ab. (20314)
- 2 (health adj3 (disparit\$ or inequal\$ or inequit\$ or equit\$ or equality or gradient or hierarchy or determinant\$)).ti,ab. (14197)
- 3 ((economic or material or structural) adj3 (disparit\$ or inequal\$ or inequit\$ or equit\$ or exclude\$ or exclusion or include\$ or inclusion or equality or gradient or hierarchy or class or determinant\$)).ti,ab. (10668)
- 4 ((socio-economic or socioeconomic) adj3 (disparit\$ or inequal\$ or inequit\$ or equit\$ or exclude\$ or exclusion or include\$ or inclusion or status or equality or gradient or hierarchy or determinant\$)).ti,ab. (25871)
- 5 (disadvantag\$ or vulnerab\$ or marginalis\$ or depriv\$).ti,ab. (159207)
- 6 (health adj1 gap).ti,ab. (124)
- 7 Vulnerable Populations/ (4582)
- 8 Socioeconomic Factors/ or poverty/ or social class/ (138755)
- 9 or/1-8 (326088)
- 10 ((perceive\$ or perception\$ or social or low\$ or high\$ or lack\$ or limit\$ or restrict\$ or personal or home or sense or desire or belief\$ or destiny or life) adj2 control\$).ti,ab. (40937)
- 11 ((civic\$ or stakeholder\$ or politic\$ or social or communit\$ or neighbour\$ or neighborhood or local\$ or resident\$ or planning or public\$ or citizen\$) adj3 (participat\$ or involve\$ or engag\$ or collaborat\$ or consult\$)).ti,ab. (31267)
- 12 ((economic\$ or financial or personal) adj2 (freedom\$ or independen\$ or choice\$)).ti,ab. (1358)
- 13 autonom\$.ti,ab. (81172)
- 14 (disempower\$ or dis-empower\$ or empower\$ or powerless\$).ti,ab. (11656)
- 15 (politic\$ adj3 voice\$).ti,ab. (42)
- 16 ((politic\$ or state) adj1 power).ti,ab. (417)
- 17 ((self adj1 determination) or self-determination).ti,ab. (2062)
- 18 "decision latitude".ti,ab. (342)
- 19 "decision authority".ti,ab. (111)
- 20 "ontological security".ti,ab. (14)
- 21 ((participat\$ or involve\$) adj3 ("decision making" or decision-making)).ti,ab. (2817)
- 22 Personal autonomy/ (11982)
- 23 Social participation/ (195)
- 24 *"Power (Psychology)"/ (3607)
- 25 (communit\$ adj2 develop\$).ti,ab. (3964)
- 26 salutogenesis.ti,ab. (118)
- 27 "sense of coherence".ti,ab. (1004)
- 28 or/10-27 (182541)
- 29 9 and 28 (11935)
- 30 limit 29 to (english language and humans) (8995)

Appendix 2

Review 3 – MEDLINE search

MEDLINE and MEDLINE In-Process

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1946 to Present>

Searched via OVID 07/02/13. Restricted to English language only, 1980 onwards.

Strategy;

- 1 (communit\$ adj2 (engag\$ or develop\$ or empower\$ or involv\$ or participat\$ or collaborat\$ or partners\$ or control\$ or mobiliz\$ or mobiliz\$ or action)).ti,ab. (16958)
- 2 (collective adj2 action).ti,ab. (414)
- 3 (civic adj1 (engag\$ or empower\$ or involv\$ or participat\$)).ti,ab. (184)
- 4 (public adj2 (engag\$ or empower\$ or involv\$ or participat\$ or control\$)).ti,ab. (2583)
- 5 (minorit\$ adj2 (engag\$ or empower\$ or involv\$ or participat\$ or control\$)).ti,ab. (393)
- 6 (ethnic\$ adj2 (engag\$ or empower\$ or involv\$ or participat\$)).ti,ab. (240)
- 7 (racial\$ adj2 (engag\$ or empower\$ or involv\$ or participat\$)).ti,ab. (80)
- 8 ((migrant\$ or immigrant\$) adj2 (engag\$ or empower\$ or involv\$ or participat\$)).ti,ab. (167)
- 9 (refugee\$ adj2 (engag\$ or empower\$ or involv\$ or participat\$)).ti,ab. (44)
- 10 ((multi or cross or trans) adj1 (racial or cultural or lingual) adj2 (engag\$ or empower\$ or involv\$ or participat\$)).ti,ab. (45)
- 11 ((black or "african american") adj2 (engag\$ or empower\$ or involv\$ or participat\$)).ti,ab. (483)
- 12 (indigenous adj2 (engag\$ or empower\$ or involv\$ or participat\$)).ti,ab. (124)
- 13 (aborigin\$ adj2 (engag\$ or empower\$ or involv\$ or participat\$ or control\$)).ti,ab. (215)
- 14 (stakeholder\$ adj2 (engag\$ or empower\$ or involv\$ or participat\$ or control\$)).ti,ab. (1398)
- 15 (neighbo\$ adj2 (engag\$ or empower\$ or involv\$ or participat\$ or control\$)).ti,ab. (1072)
- 16 (local adj2 (engag\$ or empower\$ or involv\$ or participat\$)).ti,ab. (2749)
- 17 (politic\$ adj1 (engag\$ or empower\$ or participat\$)).ti,ab. (244)
- 18 ((women\$ or female\$ or maternal or mother\$) adj2 (status or autonomy or empowerment or decision making or decision-making or societal position or social position or household position or household autonomy or power or control or freedom or agency or employment or politic\$ or rights or freedom\$ or literacy or education or school\$ or income or earning\$)).ti,ab. (30159)
- 19 (gender adj2 (equality or inequality or equity or inequity or disadvantage or preference or mainstreaming)).ti,ab. (1317)
- 20 (micro-credit or microcredit or micro-finance or microfinance).ti,ab. (155)
- 21 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 (57317)
- 22 ((benefit\$ or chang\$ or enhanc\$ or improv\$ or increas\$ or promot\$ or rais\$ or effect\$ or affect\$ or gain\$ or better\$) adj2 (health or outcome\$ or wellbeing or well-being or "well being" or fitness or inclusion or "life expectancy" or life-expectancy or "life satisfaction" or life-satisfaction or happiness or vaccinat\$ or immunis\$ or immuniz\$ or breastfeed\$ or fertility or birthweight or "birth weight" or contracept\$ or condom\$)).ti,ab. (230224)
- 23 ((prevent\$ or reduc\$ or less\$ or lower\$ or decreas\$ or effect\$ or affect\$ or chang\$) adj2 (death\$ or ill\$ or sick\$ or mortality or morbidity or disabilit\$ or "heart failure" or hypertension or cardiomyopath\$ or "myocardial infarction\$" or stroke or diabetes or depression or stress or anxiety or "mental illness\$" or "mental disorder\$" or "psychiatric illness\$" or "psychiatric disorder\$" or backache or "back pain" or asthma or "dental caries" or AIDS or HIV or malnourish\$ or stunting or wasting or anemia or anaemia or violen\$ or abuse\$ or rape\$ or STI\$ or "sexually transmitted infection\$" or STD\$ or "sexually transmitted disease\$" or fertility)).ti,ab. (340699)
- 24 22 or 23 (550356)
- 25 21 and 24 (9391)
- 26 limit 25 to (english language and humans and yr="1980 -Current") (7110)

Appendix 3

Review 2 critical appraisal tool

A/ What is this paper about?

	Notes	Yes	Can't tell	No	Reviewer notes
1. Is the study relevant to the needs of the Project?	Does it meet our inclusion criteria?				
2. Does the paper address a clearly focused issue?					
in terms of ... • The population studied?	Sample description: Country and date?				
	Demographic details?				
	Inclusion/exclusion criteria?				
• (case-control study only) Is the case definition explicit and confirmed?	Unlikely to be appropriate				
The outcomes considered?	Are the outcomes and their indicators (measures) described?				
<input type="checkbox"/> Are the aims of the investigation clearly stated?					

	Notes	Yes	Can't tell	No	
3. Is the choice of study method appropriate?					
4. Is the population studied appropriate?					
• (x-sec study) Was the sample representative of its target population?					
• (cohort study) Was an appropriate control group used – i.e. were groups comparable on important confounding factors?	Unlikely to be appropriate				

<ul style="list-style-type: none"> (case-control study) Were the controls randomly selected from the same population as the cases? 	Unlikely to be appropriate				
5. Is confounding and bias considered?					
<ul style="list-style-type: none"> Have all possible explanations of the effects been considered? 	Has the analysis accounted for all possible explanations (obvious confounders)?				
<ul style="list-style-type: none"> (cohort study) Were the assessors blind to the different groups? 	Unlikely to be appropriate				
<ul style="list-style-type: none"> (cohort study) Could selective drop out explain the effect? 					
<ul style="list-style-type: none"> (x-sec & cohort study) Did the study achieve a good response rate? 	Record the response rate% and any other relevant information. Have they reported the response rate? Is it sufficient?				
	Are non-responders likely to have introduced bias?				
	Have they considered how this may have affected the results?				
<ul style="list-style-type: none"> (x-sec & cohort study) Were rigorous processes used to develop the questions? (e.g. were the questions piloted/validated?) 	Are indicators & constructs appropriate?				
	<ul style="list-style-type: none"> Justification given? 				
	<ul style="list-style-type: none"> Reliability & validity assessed (e.g. Cronbach's Alpha)? 				
	<ul style="list-style-type: none"> Are they published measures? 				

<ul style="list-style-type: none"> (case-control study) How comparable are the cases and controls with respect to potential confounding factors? 	Unlikely to be appropriate				
<ul style="list-style-type: none"> (case-control study) Were interventions and other exposures assessed in the same way for cases and controls? 	Unlikely to be appropriate				
6. (Cohort study) Was follow up for long enough?					
<ul style="list-style-type: none"> Could all likely effects have appeared in the time scale? 					
<ul style="list-style-type: none"> Could the effect be transitory? 					
<ul style="list-style-type: none"> Was follow up sufficiently complete? 	Have they reported the drop-out/attrition rate? Is it sufficiently low?				
	Are drop-outs likely to have introduced bias?				
	Have they considered how this may have affected the results?				
	Record the drop-out/attrition rate% and any other relevant information				
<ul style="list-style-type: none"> Was dose response demonstrated? 	Did they calculate a dose-response relationship?				

C/ What did they find?

	Notes	Yes	Can't tell	No	
7. Are tables/graphs adequately labelled and understandable?					
8. Are you confident with the authors' choice and use of statistical methods, if employed?	Choice of stats test				

Appendix 4

Review 3 critical appraisal tool

The quality assessment tool contains six questions:

1. Selection bias
2. Study design
3. Confounders
4. Blinding
5. Data collection
6. Withdrawals and dropouts.

Each question can get an A (high), B (medium) or C (low) quality rating, as per the tool below.

The guidelines for the specific questions are as follows.

1. Selection bias

Selected study sample very likely to represent population from target area AND 80 to 100% response at baseline	A
Selected study sample very likely to represent population from target area AND 60 to 79% response at baseline; OR Selected study sample somewhat likely to represent population from target area AND 80 to 100% response at baseline	B
<60% baseline response; OR Somewhat likely to represent population AND <80% response; OR Not likely to represent population OR representativeness NR/unclear; OR Response rate at baseline NR/unclear	C

2. Study design

Control group and pre and post longitudinal data OR random allocation	A
No control group and pre and post longitudinal data; OR Control group and pre and post cross-sectional data AND no indication of major change in population	B
No control group and pre and post cross-sectional data; OR Control group and pre and post cross-sectional data AND possibility of major change in population	C

Note: 'longitudinal' = same individuals pre and post; 'cross-sectional' = different individuals. Where studies use mixed designs (e.g. presenting both cross-sectional and longitudinal data), give the highest grade applicable to the analyses actually reported. Where studies collect longitudinal data and report attrition rates, grade as longitudinal even if only cross-sectional analyses are reported.

3. Confounders

Control group matched on key variables (at least two of: crime rate (area level), SES or relevant proxies (area or individual level), gender, age, ethnicity (individual level)) AND supporting data presented; OR Outcomes adjusted for key variables (at least two of: gender, age, ethnicity, SES) using appropriate methods	A
Stated that control group matched or 'similar', but supporting data not presented	B
No matching or adjustment reported AND likely to be substantial differences between groups; OR no information on differences between intervention and control group; OR no control group	C

Note: RCTs will be graded 'B' if no information on between-group differences is presented

4. Blinding

Both outcome assessors AND participants blind to allocation	A
Either outcome assessors OR participants blind to allocation	B
Blinding NR; OR no control group	C

5. Data collection

Piloting or pre-testing of tool; OR checks on validity of data (e.g. verification of a percentage of responses); OR tool shown to be reliable in relevant population	A
Data collection tool based on previous research, but no piloting or checking, and reliability not demonstrated	B
Data collection unclear; OR tools not piloted, checked or based on previous research	C

6. Withdrawals and dropouts

Attrition <20%	A
Attrition 21%-40%	B
Attrition >40%; OR attrition NR; OR cross-sectional data only	C

Note: Attrition is measured as the percentage of the baseline sample lost at final follow-up

Appendix 5

Measures of control in reviewed studies: non-gender observational

Micro / personal level			
Control measure	Scale	Study	Setting
Perceived control	11-item Dutch version of Rotter's locus of control scale	Bosma H, Schrijvers C, Mackenbach JP (1999)	Netherlands
	8-item index assessing the degree to which individuals feel their life is under their control. Authors state that index is similar in structure to other instruments used to assess perceived control (see Lachman & Weaver, 1998; Pearlin & Schooler, 1978).	Infurna, Gerstorf et al 2011	Germany
	Generalized self-efficacy scale (10 items) 2. Powerlessness scale (8 items, adapted from the Empowerment Scale (Rogers 1997) 3. Single question - assess perceived work conditions	Dalgard 2008	Norway
	Perceived control over life; control over own health. 6 questions on perceived control over one's life and 3 questions on control over own health (developed in the MacArthur Foundation programme on midlife development (Lachman & Boone James, 1997)).	Bobak et al 1998	Russia
	Perception of life control. Respondents' agreement with 11 items (adapted from control measures used in three previous studies). The authors constructed two subscales, control over health and control over life.	Lundberg et al 2007	Sweden and Russia
Control beliefs	General self-efficacy and mastery. Sherer's General Self-Efficacy Scale (Sherer et al, 1992) (Cronbach's alpha = 0.84). Mastery measured using Pearlin and Schooler's Mastery Scale (Pearlin and Schooler, 1978)	Bosma H, Van Jaarsveld CHM, Tuinstra J, Sanderma R, Ranchor AV, Van Eijk JThM, Kempen GJM (2005)	Netherlands
	Life control scale (extent to which an individual believes that he or she has control over all aspects of life) Life Control Scale (Bobak 1998)	Lee et al 2009	Australia
Sense of personal control	2 x 2 index that balances statements claiming or denying control over good or bad outcomes (Mirowsky and Ross 1991)	Ross CE and Wu C (1995)	USA
	Personal control 4 items:	Lincoln 2003	USA

	<p>Personal control 4 items: 1) their lives are determined by their own actions 2) they can make plans work 3) they get what they want by working hard, and 4) they can protect their own interests.</p>		
	<p>Personal control Shortened (9 item) version of Rotter's (1966) Internality-Externality Scale.</p>	Turner and Noh 1983	Canada
	<p>Sense of control. Sense of control was measured using average scores on a 10-item scale that tapped persons' perceptions that their circumstances were determined by their own efforts (internal control), chance or fate, or powerful others (Levenson 1973)</p>	Kiecolt 2009	USA
	<p>Sense of control was operationalised with two dimensions: personal mastery (one's sense of efficacy or effectiveness in carrying out goals, adapted from Pearlin and Schooler's Mastery Scale (1978)) and perceived constraints (the extent one believes there are obstacles or factors beyond one's control that interfere with reaching goals, based on Skinner's (1996) conceptualisation of control)</p>	Lachman and Weaver 1998	USA
	<p>Sense of control over life; belief that most Americans control their lives. 'Personal instrumentalism' measured by agreement/disagreement with questions on personal instrumental or fatalistic success and failure and American instrumentalism</p>	Mirowsky 1996	USA
Control over one's life	<p>Self-rated, ranked 1 to 10 Control over one's life was self-rated (ranked 1 to 10, categorised into 3 groups: low, medium and high control).</p>	Gilmore et al 2002	Ukraine
	<p>Life control Sum of 3 questions that provided alternative choices, one in the direction of control over life and the other in the direction of lack of control</p>	Power 2001	UK
Sense of coherence	<p>SOC-13 (a shortened version of Antonovsky's 29-item SOC scale). The 13 questions include items that</p>	Ing and Reutter 2003	Canada

	address manageability (4), comprehensibility (5), and meaningfulness (4).		
	29-item SOC scale - includes three domains: comprehensibility, meaningfulness and manageability.	Hakansson et al 2003	Sweden
Control at home	Single statement about control at home: "at home, I feel I have control over what happens in most situations" - 6 categories: disagree strongly to agree strongly	Griffin JM, Fuhrer R, Stansfeld SA, Marmot M (2002)	UK
	Single statement about control at home: "at home, I feel I have control over what happens in most situations." Responses dichotomised as "low control" (strongly disagree, moderately disagree, slightly disagree and slightly agree) vs "high control" (moderately agree and strongly agree). 2. Rosenfeld's (1989) measure of power within the household (ratio of respondent's personal income to total household income, divided into high, medium and low tertiles)	Chandola, Kupper et al 2004	UK
Psychological control	Control beliefs measured using 3 dimensions (Internal, Chance, and Powerful Others) of the Health Locus of Control questionnaire (HLC; Wallston 1978).	Poortinga et al 2008	UK
Autonomy	Freedom of choice and control over lives. Single item asking individuals the degree of freedom of choice and control they have over their lives	Martin 2012	51 medium to low human development countries
Vulnerability, justice & personal efficacy ('world views')	Personal efficacy (based on Pearlin et al, 1981 and Rotter, Chance and Phares, 1972).	Umberson 1993	USA
Meso- / community level			
Control measure	Scale	Study	Setting
Perceived control at multiple levels (organisational, neighbourhood and beyond the neighbourhood, plus a composite of multiple levels	Respondents asked how much they agreed or disagreed with a series of statements regarding their influence in their most important organisation, their neighbourhood and beyond the neighbourhood. A factor analysis of the 12 scale items resulted in 3 factors which correspond to perceived control at the organisational, neighbourhood and beyond the neighbourhood levels. A composite scale including the 3 subscales was created to	Becker 2000	USA

	assess perceived control at multiple levels.		
Perceived neighbourhood disorder.	Sense of personal powerlessness is the belief that events and outcomes in one's life remain outside one's control. The sense of personal control versus powerlessness is measured by the Mirowsky-Ross scale which is a 2x2 index that balances statements claiming or denying control over good or bad outcomes	Ross, Mirowsky, Pribesh 2001	USA
Neighbourhood disorder Powerlessness	Neighbourhood disorder (Ross and Mirowsky 1999) variables related to physical disorder and order; social disorder and order Perceived powerlessness is the learned and generalised expectation that one has little control over meaningful circumstances in one's life.	Ross & Mirowsky 2009	USA
Perceived neighbourhood disorder; loss of collective control	Disorder scale refers to conditions and activities, both major and minor, criminal and noncriminal, that residents perceive to be signs of the breakdown of social order.	Hill, Ross and Angel 2005	USA
Perceived community participation	Measured by mother's responses to 11 items asking about involvement of 'collective grassroots organisations' in specific tsunami-recovery activities (for example, searching for individuals/bodies; cleaning, repairing and constructing houses; decision making, sharing worries). Responses were summed to yield an index of perceived community participation.	Wickrama 2011	Sri Lanka
Macro-level			
Control measure	Scale	Study	Setting
Black political gains in terms of absolute political power (APP); relative political power (RPP).	APP= % of city council members who are black and RPP=the proportion black on the city council divided by the proportion black in the voting-age population	LaVeist TA (1992)	USA

Power relations	Power relations - Number of years of SDP government since the first autonomous community elections at the beginning of the 1980s, and until 1998. Earlier literature has shown that SDPs are more committed than other political parties to redistributive policies, universalistic welfare policies, and full-employment policies.	Rodríguez-Sanz et al 2003	Spain
Perception of life control.	11 items (adapted from control measures used in three previous studies). The authors constructed two subscales, control over health and control over life.	Lundberg et al 2007	Sweden and Russia
Freedom, personal control; general satisfaction.	Freedom of control was computed on the basis of three domains (say what I think; join any organisation I like and; travel freely anywhere I want). Personal control was computed on the basis of six domains (can't overcome difficulties; unable to enjoy normal day-to-day activities; dissatisfied with work; life is too complicated; impossible to influence things activities and; feeling lonely).	Abbot and Sapsford 2006	Russia and Ukraine
Perceived control over life; control over own health.	6 questions on perceived control over one's life and 3 questions on control over own health ((developed in the MacArthur Foundation programme on midlife development (Lachman & Boone James, 1997)).	Bobak et al 1998	Russia
Control over one's life	Self-rated, ranked 1 to10 Control over one's life was self-rated (ranked 1 to 10, categorised into 3 groups: low, medium and high control).	Gilmore et al 2002	Ukraine
Social Control	(Freedom of choice and control, personal control scale, freedom index).	Abbot 2007	Belarus and Moldova
Women's representation	A 5-year lag of the % of seats held by women in the lower/single house of the national legislature at the end of each of our panel years	Swiss 2012	102 developing countries

Appendix 6

Measures of control in reviewed studies: gender observational

Control over	Example of measure used	Study & setting
Household	Household decision making scores: <ul style="list-style-type: none"> Who makes 'big decisions' (decisions to change place of residence, buy, sell or reconstruct a house, rent land, etc.) Routine household decisions that include decisions on buying and selling food items and day-to-day activities in the household. 	Fantahun et al (2007) Ethiopia
	Autonomy in the household (autonomy to: take a sick child to a hospital outside her village alone, to meet unknown male visitors at her home, to go outside for recreation and to travel for family planning). Household authority (authority to: spend money on medicine when her child is sick, see a doctor when she is sick, decide how long a child should attend school and to whom and at what age a daughter should be married).	Hossain et al (2007) Bangladesh
Movement/mobility	Index of <i>purdah</i> : <ul style="list-style-type: none"> Frequency of travel outside village and freedom to do so unaccompanied by others. 	Hossain et al (2007) Bangladesh
	Freedom to visit friends and family.	Mogford (2011)
	Freedom to go to the market.	India
Legal & political resources	Percentage of seats held by women in the lower/single house of the national legislature.	Swiss et al (2012) USA
	Female political participation, 3 variables: <ul style="list-style-type: none"> Female empowerment: the proportion of a district's constituencies that had a female member of the Legislative Assembly, divided by the proportion of the voting age population that is female. Ratio of female to male voters. Ratio of female to male candidates. 	Gleason (2001) India
Fertility & reproductive rights	Self-efficacy in sexual negotiation (based on response to question: "How sure are you that you could resist sexual intercourse if your partner did not want to use some form of birth control?").	Pearson (2006) USA
	Decision-making regarding condom use.	Lau (2006)
	Sexual relationship power scale.	China
Access to food & nutrition	Who makes the final decision about what foods to be cooked.	Khandoker (2006) Bangladesh
	Household decision making scores that include decisions on buying and selling food items.	Fantahun et al (2007) Ethiopia
Access to education	Women's education level.	Riyami (2011)

		Oman
	Women's access to education resources.	Shannon (2012) Botswana and Swaziland
Access to employment	Women's economic autonomy: <ul style="list-style-type: none"> • participation in income-generating activity • control of resultant income • perception of household economic responsibility 	Krishnan (2005) India
	Employment and earnings.	Chen et al (2005)
	Economic autonomy.	US
Access to healthcare	Authority to: <ul style="list-style-type: none"> • Spend money on medicine when her child is sick. • See a doctor when she is sick. 	Hossain et al (2007)
	Who usually makes decisions about: child's healthcare.	Story (2012) Bangladesh
Status of women indices	Status of Women Index (women's: educational status, occupational status, political status).	Yodanis (2004) 27 countries in Europe and North America
	Index of 'gender inequity norms' – "adherence to socially and culturally embedded norms on gender and sexual roles among men and women, including expectations on gender roles, access to resources (education, inheritance) and adherence to traditional concepts of masculinity and femininity."	Shannon (2012) Botswana and Swaziland