UNIVERSITY OF CAMBRIDGE
Institute of Public Health

# DISABILITY, DEMENTIA AND FRAILTY IN LATER LIFE: MID-LIFE APPROACHES TO PREVENT OR DELAY THE ONSET OF THESE CONDITIONS

**REVIEW 1 - Issues that prevent or limit the uptake and maintenance of healthy behaviours by people in mid-life (barriers and facilitators)**

**FINAL REPORT**


**Produced by** Cambridge Institute of Public Health, University of Cambridge

http://www.iph.cam.ac.uk

**Review team** Sarah Kelly
Louise Lafortune
Steven Martin
Isla Kuhn
Andy Cowan
Carol Brayne



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**For further details please contact:**

Dr Louise Lafortune
Senior Research Associate
Institute of Public Health, Forvie Site
University of Cambridge School of Clinical Medicine
Box 113 Cambridge Biomedical Campus
Cambridge, CB2 0SR
ll394@medschl.cam.ac.uk

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**Abbreviations**

| | |
|---|---|
| AL | Alcohol |
| CIPH | Cambridge Institute of Public Health |
| CPH | Centre for Public Health |
| CPHE | Centre for Public Health Excellence |
| CVD | Cardiovascular disease |
| DH | Department of Health |
| DI | Diet |
| EC | Eye Care |
| HB | Health Behaviours |
| LGBT | Lesbian, gay, bisexual and transsexual |
| NICE | National Institute for Health and Care Excellence |
| NIHR SPHR | National Institute of Health Research School of Public Health Research |
| OECD | Organisation for Economic Co-Operation and Development |
| PA | Physical Activity |
| RCT | Randomised controlled trial |
| SES | Socioeconomic status |
| SM | Smoking |
| WCRF | World Cancer Research Fund |
| WHO | World Health Organisation |

**Operational definitions**

| | |
|---|---|
| Successful ageing | Successful ageing is defined as survival to an advanced age while maintaining physical and cognitive function, functional independence and a full and active life. It means that morbidity and disability are compressed into a relatively short period before death, in line with the 'compression of morbidity' theory. |
| Disability | Disability will refer to any long-term restriction on the ability to perform an activity in the manner, or within the range, considered normal. |
| Dementia | Dementia will refer to a progressive, degenerative condition caused by diseases of the brain. Whether it occurs alone, in addition to, or as a combination of, chronic conditions, it is characterised by cognitive and non-cognitive symptoms of variable frequency and severity. |
| Frailty | Frailty will refer to a syndrome characterised by age-related declines in functional reserves where a small insult (e.g. infection, loss of partner) results in a striking and disproportionate change in health state. Frail older adults experience an increased risk of adverse outcomes such as falls, fractures, comorbidity, disability, dependency, hospitalisation, need for long-term care and mortality. |
| Non-communicable chronic conditions | Non-communicable chronic conditions will include cardiovascular diseases, diabetes, chronic obstructive pulmonary diseases, obesity, visual and hearing conditions, and some cancers that may be associated with behavioural risk factors. |
| Disadvantaged populations | Disadvantaged populations will include (but are not limited to) low socioeconomic status, ethnic minority groups, lesbians, gay, bisexual and transsexual (LGBT) community groups, travellers and other groups with protected characteristics under the equality and diversity legislation. |

# EXECUTIVE SUMMARY

## 1. INTRODUCTION

### 1.1 Background

The Department of Health (DH) has asked the National Institute for Health and Care Excellence (NICE) to produce public health guidance on preventive approaches to be adopted in mid-life to delay the onset of disability, dementia and frailty in later life. Three evidence reviews and an economic model underpin the guidance. The reviews looked for evidence on a wide range of potential influences on well-being in later life (i.e. demographic, economic, geographical, physical, cultural and social factors), and at the effectiveness and cost effectiveness of available interventions to act on these factors. This report presents the findings of the evidence review looking at the key issues for people in midlife that prevent or limit, or which help or motivate them to take up and maintain healthy behaviours.

### 1.2 Aims and review questions

The overarching research question for the three evidence reviews is which primary prevention approaches to be adopted in midlife are most effective and cost-effective to prevent and delay the onset of disability, dementia, frailty, and other non-communicable chronic conditions in later-life.

The specific question addressed in this review (Review 1) is:

- What are the key issues for people in midlife that prevent or limit, or which help or motivate them to take up and maintain healthy behaviours, and to what extent do they have an effect? How does this differ for subpopulations, for example by ethnicity, socioeconomic status or gender?

The two other reviews focus on the association between behavioural risk factors in midlife and late life outcomes (Review 2), and the effectiveness and cost effectiveness of midlife interventions for increasing uptake and maintenance of healthy behaviours, and the extent to which different healthy behaviours prevent or delay disability, dementia, frailty or non-communicable chronic disease (Review 3).

## 2. METHODS

The scope of the review includes a wide range of issues (including barriers and facilitators) for people in midlife that prevent, limit, or which help or motivate people to take up and maintain:

- Healthy behaviours such as increased physical activity, improved diet or components of diet, weight loss or control, cessation or reduction of smoking, reduction or modification of alcohol consumption, sufficient levels of social activity and less loneliness, address hearing and/or sight loss, or to improve/modify multiple behavioural risk factors and health behaviours in general;
- At individual, family, community, subnational or national level;
- In a range of settings including primary and secondary care, and workplace and community settings in the private, public, voluntary or commercial sectors.

The population covered by the review includes adults aged 40 to 64 years and adults aged 39 and younger from disadvantaged populations. The review does not cover people with and treated for pre-existing conditions (i.e. dementia, frailty, disability, non-communicable chronic conditions) nor does it cover the treatment (i.e. drugs, dietary supplements), diagnostic and care and management of these conditions.

The review includes the following non-modifiable and modifiable factors as outcomes:

- Personal factors such as gender, socioeconomic status, ethnicity, employment, family, previous experiences, expectations;
- Social factors such as social norms, support;
- Environmental factors such as access to resources, facilities, residential and work environment.

We conducted a thorough search of the scientific and grey literature to identify systematic reviews and primary qualitative and quantitative studies published in English since 2000 that reported data on these issues. Qualitative studies (including surveys and process evaluations) provide information on the key issues for people in midlife whereas quantitative studies also provide answers to the question about the extent to which issues have an effect. Cross-sectional (quantitative) primary studies were excluded as they would only show a cross-sectional association.

The title and abstract of identified references were screened independently by two reviewers. Primary studies that met the inclusion criteria (as described above) were assessed for quality using available tools from NICE (CPH methods manual). For systematic reviews the AMSTAR tool was used to assess quality by one reviewer and data was

extracted using piloted data extraction tools. A minimum of 10% of the included studies were fully double assessed for quality. Quality assessment was conducted for all studies included in this review. No studies were excluded on the basis of quality.

As both quantitative and qualitative evidence are included in this review, we synthesised the results thematically where themes emerged and descriptively otherwise. The data was not amenable for meta-analysis. Data specific to health inequalities and vulnerable communities was extracted and findings are summarised separately where data is available. Studies conducted in the UK were prioritised in the synthesis of data and in the applicability statements.

For each key issue or factor of interest an evidence statement was generated which provides an aggregated summary of all of the relevant studies. Applicability ratings (i.e. directly applicable, partially applicable or not applicable) are proposed for each evidence statement to judge how similar the population(s), setting(s), intervention(s) and outcome(s) of the included studies are to those outlined in the review question.

## 3. FINDINGS

This review sought to identify issues that prevent or limit the uptake and maintenance of healthy behaviours by people in midlife or from disadvantaged populations. Evidence was found relating to barriers and facilitators to physical activity, diet and eating behaviours, smoking, alcohol, eye care, and health behaviours in general (in particular in relation to prevention of cardiovascular disease).

The evidence found by this review was derived from three types of studies:-

1) primary qualitative studies in adults at midlife;
2) primary longitudinal cohort studies that examined behavioural predictors of health behaviours at midlife;
3) systematic reviews of qualitative or quantitative studies in adults in general (from a broader age range than just midlife adults).

Only 7 studies (systematic reviews and primary studies) were conducted in the UK or used UK data. However, most of the available evidence is from developed OECD countries including Europe, the US, Canada, Australia, New Zealand. Evidence was found for men and women at midlife and for some disadvantaged groups in relation to some health behaviours.

The evidence relating to specific barriers and facilitators is summarised fully in the evidence statements. For each behaviour (i.e. physical activity, diet, smoking, alcohol, eye care and health behaviour in general), the barriers and facilitators have been grouped into six broad themes: health and quality of life, sociocultural factors, the physical environment, access (to facilities and resources), psychological factors, specific evidence for subpopulations (ethnic minorities, gender, disadvantaged groups, people with disabilities).

Overall findings

Key barriers to the uptake of healthy behaviours in midlife populations that were reported across different health behaviours include: lack of time (in particular in relation to family, childcare, household, occupational responsibilities), financial costs, personal attitudes and behaviours including lack of motivation, personal identity and entrenched attitudes and behaviours in midlife. Other factors include transport issues, restrictions in the physical environment, low socioeconomic status, co-existing poor health behaviours, access/availability (to programmes) and lack of knowledge.

Key facilitators to the uptake of healthy behaviours in midlife populations that were reported across different health behaviours include health and wellbeing as motivation, also social support and encouragement. Health check-ups/appointment arrangements and a clear accurate health message were also facilitators, as were enjoyment, health benefits, prevention of illness, body image and integration of behaviours into lifestyle and routine.

## 4. DISCUSSION

Evidence was found for men and women at midlife and for disadvantaged groups, however there is a lack of robust evidence conducted in UK populations. The applicability of findings from other countries to the UK population is therefore an important consideration. While this review mainly included evidence from OECD developed countries, the contexts and mechanisms will be different between each locality. This especially applies in relation to determining the magnitude of the impact of social and cultural determinants across localities.

**EVIDENCE STATEMENTS (see page 46, section 3.3.2 onwards)**

**Organisation of evidence statements**

The evidence statements have been ordered in three levels as outlined below:

- Primary level - By health behaviour found: Physical activity (PA), diet (DI), smoking (SM), alcohol (AL), eye care (EC), health behaviours (HB) in general including cardiovascular prevention.
- Secondary level - Within each primary heading barriers and facilitators have been grouped under the following themes: Health and quality of life, sociocultural factors, the physical environment, access (to facilities and resources), psychological factors, subpopulations
- Tertiary level - Specific barriers and facilitators found: e.g. enjoyment, well-being, illness prevention and healthy ageing etc.

An overall summary of the evidence relating to barriers and facilitators that prevent or limit the uptake and maintenance of healthy behaviours by people in midlife is shown in Tables 1 and 2. The tables show the primary, secondary and tertiary levels of evidence described above.

**Table 1. Barriers that prevent or limit the uptake and maintenance of healthy behaviours by people in mid-life (with reference to evidence statement section)**

| Barriers that prevent or limit the uptake and maintenance of healthy behaviours by people in mid-life | | | | | | |
|---|---|---|---|---|---|---|
| | Physical activity | Diet | Smoking | Alcohol | Eye care | Health behaviours |
| **Health and quality of life** | Physical ailments 1.2.1PA | Misinterpretation of health messages 1.2.1DI | None found | None found | Other medical problems 1.2.1EC | None found |
| **Sociocultural factors** | Lack of time 1.3.1PA<br>Lack of knowledge 1.3.2PA<br>Self-consciousness or social concerns (in women) 1.3.3PA<br>Socioeconomic status 1.3.4PA<br>More time at home 1.3.5PA | Social environment around food 1.3.9DI<br>Food environment 1.3.1DI<br>Eating out of home 1.3.2DI<br>Competing priorities 1.3.3DI<br>Lack of time 1.3.4DI<br>Socioeconomic status 1.3.5DI<br>Unplanned shopping routines 1.3.6DI<br>Alcohol consumption 1.3.7DI<br>Co-existence of other unhealthy lifestyle behaviours 1.3.8DI | Cultural and social acceptance 1.3.1SM<br>Misperception of benefits 1.3.2SM<br>Relaxation 1.3.3SM<br>Concentration 1.3.4SM | Socioeconomic status 1.3.1AL<br>Neighbourhood disorder and crime 1.3.2AL | Lack of understanding 1.2.2EC | Alcohol consumption 1.3.1HB<br>Lack of time 1.3.2HB |

| Barriers that prevent or limit the uptake and maintenance of healthy behaviours by people in mid-life | | | | | | |
|---|---|---|---|---|---|---|
| | Physical activity | Diet | Smoking | Alcohol | Eye care | Health behaviours |
| **Physical Environment** | Neighbourhood safety 1.4.1PA<br><br>Driving instead of walking 1.4.3PA<br><br>Weather 1.4.2PA | None found, though related to food environment 1.3.1DI | Easy availability 1.4.1SM | Advertising and media 1.4.2AL<br><br>Availability 1.4.1AL | Could not find transportation 1.4.1EC | Distance 1.4.1HB |
| **Access (to facilities & resources)** | Financial costs 1.5.1PA<br><br>Transport 1.5.2PA<br><br>Lack of availability or access to community PA programmes or facilities 1.5.3PA<br><br>Programmes delivered by mobile phones/social networking 1.5.4PA | Financial costs 1.5.1DI<br><br>Food availability. 1.5.2DI<br><br>Programmes delivered by mobile phones/social networking 1.5.3DI<br><br>Low SES groups: Access to supermarkets 1.7.2DI | Low cost 1.5.1SM<br><br>Marketing strategies 1.5.2SM | None found | Could not afford transportation 1.5.1EC<br><br>Appointment arrangements 1.5.3EC<br><br>Long waits 1.5.2EC | None found |
| **Psychological factors** | Lack of motivation 1.6.1PA<br><br>Low self-efficacy 1.6.2PA<br><br>Perception of lack of capability (in women) 1.6.3PA<br><br>Entrenched attitudes and behaviours in midlife 1.6.4PA | Lack of motivation 1.6.1DI<br><br>Identity 1.6.4DI<br><br>Perception of lack of capability 1.6.2DI<br><br>Existing entrenched behaviours around eating 1.6.3DI | Lack of motivation 1.6.1SM | None found | None found | None found |

| Barriers that prevent or limit the uptake and maintenance of healthy behaviours by people in mid-life | | | | | | |
|---|---|---|---|---|---|---|
| | Physical activity | Diet | Smoking | Alcohol | Eye care | Health behaviours |
| **Subpopulations** | **Ethnic minority groups**<br>Language barriers 1.7.1PA<br><br>Cultural barriers 1.7.2PA<br><br>**Gender**<br>Female gender and gender roles 1.7.5PA<br><br>Hair maintenance 1.7.6PA<br><br>**People with disabilities**<br>Barriers relating to the built and natural environment 1.7.8PA<br><br>Barriers relating to cost 1.7.9PA<br><br>Equipment related barriers 1.7.10PA<br><br>Information-related barriers 1.7.11PA<br><br>Emotional and psychological barriers 1.7.13PA<br><br>Perceptions and attitudes relating to accessibility and disability 1.7.12PA<br><br>Lack of resources 1.7.14PA | **Low SES groups**<br>Access to supermarkets 1.7.2DI | **Unemployed young adults**<br>Lack of motivation 1.7.1SM | **Gender**<br>Female 1.7.2AL<br>**LGBT groups**<br>Disconnection from identity 1.7.3AL | All data reported above for eye care was from a population with little or no health insurance in the US. | **Gender**<br>Female 1.7.1HB<br><br>**Ethnic minority groups**<br>Ethnicity 1.7.2HB |

**Table 2. Facilitators that promote the uptake and maintenance of healthy behaviours by people in midlife**

| Facilitators that promote the uptake and maintenance of healthy behaviours by people in mid-life | | | | | | |
|---|---|---|---|---|---|---|
| | Physical activity | Diet | Smoking | Alcohol | Eye care | Health behaviours |
| **Health and quality of life** | Enjoyment 1.2.2PA<br>Sense of wellbeing/QoL 1.2.3PA<br>Prevention of illness/ Healthy Ageing 1.2.4PA<br>Health benefits in general 1.2.5PA<br>Previous experience of ill health 1.2.6PA<br>Focus on short term benefits 1.2.7PA<br>Weight loss/ body image 1.2.8PA<br>Specific tools 1.2.9PA<br>Integration of PA into lifestyle 1.2.10PA | Clear food choices 1.2.2DI<br>Health concerns 1.2.3DI<br>Previous experience of ill health 1.2.4DI<br>Swapping foods 1.2.5DI<br>Weight loss 1.2.6DI<br>Specific tools 1.2.7DI | Experience of ill health 1.2.1SM<br>Health check-ups 1.2.2SM<br>Physical activity 1.2.3SM<br>Medicine use 1.2.4SM | None found | None found | Health check-ups 1.2.1HB<br>Knowledge 1.2.2HB<br>Physical activity 1.2.3HB<br>Experience or fear of ill health 1.2.4HB |
| **Sociocultural** | Support 1.3.6PA<br>Being a good role model (men) 1.3.7PA | Support 1.3.10DI<br>Social environment around food 1.3.9DI | Support 1.3.5SM<br>Occupation 1.3.6SM<br>Current practice 1.3.7SM | None found | None found | Marital status 1.3.3HB<br>Education 1.3.4HB<br>Having a child at home 1.3.5HB |

| Facilitators that promote the uptake and maintenance of healthy behaviours by people in mid-life | | | | | | |
|---|---|---|---|---|---|---|
| | **Physical activity** | **Diet** | **Smoking** | **Alcohol** | **Eye care** | **Health behaviours** |
| | | | Age at initiation 1.3.8SM | | | |
| **Physical environment** | None found | None found | None found | None found | None found | None found |
| **Access** | Fast, easy websites 1.5.5PA | Accessibility 1.5.4DI<br>Fast, easy websites 1.5.5DI | Information 1.5.3SM | None found | Appointment arrangements 1.5.3EC | None found |
| **Psychological** | None found | Identity 1.6.4DI | None found | None found | None found | Self-efficacy 1.6.1HB |
| **Subpopulations** | **Ethnic minority groups**<br>Type of activity 1.7.3PA<br>Having exercise equipment at home 1.7.4PA<br>**Gender**<br>Physically active, adult, female role models 1.7.7PA<br>**People with disabilities**<br>Facilitators relating to the built and natural environment 1.7.15PA<br>Facilitators relating to cost 1.7.16PA | **Disadvantaged groups**<br>Access to supermarkets 1.7.2DI | None found | None found | All data reported above for eye care was from a population with little or no health insurance in the US | None found |

| Facilitators that promote the uptake and maintenance of healthy behaviours by people in mid-life | | | | | |
|---|---|---|---|---|---|
| Physical activity | Diet | Smoking | Alcohol | Eye care | Health behaviours |
| Equipment related facilitators 1.7.17PA | | | | | |
| Information-related facilitators 1.7.18PA | | | | | |
| Emotional and psychological facilitators 1.7.19PA | | | | | |
| Perceptions and attitudes relating to accessibility and disability 1.7.20PA | | | | | |
| Resources 1.7.21PA | | | | | |

# 1. INTRODUCTION

## 1.1 Background

Non-communicable chronic conditions and disability in later life are heavily influenced by behaviours across the life course, which in turn are influenced by a variety of wider contextual social, economic, and organisational factors (Kuh 2002; Clegg 2013). Although these outcomes manifest themselves in later life, the processes leading to ill health have been shown to start in midlife (Newman et al. 2011; Singh-Manoux et al. 2011; Wills et al. 2011). Conversely people who adopt healthy behaviours are more likely to age successfully and have improved quality of life (Khaw et al. 2008; Myint et al. 2011; Sabia et al. 2012).

Evidence suggests that the four main behavioural risk factors[1], i.e. smoking, excessive consumption of alcohol, poor diet and low levels of physical activity, contribute to close to half of the burden of illness in developed countries (WHO 2002). It is also known that these risks, which tend to co-occur or cluster, are unequally distributed in the population. A good understanding of cultural, ethnic, and geographic differences (in how people view and interpret health risks and health behaviours) is therefore necessary to understand the breadth of barriers and facilitators which may be present in these communities; and how much they can vary within and between them. Although many good systematic reviews have looked at the links between specific and multiple behavioural risk factors and individual chronic conditions, there are few which have assessed those social, economic and cultural risk factors which impact on outcomes in later life. While evidence suggests that it is possible to prevent or delay morbidity and mortality related to these risks (Barnes and Yaffe 2011) finding effective ways to change people's behaviours is a challenging task without a good understanding as to why people engage in unhealthy behaviours, or do not undertake healthy ones.

In that context, the Department of Health (DH) has asked National Institute for Health and Care Excellence (NICE) to produce public health guidance on preventive approaches to be adopted in mid-life to delay the onset of disability, dementia and frailty in later life. Three evidence reviews and an economic model underpin the guidance. The reviews looked for evidence on a wide range of potential influences on well-being in later life (i.e. demographic, economic, geographical, physical, cultural and social factors), and at the effectiveness and cost effectiveness of available interventions to act on these factors. This report presents the

[1]The collective term for these risk factors is the subject of much debate, with people from different fields preferring different terminology, each having a view about what is pejorative and what is not. Phrases used range from 'unhealthy or healthy behaviours' and 'poor health behaviours', 'health promoting behaviours', 'lifestyle risks', 'behavioural risk factors'. We will use the terms healthy behaviours and behavioural risk factors interchangeably in this report.

findings of the evidence review looking at the key issues for people in midlife that prevent or limit, or which help or motivate them to take up and maintain healthy behaviours.

### 1.2 Aims of the review

The aim of this evidence review is to support the public health guidance on preventive approaches to be adopted in mid-life to delay the onset of disability, dementia, frailty, and non-communicable chronic conditions in later life. The overarching research question for the suit of evidence reviews is which primary prevention approaches to be adopted in mid-life are most effective and cost-effective to prevent and delay these conditions.

### 1.3 Research questions

The specific question addressed in this review (Review 1) is:

- What are the key issues for people in midlife that prevent or limit, or which help or motivate them to take up and maintain healthy behaviours, and to what extent do they have an effect? How does this differ for subpopulations, for example by ethnicity, socioeconomic status or gender?

The two other evidence reviews (presented separately) address the following questions:

- Review 2: What behavioural risk factors in midlife are associated with successful ageing and the primary prevention or delay of disability, dementia, frailty, and non-communicable chronic conditions? How strong are the associations and how does this vary for different subpopulations?
- Review 3: What are the most effective and cost-effective midlife interventions for increasing the uptake and maintenance of healthy behaviours? To what extent do the different health behaviours prevent or delay disability and frailty related to modifiable behavioural risk factors? To what extent do the different health behaviours prevent or delay dementia? To what extent do the different health behaviours prevent or delay non-communicable chronic conditions?

An overview of the three reviews is presented in Appendix A.

### 1.4 Operational definitions

- Successful ageing is defined as survival to an advanced age while maintaining physical and cognitive function, functional independence and a full and active life. It means that morbidity and disability are compressed into a relatively short period before death, in line with the ‘compression of morbidity’ theory (Fries 2011).

- Disability will refer to any long-term restriction on the ability to perform an activity in the manner, or within the range, considered normal.
- Dementia will refer to a progressive, degenerative condition caused by diseases of the brain. Whether it occurs alone, in addition to, or as a combination of, chronic conditions, it is characterised by cognitive and non-cognitive symptoms of variable frequency and severity.
- Frailty will refer to a syndrome characterised by age-related declines in functional reserves where a small insult (e.g. infection, loss of partner) results in a striking and disproportionate change in health state. Frail older adults experience an increased risk of adverse outcomes such as falls, fractures, comorbidity, disability, dependency, hospitalisation, need for long-term care and mortality (Clegg 2013).
- Non-communicable chronic conditions will include cardiovascular diseases, diabetes, chronic obstructive pulmonary diseases, obesity, visual and hearing conditions, and some cancers that may be associated with behavioural risk factors.
- Disadvantaged populations will include (but are not limited to) low socioeconomic status, ethnic minority groups, lesbians, gay, bisexual and transsexual (LGBT) community groups, travellers and other groups with protected characteristics under the equality and diversity legislation.

### 1.5 Equality and equity issues

A key theme that emerges from the evidence looking at population's health from a life course perspective is that long-term chronic conditions, age related disability, and to some extent frailty and dementia are highly heterogeneous (Ben-Shlomo 2003) and the potential for inequalities in health outcomes is considerable, compounding those arising from poverty, social and environmental factors. For instance, over the past 5 years, the greatest reduction in the number of people displaying 4 behavioural risk factors (consumption of alcohol, smoking, lack of physical activity and poor diet) has been among those in higher socioeconomic and more highly educated groups (Buck 2012).

A core aim of this suit of evidence reviews is to identify prevention approaches that are tailored to midlife populations, highlighting those that have the greatest potential to maintain well-being in later life and avoid or reduce health inequalities.

It is hoped that the combined outputs will summarise an evidence base that address key areas of concern for government and society – how to optimise health and well-being, and reduce inequalities in later life; how to tackle at a population level increasing health and social care demand; and how to change policy and practice through better use of research.

### 1.6 Review team

The expertise of the review team and the role of each member in the review are presented in Appendix E.

## 2. METHODOLOGY

### 2.1 Searches

An iterative approach was undertaken to develop the search strategies:

a) Initial team discussions around research questions;
b) Initial drafting of search building at least (but not exclusively) on the final scope for this guidance, comments received from key stakeholders on the draft scope, high quality peer-review systematic reviews on same or similar topics for each key domains of the strategy (e.g. health, preventive interventions, behaviours, etc.);
c) Testing of individual search components and development of the review specific strategies in key databases;
d) Refining of specific review strategies upon discussion with information specialists;
e) Updating of search strategies based on reviewers comments;
f) Adaptation of strategies to individual databases (i.e. Mesh terms or filters in one database don't usually apply to other databases);
g) Running of search and uploading of references in individual Endnote databases (for specified time period, i.e. since 2000);
h) Create a combined Endnote database (master file); delete duplicates and prepare for title screening;
i) Identification of potential included studies; selection of full text for further assessment; identification of included and excluded studies.

As initial searches suggested a large volume of search hits, searching was conducted in two stages. First, we searched for systematic reviews using a systematic review filter agreed with the CPH team. Using the model presented in Appendix A as a guide, we screened the systematic review titles to identify where there were no systematic reviews covering a topic or area of interest. Targeted searches were developed to identify primary studies pertaining to the topic or areas were there were gaps.

We searched the following electronic databases for peer-reviewed studies published since year 2000:

- MEDLINE (including MEDLINE – in-process) (Ovid)

- EMBASE (Ovid)
- PsycINFO (Ovid)
- CINAHL (EBSCO host)
- The Cochrane Collaboration databases (www.thecochranelibrary.com)
    - Cochrane Central Register of Controlled Trials
    - Cochrane Database of Systematic reviews
    - Database of Abstracts of Reviews of Effectiveness
    - HTA database
    - NHS EED database
- Health Management Information Consortium (Ovid)
- Social Science Citation Index (Web of Knowledge).

The detailed search strategies used to identify systematic reviews and primary studies are presented in Appendix F. We also conducted a thorough grey literature search to identify publications that may provide a source of relevant data. The websites searched are:

- NHS Evidence Search (www.evidence.nhs.uk)
- Open Grey (www.opengrey.eu)
- Public Health Observatories (www.apho.org.uk)
- Health Evidence Canada (www.healthevidence.org)
  Alzheimer's Society (www.alzheimers.org.uk)
- RNIB (www.fightforsight.org.uk)
- Fight for Sight (www.fightforsight.org.uk)
- Action on Hearing Loss (www.actiononhearingloss.org.uk)
- Beth Johnson Foundation (www.bjf.org.uk)
- British Library (http://www.bl.uk)
- Campbell Collaboration (http://www.campbellcollaboration.org)
- Department of Health (https://www.gov.uk/government/publications)
- E-Print Network (http://www.osti.gov/eprints/)
- Google Scholar (http://scholar.google.co.uk)
- Grey Literature Report (http://www.greylit.org)
- Lenus (http://www.lenus.ie/hse/)
- OAIster (http://www.oclc.org)
- Public Health Europe (http://ec.europa.eu/health/index_en.htm)
- RAND Health (http://www.rand.org/health.html)
- Scirus (http://www.scirus.com)
- World Health Organisation (http://www.who.int/en/)

We did not conduct additional hand searches nor did we contact authors for additional data. However, the publication list of the Behaviour and Health Research Unit at the University of Cambridge (led by Professor Theresa Marteau) was searched for relevant publications as well as the responses to the NICE call for evidence relating to this guidance conducted between 31/5/2013 and 28/6/2013.

### 2.2 Population

The populations covered by this review include:

- Adults aged 40-64 years, with a particular focus on people at increased risk of disability, dementia, frailty, or other non-communicable chronic conditions due to behavioural risk factors.
- Adults aged 39 and younger from disadvantaged populations (as defined previously in operational conditions) as they are at increased risk of ill health and more likely to develop multiple morbidities.

This review does not cover the following populations:

- Adults with any type of dementia or pre-existing cognitive impairments.
- Adults who are receiving treatment for a non-communicable chronic condition.
- Adults who have a disability associated with modifiable behavioural risk factors will not be included for that particular condition or disability.

### 2.3 Healthy behaviours

This review focuses on the key issues (barriers or facilitators) that prevent or limit the uptake, or that help and motivate the uptake and maintenance of healthy behaviours by people in midlife that may impact on the development and progression of: disability, dementia, frailty (including bone health) and common non-communicable chronic diseases. Examples of the latter include cardiovascular diseases, diabetes, chronic obstructive pulmonary disease, visual and hearing conditions and some cancers that may be associated with behavioural risk factors.

It includes both external factors and internal factors as outcomes. An example of an external factor could be access to resources; examples of internal factors could include peoples' attitudes and expectations.

The scope of the review includes (but is not limited to) barriers or facilitators to:

a. Uptake or maintenance of healthy behaviours including less sedentary behaviour, increased physical activity, improved diet or components of diet (e.g. fat intake, fruit and vegetable intake), weight loss or control, cessation or reduction of smoking, reduction or

modification of alcohol consumption, sufficient levels of social activity and less loneliness (this may vary for individuals), avoid excessive exposure to noise and address hearing and/or sight loss, or to improve/modify multiple behavioural risk factors and health behaviours in general.

b. Uptake or maintenance of healthy behaviours at individual, family, community, subnational or national level (these may be targeted at specific groups, particularly those who are at increased risk, or who are from disadvantaged groups, or at healthcare professionals).
c. Uptake or maintenance of healthy behaviours in a range of settings including primary and secondary care, and workplace and community settings in the private, public, voluntary or commercial sectors.

The review does not cover barriers and facilitators to:

a. Use of drugs to prevent or treat dementia and non-communicable chronic conditions;
b. Use of dietary supplements;
c. Diagnosis and care of disability, dementia, frailty and common non-communicable chronic conditions;
d. Management of existing disability, dementia, frailty and common non-communicable chronic conditions;
e. Recreational drug use;
f. Management of obesity, including medical and surgical interventions for obesity;
g. Organisational interventions, policies and laws.

Interventions to promote lifestyle and/or behaviour change such as the primary prevention of overweight or obesity or hypertension or raised cholesterol are covered by the scope of the review and the guidance. However, interventions for the secondary prevention or management of such conditions or for people with existing dementia, disability, chronic disability or frailty are outside the scope of this review and the guidance.

### 2.4 Review outcomes

The outcomes of interest for this review are the key issues for people in midlife that prevent or limit or which help and motivate them to take up and maintain healthy behaviours (barriers or facilitators).

Both qualitative outcomes on barriers or facilitators to the type, level or amount of healthy behaviour and quantitative outcomes that include the extent of the effect of any barrier or facilitator on the type, level and amount of healthy behaviour.

The review includes both non-modifiable and modifiable factors as outcomes, including for those delivering and receiving interventions. These include:

- Personal factors such gender, SES, ethnicity, employment, family, previous experiences, expectations;
- Social factors such as social norms, support;
- Environmental factors such as access to resources/interventions, residential and work environment;

### 2.5 Inclusion criteria – types of studies

The evidence base for this review is so large that resource limitations made it difficult to cover all primary studies within the available timescales, so it was agreed with the CPH project team that systematic review level evidence should be included in the review.

All types of studies were searched for including systematic reviews (of all types of studies), interventional, observational and qualitative studies. Quantitative studies provide answers to the question *if* a relationship exists between factors and the extent to which issues have an effect (and also information) on the key issues for people in midlife. Qualitative studies provide information on *why* the relationships between these factors may exist, these include key issues for people in mid-life.

### 2.6 Inclusion criteria – dates of studies to be included

Systematic reviews and primary studies published from year 2000 onwards.

### 2.7 Inclusion criteria – intervention studies

Populations: Adults at midlife (aged 40 to 64 years for the general population) with a particular focus on people at increased risk of the target conditions and adults in disadvantaged populations aged 18-39 (as defined in operational definitions). Studies were not excluded on basis of country of origin however studies conducted in the UK were prioritised in the synthesis of evidence and applicability statements.

Studies: Interventions that identify or target barriers or facilitators to the uptake or maintenance of healthy behaviours in midlife. Healthy behaviours include (but are not limited to) increase/maintain physical activity or decrease sedentary behaviours; maintain balance, strength and weight-bearing functions; improve/maintain good diet (or components of diet) and nutrition; weight loss or control; smoking cessation or reduction or prevention of smoking; decrease/moderate alcohol consumption or prevent excessive consumption; improve/modify multiple behavioural risk factors; healthy behaviours in general, increase/maintain social activity or prevent loneliness; increase or maintain/address

management of sight loss or hearing loss, body weight, avoid excessive exposure to noise.

Outcomes**:** Issues that prevent, limit, facilitate or motivate the uptake or maintenance of healthy behaviours, including quantitative data on effect size.

Timescale: No lower time limit for study duration.

Language: English language studies only.

### 2.8 Inclusion criteria – observational and qualitative studies

For the purposes of this review, we included the following types of observational studies: cohort, case-control, population, ecological studies or surveys. Cross-sectional studies were excluded as they would only show a cross-sectional association. Cross-sectional analyses in the other observational study types were also excluded.

All types of qualitative studies were eligible for inclusion.

Population: Adults at midlife (aged 40 to 64 years for the general population) with a particular focus on people at increased risk of the target conditions and adults in disadvantaged populations aged 18-39 (as defined in operational definitions). Studies were not excluded on basis of country of origin. However, studies conducted in the UK have been prioritised in the synthesis of evidence and applicability statements.

Exposure: Barriers or facilitators to the uptake of healthy behaviours in midlife. Healthy behaviours include (but are not limited to increase/maintain physical activity or decrease sedentary behaviours; maintain balance, strength and weight-bearing functions; improve/maintain good diet (or components of diet) and nutrition; weight loss or control; smoking cessation or reduction or prevention of smoking; decrease/moderate alcohol consumption or prevent excessive consumption; improve/modify multiple behavioural risk factors; healthy behaviours in general, increase/maintain social activity or prevent loneliness; increase or maintain/address management of sight loss or hearing loss, body weight, avoid excessive exposure to noise.

Outcomes: Any quantitative or qualitative barrier or facilitator to the uptake or maintenance of healthy behaviours (as defined above), including quantitative data on effect size (as defined above).

Timescale: No limits to length of exposure.

Language: English language studies only.

### 2.9 Inclusion criteria – systematic reviews

Systematic reviews of the study types detailed in sections 2.6 to 2.9 above were included if they were relevant to the review question (see section 2.12) and published from 2000 onwards. The process for using review level material is described in more detail in section 2.11.

### 2.10 Identification of relevant studies

Titles and abstracts were screened independently by SK and SM using the inclusion criteria described above. Differences between reviewer's results were resolved by discussion and when necessary in consultation with a third reviewer (LL). If there was still doubt about a study's relevance for the review after discussion, the full paper was obtained.

Full paper copies were obtained (AC, SK, LL) for all reviews and primary studies identified by the title/abstract screening. For systematic reviews, the process for using review level material as described in Appendix J of the CPHE methods manual was followed. Systematic reviews were initially screened using an adapted version of the review screening form in the CPHE methods manual (Appendix I.1) to determine if the review was relevant to the guidance topic (but systematic reviews were not excluded on the basis of quality). For primary studies, decisions were made based on inclusion and exclusion criteria. Full paper screening was carried out independently by SK and SM. Any differences of opinion about inclusion/exclusion was resolved by discussion between the two reviewers or by consultation with a third reviewer (LL). If, there was still doubt about a study's relevance for the review after discussion, the paper was retained and reassessed after quality assessment and data extraction.

Two flow charts summarise the number of papers included and excluded at each stage of the process for systematic reviews and primary studies (Figures 1 and 2, respectively). Systematic reviews and primary studies excluded at the full paper screening stage are listed in Appendix H along with the reason for exclusion.

### 2.11 Quality Assessment

Systematic reviews

The methodological quality of included studies was assessed using the AMSTAR tool (Shea et al. 2009; see Appendix I.3), a tool specifically designed to assess the quality of systematic reviews (as opposed to the PRISMA statement which is designed to assess the quality of

reporting; Liberati 2009). Each review was assessed by one reviewer and checked for accuracy by another. A minimum of 10% of the studies was fully double assessed. Any discrepancy between reviewers was resolved by discussion.

The quality of the evidence (i.e. primary studies) presented in the included systematic reviews was not reassessed for the purpose of this review. The results were extracted into the evidence tables.

Other study designs

Two other study designs are included in the review: qualitative studies and prospective cohort studies (assigned using the glossary and algorithm of study designs presented in appendix D and E of the CPHE methods manual). Quality appraisal was assigned using the relevant quality appraisal checklist in the NICE methods manual (see Appendix I2.1 for cohort studies and I2.2 for qualitative studies).

Each full paper was assessed by one reviewer and checked for accuracy by another. A minimum of 10% of the studies was fully double assessed.

The quality assessment of all studies included in the review is reported in Appendix D. No studies were excluded from the review based on quality.

### 2.12 Description of overall quality ratings

++ All or most of the checklist criteria have been fulfilled; where they have not been fulfilled the conclusions are very unlikely to alter.

+ Some of the checklist criteria have been fulfilled, where they have not been fulfilled or adequately described the conclusions are unlikely to alter.

- Few or no checklist criteria have been fulfilled and the conclusions are likely or very likely to alter

QA ratings included in evidence summary statements: [++]/[+]/[-]

### 2.13 Data extraction

Data was extracted on study detail, population and setting, study design, outcomes and method of analysis, and results. To ensure accurate reporting the data extraction pro-forma was piloted against two included papers. Each included full paper was assessed by one reviewer and checked for accuracy by another. A minimum of 10% of the studies was fully double extracted (as above for quality assessment).

### 2.14 Synthesis of evidence

As both quantitative and qualitative evidence are included in this review, data about barriers and facilitators was not suitable for meta-analysis. Key themes were identified based on analysis of the full papers and data extracted for the evidence tables across each topic area from both the quantitative and qualitative data (where sufficient data was available to identify themes). Findings were narratively synthesised. Data specific to health inequalities and vulnerable communities was extracted and findings are summarised separately where data is available. Studies conducted in the UK are prioritised in the synthesis of data.

For each key question or issue an evidence statement was generated which provides an aggregated summary of all of the relevant studies. Applicability ratings are proposed for each evidence statement to judge how similar the population(s), setting(s), exposure/intervention(s) and outcome(s) of the included studies are to those outlined in the review question. Each evidence statement is assessed as directly applicable, partially applicable or not applicable.

## 3. FINDINGS

### 3.1 Searches

The searches for systematic reviews (Figure 1; Appendix G, Table G1) located 9194 articles after removing duplicates, 643 of which had relevant titles and abstracts. Of the 643 selected for full text assessment, 46 are included in the review. The targeted searches of primary studies (Figure 2; Appendix G, Table G2) located 6628 articles after removing duplicates, 451 of which had relevant titles and abstracts. Of the 451 selected for full text assessment, 34 are included in the review. Finally, the grey literature searches located 604 potentially relevant documents (Appendix G, Table G3), one of which is included in this review (DH 2010). Many of these documents either referred to evidence already identified by the searches or did not report research evidence; they were therefore subsequently excluded from this review. Appendix H lists the excluded studies and the reasons for exclusion. In total, 81 studies are included in the review and form the basis of the evidence statements.

**Figure 1. Search results for systematic reviews**

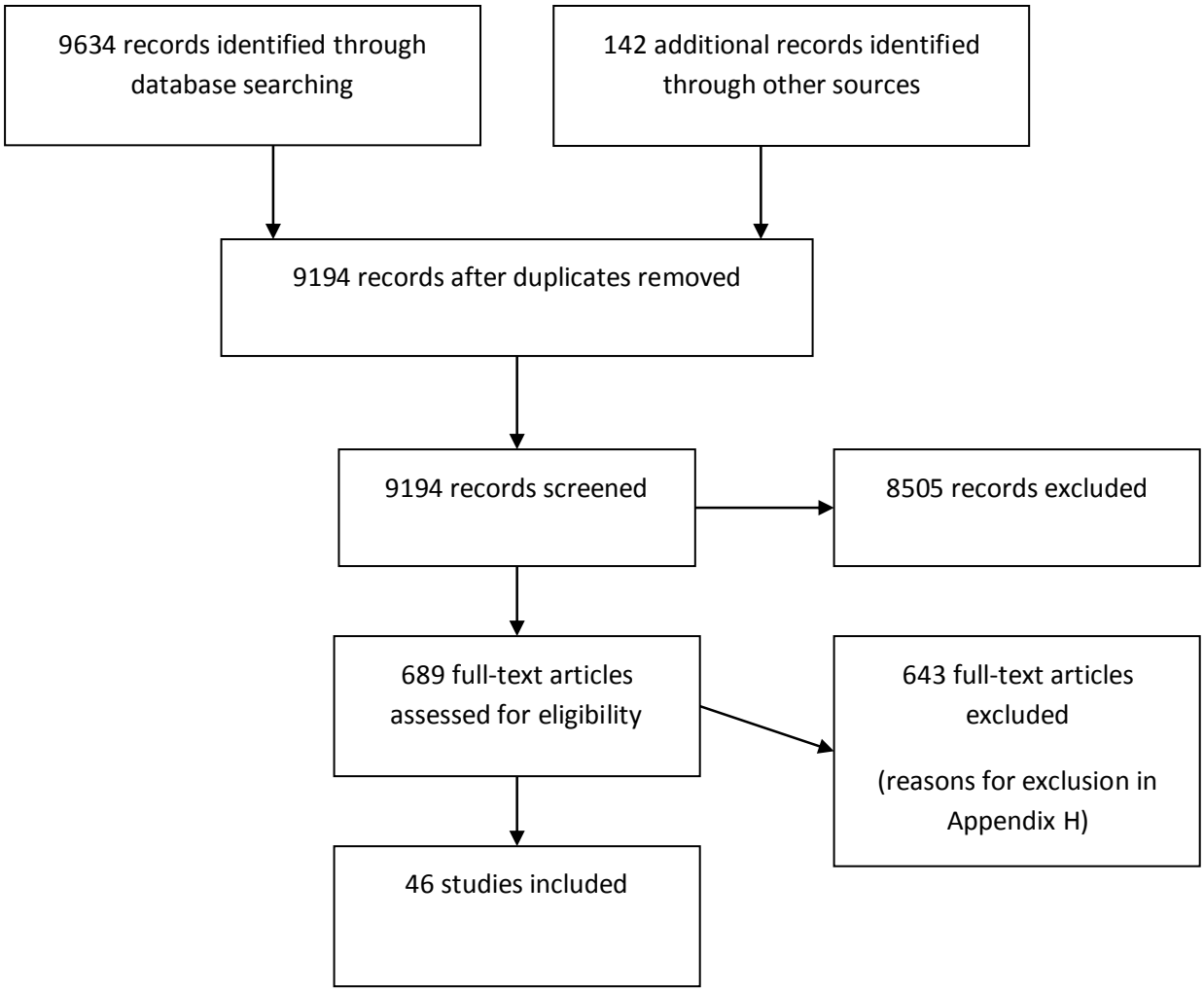
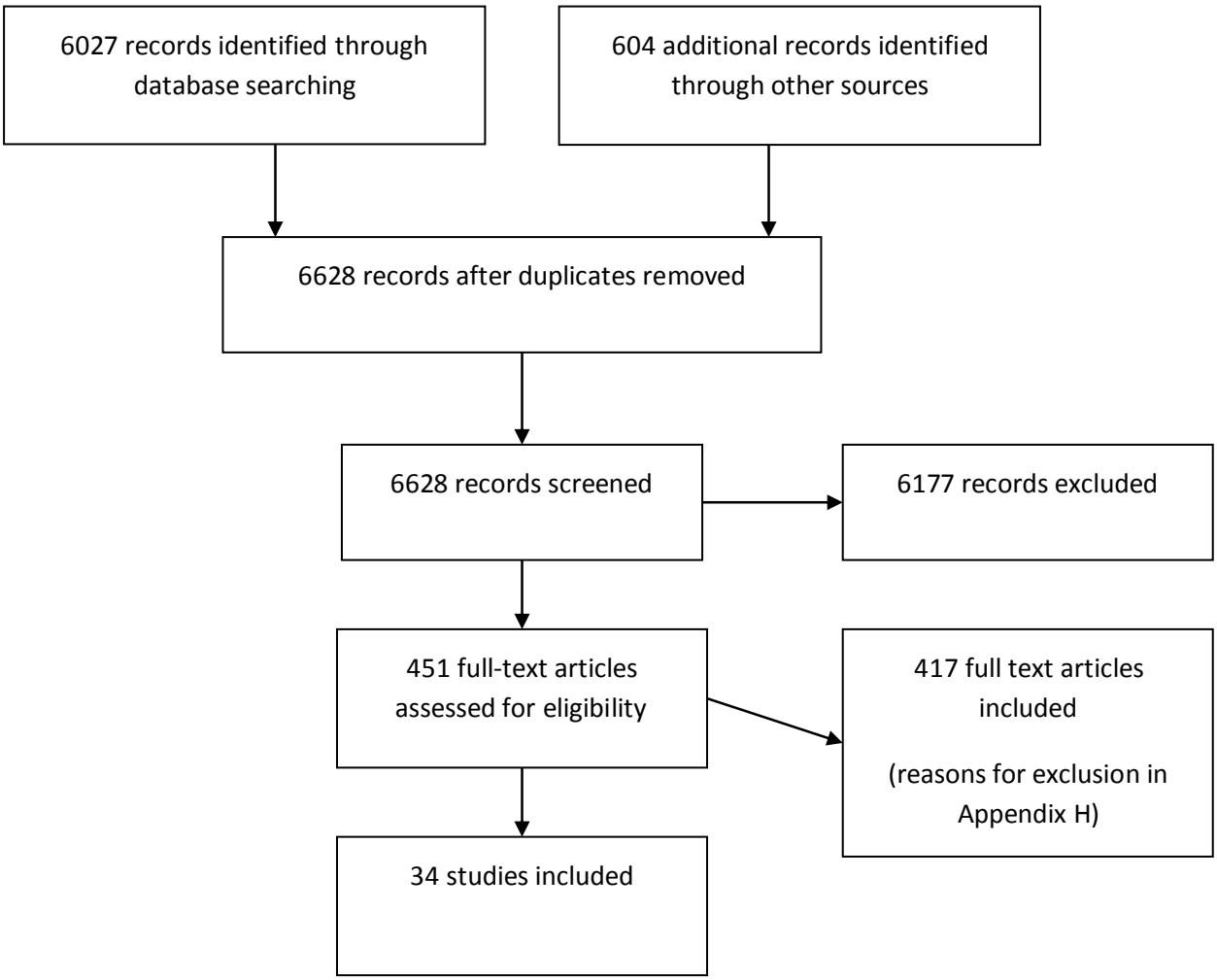


**Figure 2. Search results for primary studies**



## 3.2 Characteristics of included studies

3.2.1 Overview of included

We identified 46 systematic reviews and 34 primary studies that presented evidence relevant to the research question.

- *Systematic reviews* – Of the 46 included systematic reviews, 19 focused on physical activity, seven focused on diet, three on overweight, four on smoking, three on alcohol consumption, four on cardiovascular health, and six on health promoting practices more generally. Most reviews focused on the adult population in general (age range of included studies 18 – 90+ years), with some looking specifically at mid-life, though age ranges varied considerably (see "included population" in tables 4-10). Of the 46 reviews, 30 looked at the adult population in general; seven looked at ethnic groups, seven focused on minority or underserved groups and two on inequalities. Four systematic reviews focused specifically on women. For physical activity (n=19), 12 reviews looked at the adult population in general, two are gender focused, three are focused on ethnic groups. For diet (n=7), two reviews are focused on lower income groups, the rest looks at the general population. Two of the three reviews on overweight also focus on inequalities. Of the four reviews on smoking, one looks at smokeless tobacco use in ethnic groups, two focus on socioeconomic status, and the last on the general population. For alcohol (n=3), two reviews look at community level factors and one at gender differences. As for reviews looking at health promoting practices (n=6), two focus on the general population, one is looking at ethnic density effects and three look at hard-to-reach populations and inequalities. Of the four reviews studying cardiovascular health, two are general population based, one looks at racial and ethnic differences in risk factors and one at women's perception of risk.

- *Primary studies* – Of the 34 included primary studies, 22 were qualitative studies and 12 were cohort studies.
    - *Qualitative studies*: All the qualitative studies focused on midlife facilitators and moderators of healthy behaviours, with five also reporting data for older populations and one for adolescents. 19 studies were conducted in the US, two in Australia, two in the UK, two in Japan, two in Sweden, one in each Finland, Germany, Canada, Latin America, France, Portugal and Iran. 20 studies are gender focused (five in men only; 15 in women only); four studies focus on ethnic groups or deprived, hard to reach or minority groups.

- *Cohort studies*: The 12 included cohort studies present an analysis (or selective analyses) of midlife issues. Studies were conducted in a range of countries with only one from the UK focused on alcohol; five are gender focused.

An overview of included studies is provided in Tables 4 to 10, with more details provided in the evidence tables (Appendix B). The tables are organised by behavioural risk factors as opposed to study design to help make the links between the source and quality of evidence and the evidence statements presented in the next section. For each behavioural risk factor, a summary of the characteristics of included studies is provided, complemented by the evidence statements and applicability statements.

**Table 4. Overview of included studies – Physical activity**

| First Author, Year | Location | Aims | Included population | Quality |
|---|---|---|---|---|
| **Systematic reviews** | | | | |
| Amireault 2013 | International | Psychosocial and socio-demographic determinants of physical activity maintenance | Midlife (18-64 yrs) | + |
| Babakus 2012 | Can, UK, US, Australia | Physical activity and sedentary time among South Asian women | Adults (16-90+ yrs) Ethnic group | ++ |
| Beenackers 2012 | Europe | Socioeconomic inequalities in occupational, leisure-time, and transport related physical activity among European adults | Midlife (18-65 yrs) | - |
| Daniel 2011 | International | Correlates of physical Activity Among South Asian Indian Immigrants | Adults (17-91 yrs) Ethnic group | - |
| Engberg 2012 | Can, UK, US, Australia | Life events and change in leisure time physical activity | Adults (17-83 yrs) | - |
| Fischbacher 2004 | UK | To assess levels of physical activity in South Asian population in the UK | Adults Children | + |
| Eyler 2002 | US | Correlates of physical activity among women from diverse racial/ethnic groups | Women (age not specified) Ethnic group | - |
| Fransson 2012 | Europe | Job strain as a risk factor for leisure-time physical inactivity | Adults (mean 43.5 yrs) | - |
| Gidlow 2005 | UK | Attendance of exercise referral schemes in the UK | Adults (> 18 yrs) | - |
| Gidlow 2006 | International | Relationship between socio-economic position and physical activity | Adults (18-89 yrs) Socioeconomic | + |

| | | | | |
|---|---|---|---|---|
| Kirk 2011 | International | Occupation correlates of adults' participation in leisure-time physical activity | Adults (18-64 yrs) Occupation | + |
| Lewis 2002 | Not reported | Psychosocial mediators of physical activity behaviour among adults (and children) | Adults (> 18 yrs) | - |
| Pavey 2012 | UK, others not reported | Moderators of the intention-behaviour relationship in the physical activity domain | Middle aged (mean 51-64 yrs) | - |
| Rhodes 2013 | International | Moderators of the intention-behaviour relationship in the physical activity domain | Adults (> 18 yrs) | + |
| Rhodes 2012 | International | Adult sedentary behaviour | Adults (18-91 yrs) | + |
| Siddiqi 2011 | USA | Understanding impediments and enablers to physical activity among African American adults | Adults (18-89 yrs) Ethnic group | + |
| Trost 2002 | Not reported | Correlates of adults' participation in physical activity | Adults (age not specified) | - |
| Vrazel 2008 | USA, Latin America | Framework of social-environmental influences on the physical-activity behaviour of women | Women (20-60 yrs) | - |
| Wendell-Vos 2007 | International | Potential environmental determinants of physical activity in adults | Adults ( > 18 yrs) | - |

**Table 4. Overview of included studies – Physical activity (cont)**

| First Author, Year | Location | Aims | Included population | Quality |
|---|---|---|---|---|
| **Cohort studies** | | | | |
| Segar 2008 | US | To investigate the effects of PA goals on PA participation | Midlife<br>Women | + |
| Sorensen 2005 | Finland | Correlates of physical activity among middle-aged Finnish male police officers | Midlife<br>Male police officers | + |
| Wurm 2010 | Germany | Study the effect of a positive view on aging on physical exercise among middle-aged and older adults | Midlife<br>Old age | + |
| **Qualitative Studies** | | | | |
| Berg 2002 | US | Physical activity perspectives of Mexican American and Anglo American Midlife women | Midlife<br>Women<br>Ethnic group | + |
| Caperchione 2012 | Australia | Understanding the challenges and motivations to physical activity participation and healthy eating in middle-aged Australian men | Midlife<br>Men | + |
| DH 2010 | England | Insight research conducted in middle-aged adults to inform the Change4Life campaign (a national marketing programme which aims to help people in England change their dietary and physical behaviours) | Midlife | - |
| Hooker 2011 | US | Factors related to physical activity and recommended intervention strategies as told by midlife and older African American men | Midlife<br>Old age<br>Men<br>Ethnic group | + |
| Hooker 2012 | US | The potential influence of masculine identity on health-improving behaviour in mid-life and older African American men | Midlife<br>Old age<br>Men<br>Ethnic group | + |

| | | | | |
|---|---|---|---|---|
| Im 2013 | US | Exploring midlife women's attitudes toward physical activity | Midlife<br>Women | + |
| Im 2012 | US | Asian American midlife women's attitudes towards physical activity (online forum) | Midlife<br>Women<br>Ethnic group | + |
| Rimmer 2004 | US | Physical activity participation among persons with disabilities | Midlife<br>Disabilities | + |
| Segar 2006 | US | To investigate the relationship between midlife women's physical activity motives and their participation in physical activity | Midlife<br>Women | + |
| Vandelanotte 2013 | Australia | What kinds of website and mobile phone-delivered physical activity and nutrition interventions do middle-aged men want? | Midlife<br>Men<br>Technology | + |
| Vaughn, 2009 | Latin America | Factors that influence the participation of middle-aged and older Latin-American women in physical activity | Midlife<br>Old age<br>Women, Ethnic group | + |
| Withall 2010 | UK | Who attends physical activity programmes in deprived neighbourhoods | Adolescent<br>Adults (74%)<br>Deprived neighbourhoods | ++ |
| Yarwood 2005 | US | Factors influencing ability of midlife women to maintain PA over time | Midlife<br>Women | + |

**Table 5. Overview of included studies – Diet**

| First Author, Year | Location | Focus | Included population | |
|---|---|---|---|---|
| **Systematic reviews** | | | | |
| Bisogni 2012 | Not reported | How people interpret healthy eating | Adults<br>(age not specified) | - |
| De Irala-Estevez 2000 | Europe | Socio-economic differences in food habits in Europe: consumption of fruit and vegetables | Adults<br>(18-85 yrs)<br>Socioeconomic inequalities | - |
| Fleischhacker 2011 | International | Fast food access studies | Children and adults<br>(age not specified) | - |
| Guillaumie 2010 | USA, Netherlands, Great-Britain | Psychosocial determinants of fruit and vegetable intake in adult population | Adults<br>(18-65 yrs) | - |
| Kamphuis 2006 | International | Environmental determinants of fruit and vegetable consumption among adults | Adults<br>(18-60 yrs)<br>Environment | + |
| Lachat 2012 | International | Eating out of home and its association with dietary intake | Adults and children<br>(5-74 yrs) | + |
| Power 2005 | Canada | Determinants of healthy eating among low-income Canadians | Adults<br>(age not specified)<br>Socioeconomic | - |
| **Cohort Studies** | | | | |
| Yates 2012 | US | To examine predictors of change over time in healthy eating behaviours in mid-life and older women in response to a one year health-promoting intervention | Midlife<br>Old age<br>Women | + |
| Mejean 2011 | France | To determine sociodemographic, lifestyle and health characteristics associated with consumption of fatty- | Midlife | + |

| | | | | |
|---|---|---|---|---|
| | | sweetened and fatty-salted foods in middle-aged French adults | | |
| Teixera 2010 | Portugal | Weight loss readiness in middle-aged women: Psychosocial predictors of success for behavioural weight reduction | Midlife<br>Women | + |
| **Qualitative studies** | | | | |
| Brown 2012 | US | To determine the perception of women of the relationship between recent life events, transitions and diet in midlife | Midlife<br>Women | **+** |
| Caperchione 2012 | Australia | Understanding the challenges and motivations to physical activity participation and healthy eating in middle-aged Australian men | Midlife<br>Men | **+** |
| DH 2010 | England | Insight research conducted in middle-aged adults to inform the Change4Life campaign (a national marketing programme which aims to help people in England change their dietary and physical behaviours) | Midlife | **-** |
| Hammond 2010 | US | To determine the perception of women of the relationship between recent life events, transitions and diet in midlife | Midlife<br>Women | **+** |
| Jilcott 2009 | US | Perceptions of the community food environment and related influences on food choice among midlife women residing in rural and urban areas. | Midlife<br>Women, Rural/urban settings | **++** |
| Vandelanotte 2013 | Australia | What kinds of website and mobile phone-delivered physical activity and nutrition interventions do middle-aged men want? | Midlife<br>Men, technology | **+** |
| Vue 2008 | US | Need states based on eating occasions experienced by midlife women | Midlife<br>Women | **+** |

**Table 6. Overview of included studies – Overweight**

| First Author, Year | Location | Focus | Included population | |
|---|---|---|---|---|
| **Systematic reviews** | | | | |
| Giskes 2011 | International | Environmental factors and obesogenic dietary intakes among adults | Adults (> 18yrs) | - |
| Giskes 2010 | Europe | Socioeconomic inequalities in dietary intakes associated with weight gain and overweight/obesity conducted among European adults | Socioeconomic inequalities | + |
| Lovasi 2009 | US | Built environments and obesity in disadvantaged populations | Adults and children (age not specified) Disadvantaged communities | - |

**Table 7. Overview of included studies – Smoking**

| First Author, Year | Location | Focus | Included population | Quality |
|---|---|---|---|---|
| **Systematic reviews** | | | | |
| Bader 2007 | International & Canada | Smoking cessation among employed and unemployed young adults | Young adults (18-24 yrs) Unemployed | - |
| Kakde 2012 | India, Pakistan, Nepal, Bangladesh, UK | Social context of smokeless tobacco use in the South Asian population | Adults and children (8-96 yrs) Ethnic group | - |
| Niederdeppe 2008 | Not specified | Media campaigns to promote smoking cessation among socioeconomically disadvantaged populations | Adults (> 18yrs) Socioeconomic status | - |
| Vangeli 2011 | International | Predictors of attempts to stop smoking and their success in adult general population samples | Adults (> 18yrs) | - |
| **Qualitative studies** | | | | |
| Honjo 2010 | Japan | To determine predictive factors for smoking cessation among middle-aged Japanese | Midlife | + |

**Table 8. Overview of included studies – Alcohol**

| First Author, Year | Location | Focus | Included population | Quality |
|---|---|---|---|---|
| **Systematic reviews** | | | | |
| Brienza 2002 | International | Alcohol use disorders in primary care: do gender-specific differences exist? | Adults<br>(age not specified)<br>Women | - |
| Bryden 2012 | International | Influence on alcohol use of community level availability and marketing of alcohol | Adults and adolescents<br>(age not specified)<br>Community factors | + |
| Bryden 2013 | International | Influence of community level social factors on alcohol use | Adults and adolescents<br>(15-59 yrs)<br>Community factors | + |
| **Cohort studies** | | | | |
| Caldwell 2008 | UK | Lifecourse socioeconomic predictors of midlife drinking patterns, problems and abstention | Midlife | ++ |
| **Qualitative studies** | | | | |
| Pettinato 2008 | US | Life experience of the misuse of alcohol among midlife and older lesbians | Midlife<br>Old age<br>Women<br>Lesbian | + |

**Table 9. Summary of included studies – Cardiovascular health**

| First Author, Year | Location | Focus | Included population | Quality |
|---|---|---|---|---|
| **Systematic reviews** | | | | |
| Bock 2012 | UK, US, Can, NZ | Practices and factors associated with behavioural counselling for cardiovascular disease prevention in primary care settings | Adults (mean 41 yrs range 34-45 yrs) | - |
| Hart 2005 | US | Women's perceptions of coronary heart disease | Adults (> 40 yrs) Women | - |
| Kurian 2006 | US | Racial and ethnic differences in cardiovascular disease risk factors | Adults (> 18 yrs) Ethnic groups | - |
| Murray 2012 | International | Patient reported factors associated with uptake and completion of cardiovascular lifestyle behaviour change | Adults (> 18 yrs) | - |
| **Qualitative Studies** | | | | |
| Folta 2008 | US | Factors related to cardiovascular disease risk reduction in midlife and older women | Midlife Old age Women | + |

**Table 10. Summary of included studies – Health promoting behaviour**

| First Author, Year | Location | Focus | Included population | Quality |
|---|---|---|---|---|
| **Systematic reviews** | | | | |
| Bécares 2012 | International | Ethnic density effects on physical morbidity, mortality, and health behaviours | Adults (> 18 yrs) Ethnicity | - |
| Coles 2012 | Developed industrialized countries | Community-based health and health promotion for homeless people | Adults (16-89 yrs) Homelessness | + |
| Dryden 2012 | Western/developed countries | Existing knowledge about who does and does not attend general health checks | Adults (age not specified) Hard to reach populations | - |
| Jansen 2012 | Germany | The influence of social determinants on the use of prevention and health promotion services | Adults (age not specified) Socioeconomic inequity | - |
| Ryan 2009 | UK | Factors associated with self-care activities among adults in the United Kingdom | Adults (age not specified) | + |
| Yarcheski 2004 | US, England, Can | Predictors of positive health practice | Adults Adolescents (age not specified) | + |
| **Cohort studies** | | | | |
| Benzies 2008 | Sweden | To measure factors that predict change in health-related behaviours among midlife Swedish women | Midlife Women | + |
| King 2007 | US | To determine factors related to adopting a healthy lifestyle | Midlife | ++ |

| | | | | |
|---|---|---|---|---|
| | | in a middle-aged cohort | | |
| Petersson 2008 | Sweden | To determine predictors of successful self-reported lifestyle changes in a defined middle-aged population | Midlife | + |
| Shi 2004 | Japan | Health values and health information seeking in relation to positive change of health practice among middle-aged urban men | Midlife<br>Men<br>Urban setting | - |
| **Qualitative studies** | | | | |
| Enjezab 2012 | Iran | Internal motivations and barriers effective on the healthy lifestyle of middle-aged women: A qualitative approach. | Midlife<br>Women | + |
| DH 2010 | England | Insight research conducted in middle-aged adults to inform the Change4Life campaign (a national marketing programme which aims to help people in England change their dietary and physical behaviours) | Midlife | - |
| Gower 2013 | US | Barriers to attending an eye examination after vision screening referral within a vulnerable population | Midlife<br>(mean age 48)<br>Underserved | + |
| Meadows 2001 | Canada | Health promotion and preventive measures: Interpreting messages at midlife | Midlife | ++ |
| Smith-Dijulio 2010 | US | The shaping of midlife women's views of health and health behaviours | Midlife<br>Women | + |

### 3.2.2 Quality and applicability

Appendix D summarises the quality of included systematic review (D.1), cohorts (D.2) and qualitative studies (D.3). These scores are also integrated in the summary statements and in the evidence tables.

An applicability statement is provided for each evidence statement. Because we wrote summary statements building on carefully selected systematic reviews and primary studies, very few evidence statements can be qualified as non-applicable. Where they are, it is because no other more applicable sources of evidence was identified on the topic and the reviewers considered it was nevertheless important to highlight what evidence there was.

### 3.2.3 Evidence statements

The evidence statements have been ordered in three levels.

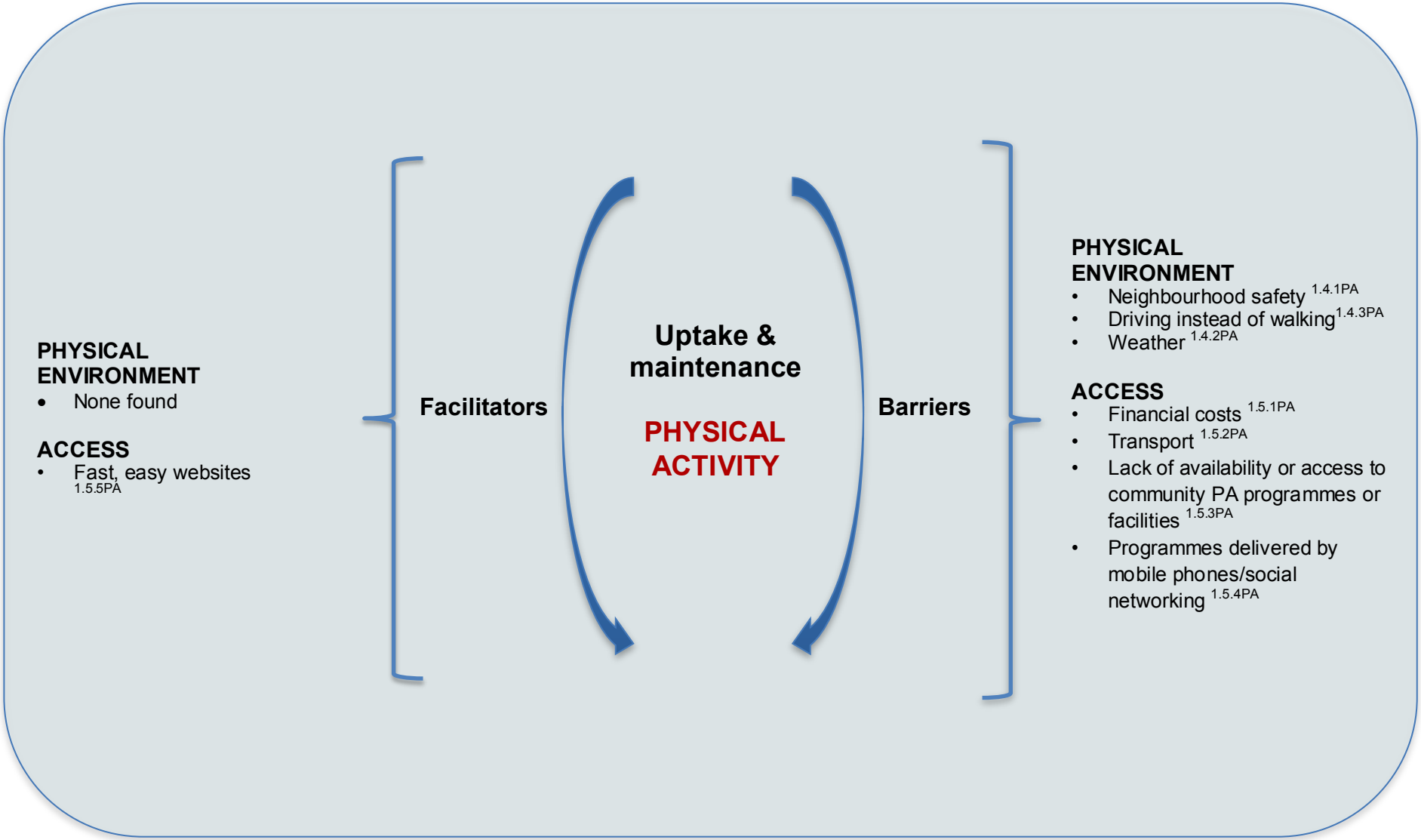
- Primary level: findings are first organised by health behaviours
  1. Physical activity (PA)
  2. Diet & nutrition (DI)
  3. Smoking (SM)
  4. Alcohol (AL)
  5. Eye care (EC)
  6. Health behaviours in general (HB)

- Secondary level: Within each primary heading barriers and facilitators are grouped under the following themes (where no evidence was found, there is a statement to that effect). Barriers are presented first, then facilitators.
  1. Health and quality of life
  2. Sociocultural factors
  3. Physical environment
  4. Access (to facilities and resources)
  5. Psychological factors
  6. Subpopulations (ethnic minorities, gender, disadvantaged groups, disabilities)

- Tertiary level: For each health behaviour, and each theme, *specific* barriers and facilitators are presented, e.g. enjoyment, well-being, illness prevention and healthy ageing etc.

To ensure cross-reference to the PH guidelines, the evidence statements are numbered as follows: the first digit refers to the review (i.e. here always 1 for Review 1), the second digit refers to the secondary level, the third digit to the tertiary level, the letters refer to risk factors (first level).

**Figure 3. Summary of barriers and facilitators for PHYSICAL ACTIVITY (with reference to evidence statements)**



**PSYCHOLOGICAL**

- Enjoyment [1.2.2PA]

**HEALTH & QUALITY OF LIFE**

- Enjoyment [1.22PA]
- Sense of wellbeing/QoL [1.2.3PA]
- Prevention of illness/ Healthy Ageing [1.2.4PA]
- Health benefits in general [1.2.5PA]
- Previous experience of ill health [1.2.6PA]
- Focus on short term benefits [1.2.7PA]
- Weight loss/body image [1.2.8PA]
- Specific Tools [1.2.9PA]
- Integration of PA into lifestyle [1.2.10PA]

**SOCIOCULTURAL**

- Support [1.3.6PA]
- Being a good role model (men) [1.3.7PA]

**Facilitators**

**Uptake & maintenance**

**PHYSICAL ACTIVITY**

**Barriers**

**PSYCHOLOGICAL**

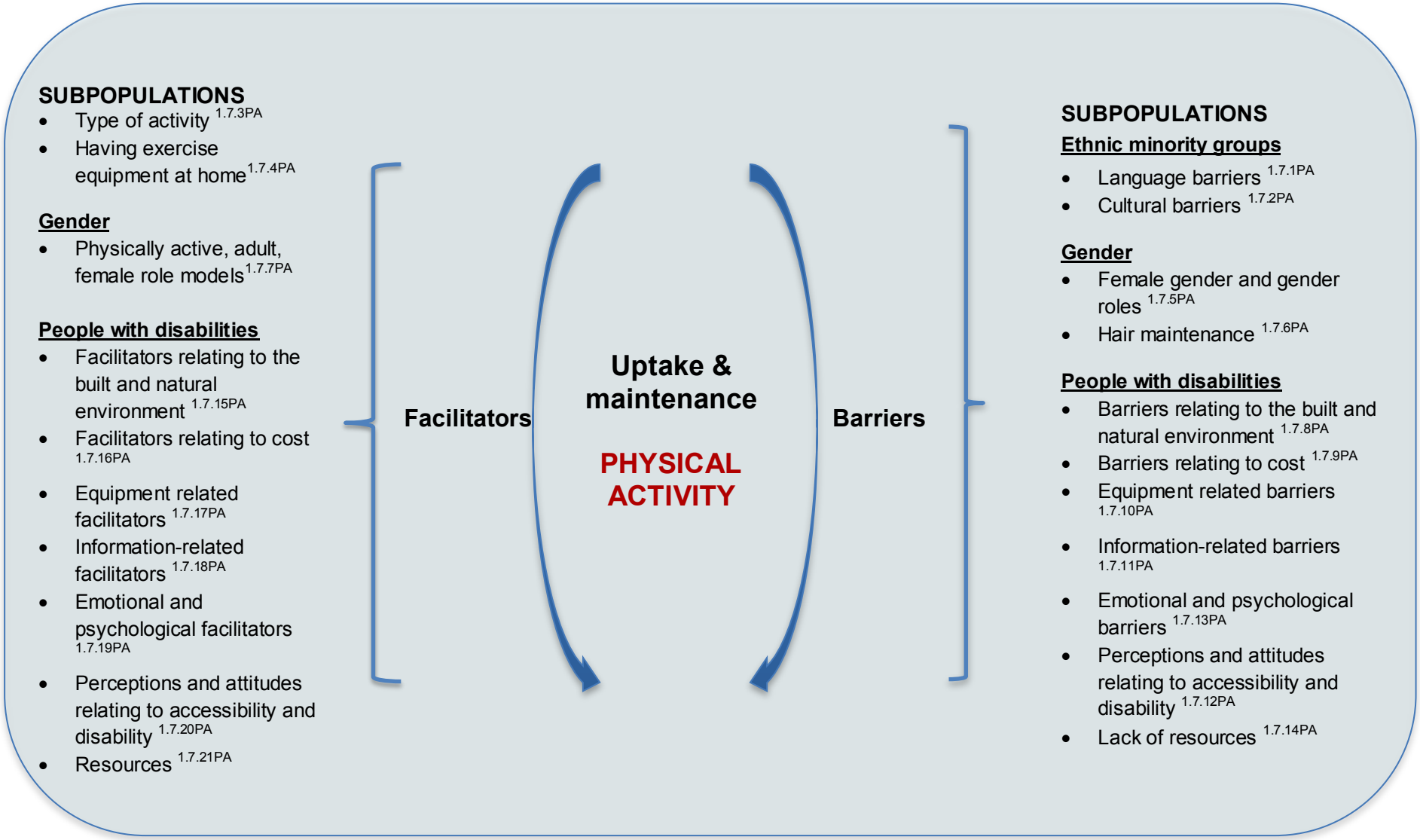
- Lack of motivation [1.6.1PA]
- Low self-efficacy [1.6.2PA]
- Perception of lack of capability (in women) [1.6.3PA]
- Entrenched attitudes and behaviours in midlife [1.6.4PA]

**HEALTH & QUALITY OF LIFE**

- Physical ailments [1.2.1PA]

**SOCIOCULTURAL**

- Lack of time [1.3.1PA]
- Lack of knowledge [1.3.2PA]
- Self-consciousness or social concerns (in women) [1.3.3PA]
- Socioeconomic status [1.3.4PA]
- More time at home [1.3.5PA]


SUBPOPULATIONS
Type of activity 1.7.3PA
Having exercise equipment at home 1.7.4PA
Gender
Physically active, adult, female role models 1.7.7PA
People with disabilities
Facilitators relating to the built and natural environment 1.7.15PA
Facilitators relating to cost 1.7.16PA
Equipment related facilitators 1.7.17PA
Information-related facilitators 1.7.18PA
Emotional and psychological facilitators 1.7.19PA
Perceptions and attitudes relating to accessibility and disability 1.7.20PA
Resources 1.7.21PA
Facilitators
Uptake & maintenance
PHYSICAL ACTIVITY
Barriers
SUBPOPULATIONS
Ethnic minority groups
Language barriers 1.7.1PA
Cultural barriers 1.7.2PA
Gender
Female gender and gender roles 1.7.5PA
Hair maintenance 1.7.6PA
People with disabilities
Barriers relating to the built and natural environment 1.7.8PA
Barriers relating to cost 1.7.9PA
Equipment related barriers 1.7.10PA
Information-related barriers 1.7.11PA
Emotional and psychological barriers 1.7.13PA
Perceptions and attitudes relating to accessibility and disability 1.7.12PA
Lack of resources 1.7.14PA

### 3.3 Evidence statements for Physical Activity (PA)

**1.1PA Summary for PA**

The evidence found for physical activity comprises 11 qualitative primary studies with data specific to midlife populations (three qualitative studies were found in men only, seven in women only and one study in men and women), three primary cohort studies (one in men and women, one in men and one in women) with data specific to midlife populations and 19 systematic reviews with data for adults in general (men and women). No systematic reviews that aimed to examine predictors, barriers or facilitators to PA in midlife specifically were found. Additionally some studies on health promotion in general reported on factors relevant to physical activity.

**1.2PA Health and quality of life**

**1.2.1PA Barrier: Physical ailments or chronic conditions**. Four qualitative primary studies ([+][1], [+][2], [+][3], [+][4]) cited existing physical ailments, including physical illness or injuries, or chronic conditions as barriers to participation in physical activity. One study was in men ([+][1]) and three were in women ([+][2], [+][3], [+][4]). In one prospective cohort study [++][5], existing physical ailments and chronic conditions were seen as a barrier to participation. Those with a history of hypertension and diabetes were less likely to adopt a healthy lifestyle. Chronic health concerns or disabilities were also cited as barriers in three systematic reviews ([-][6], [++][7], [+][8]) in adults in general.

[1] Hooker 2011; [2] Yarwood 2005; [3] Vaughn; [4] Berg 2002; [5] King; [6] Eyler 2002; [7] Babakus 2012; [8] Siddiqi 2011

- **Applicability**: Partially applicable. Four primary studies in midlife populations were conducted in US, one in Latin America. Of the three systematic reviews, one included international studies and two focused on US populations. Consistency of findings including in men and women suggest broad application although no studies in UK.

**1.2.2PA Facilitator: Enjoyment (of the activity).** From the primary qualitative studies, two studies in midlife women ([+][1],[+][2]) reported the importance of enjoyment of the activity, feeling good about themselves and the benefits of doing physical activity (improved quality of life) as a motivating factor. Additionally, one study [+][3] on health behaviours in general in women found enjoyment of PA was a more important facilitator than doing it because the doctor told them to. One primary cohort study [+][4] was found that examined determinants of physical activity in midlife. The baseline factor 'enjoyment' was the most powerful determinant of physical activity. One quantitative systematic review of adults in general [-][5] found there was repeatedly documented association between enjoyment and PA in adults in general.

[1] Berg 2002; [2] Yarwood 2005; [3] Smith-DiJulio 2010; [4] Sorensen 2005; [5] Trost 2002

- **Applicability**: Partially applicable. Primary studies in midlife populations were conducted in Australia, Finland, US, NZ. The systematic review included international studies. Consistency of findings including in men and women suggest broad application although no studies in UK.

**1.2.3PA Facilitator: Sense of wellbeing/quality of life.** In five qualitative studies, improved sense of wellbeing, energy, positive feelings or self-esteem were motivating factors for physical activity in midlife populations. Three of the studies were conducted in women ([+][1], [+][2], [+][3]) and two in men ([+][4], [+][5]). Additionally a UK DH report [-][6] in middle-aged adults reported that promotion of holistic 'feel good' benefits that cover psychological and emotional benefits like greater self-esteem and confidence was a motivator for behaviour change (including PA). One cohort study in midlife women university employees [+][7] investigated the effects of PA goals on subsequent PA participation one year later. Those participants who focused on a sense of wellbeing and/or stress reduction goals participated in significantly more PA than those who focused on weight loss and/or health benefits.

[1] Vaughn 2009; [2] Yarwood 2005; [3] Berg 2002; [4] Caperchione 2012; [5] Hooker 2011; [6] DH Insight report 2010; [7] Segar 2008

- **Applicability**: Partially applicable. Of seven primary studies in midlife populations, one was conducted in the UK and of the other 6, 4 were conducted in the US, one in Australia, and one in Latin America. Consistency of findings including in men and women suggest broad application; findings of studies from other countries consistent with one low quality UK report.

**1.2.4PA Facilitator: Prevention of illness and healthy ageing.** Seven primary qualitative studies in midlife populations, three in men ([+][1], [+][2], [+][3]) and four in women ([+][4], [+][5], [+][6], [+][7]) reported fear of illness or ageing and wanting to promote a healthy old age so that they were able to do the things they wanted (e.g. recreation, travel, hobbies, care for families) as a motivator for PA.

[1] Caperchione 2012; [2] Hooker 2011; [3] Hooker 2012; [4] Berg 2002; [5] Im 2013; [6] Yarwood 2005; [7] Enjezab 2012

- **Applicability**: Partially applicable. Of seven primary studies in midlife populations, five were conducted in the US, one in Australia, and one in Iran. Consistency of findings including in men and women suggest broad application although no studies were conducted in UK.

**1.2.5PA Facilitator: Health benefits in general (including mental health and stress relief).** In seven qualitative studies, health benefits in general were specifically reported to be a motivator for participation in PA. Two of the studies were in men ([+][1], [+][2]) and five studies were in women ([+][3], [+][4], [+][5], [+][6], [+][7]). Additionally a DH report in middle-aged adults [-][8] reported that physical benefits like better mobility and agility as well as specific health benefits like better digestion were a motivator for PA. Additionally, health benefits was one of five important goal groups identified in a prospective cohort study [+][9] investigating the effects of PA goals on PA participation in women. However, those with health benefits goals participated in significantly less PA than those with sense of wellbeing or stress reduction goals. Also, one prospective cohort study on health behaviours in general in men [-][10] found that a high value placed in health was positively associated with change in general health practice. One quantitative systematic review of adults in general [-][11] found there was repeatedly documented association between expected health benefits and PA in adults in general.

[1] Hooker 2011; [2] Caperchione 2012; [3] Berg 2002; [4] Im 2013; [5] Yarwood 2005; [6] Smith-DiJulio 2010; [7] Enjezab 2012; [8] DH Insight report 2010; [9] Segar 2008; [10] Shi 2004; [11] Trost 2002

- **Applicability**: Partially applicable. Of ten primary studies in midlife populations, seven were conducted in US, one in Australia, one in Japan and one in Iran. The systematic review included international studies. Consistency of findings including in men and women suggest broad application although no studies in UK.

**1.2.6PA Facilitator: Previous experience of ill health.** Two qualitative studies reported previous experience of ill health events as a motivator to take part in PA. One study in US men [+][1] and one study in Latin-American women [+][2] reported that existing diseases such as high blood pressure, diabetes, obesity, stroke or having experienced a personal health event were motivators to take part in PA. In a prospective cohort in Swedish adults in general [+][3], that examined predictors of successful lifestyle changes in middle-aged people, significant predictors of positive lifestyle change were CVD risk conditions or myocardial infarction in men. For women, elevated blood pressure at baseline was associated with successful lifestyle changes. However, in another cohort study in the US that included men and women and looked at factors relating to adopting a healthy lifestyle [+][4], those with no history of hypertension were more likely to have switched than others and those with a history of hypertension or diabetes were less likely to adopt a healthy lifestyle. In a qualitative study conducted in Canada on health promotion in general [++][5], family history of disease was important when weighing the pros and cons of preventive health care.

[1] Im 2013; [2] Vaughn; [3] Petersson 2008; [4] King 2007; [5] Meadows 2001

- **Applicability**: Partially applicable. The three qualitative primary studies in midlife populations were conducted in the US and Canada. The cohort study that found a positive relationship between health conditions and lifestyle change was conducted in Sweden. The other cohort study was conducted in the US. Consistency of findings including in men and women suggest broad application although no studies in UK.

**1.2.7PA Facilitator: Focus on short-term benefits (ultimately beneficial long-term).** A DH qualitative report in middle-aged adults [-][1] reported that promotion of short-term benefits of PA that can be achieved relatively quickly was important also with the potential to lead to longer term benefits such as ability to fight off longer term diseases like heart disease and diabetes. 'Small steps towards big gains' represented the idea that most motivated the midlife participants.

[1] DH Insight report 2011

- **Applicability**: Directly applicable. Study conducted in UK in middle-aged adults.

**1.2.8PA Facilitator: Weight loss, body image, physical appearance.** Five qualitative primary studies, two in men ([+][1], [+][2]) and three in women ([+][3] , [+][4], [+][5]) reported weight loss and physical appearance as important motivators for PA. However, in one study [+][4] those who reported body shape motives reported less PA participation than those whose motives were related to things other than body shape, toning or losing weight. Additionally a DH report in middle-aged adults [-][6] reported that promotion of weight loss was a facilitator with the proviso that this was supported by other short term benefits. In one prospective cohort study that aimed to investigate the effects of PA goals on PA participation [+][7], weight loss and weight maintenance/toning were two of five goal clusters identified. However, participants with weight loss goals participated in significantly less PA than those with sense of wellbeing or stress reduction goals.

[1] Caperchione 2012; [2] Hooker 2011; [3] Yarwood 2005; [4] Segar 2006; [5] Vaughn 2009; [6] DH 2010; [7] Segar 2008

- **Applicability**: Partially applicable. Four primary studies in midlife populations were conducted in US, one in Australia, one in NZ, one in UK. The systematic review included international studies. Consistency of findings including in men and women suggest broad application, with one study conducted in UK.

**1.2.9PA Facilitator: Supplying the specific tools to make and sustain behaviour changes**. In a DH of qualitative research in middle-aged people [-][1], most people felt they were broadly aware of the changes they needed to make but lacked the specific information, tips and strategies they needed to make the changes in their daily lives.

[1] DH 2010

- **Applicability**: Directly applicable. Study conducted in UK in middle-aged adults.

**1.2.10PA Facilitator: Integration of PA into lifestyle.** In a DH report of qualitative research in middle-aged people [-][1], umbrella messages that overarched a number of key messages was 'swap it don't stop it' for positive swapping of old activity (and diet) behaviours for new ones; 'up and about (walk)' to help position walking as an easily integrated part of everyday activity and specifically as a means of replacing sedentary travel and 'up and about (activity)' to help reintroduce structured activity and exercise (specifically, for men who used to exercise regularly). One qualitative primary study [+][2] reported women would like strategies for incorporating PA into daily lifestyle. A need for PA to be incorporated into everyday activities was also emphasised in one systematic review [+][3] in South Asian populations in the UK.

[1] DH 2010; [2] Folta 2008; [3] Fischbacher 2004

- **Applicability**: Directly applicable. One primary study in midlife population was conducted in US, one in UK. The systematic review was conducted in the UK South Asian population. Consistency of findings including in men and women and across different ethnic groups suggest broad application.

**1.3PA Sociocultural factors**

**1.3.1PA Barrier: Lack of time (in particular due to other responsibilities, lack of childcare, family responsibilities).** In seven qualitative primary studies lack of time for physical activity was raised repeatedly as a barrier to participation. Two studies were in men ([+][1], [+][2]) and five studies were in women ([+][3], [+][4], [+][5], [+][6], [+][7]). It was expressed in particular in relation to conflicting demands of work, child care, family and household responsibilities in both men and women, in all ethnic groups represented (including white Australian men, Africa American men, Anglo-American and Mexican-American women, Asian-American women, studies in populations of mixed ethnicity, New Zealand women, Latin-American women). Additionally, in one qualitative study examining general factors relating to health promotion and preventive measures [++][8] reported time constraints as a barrier in rural midlife women. Six systematic reviews also raised relevant barriers relating to lack of time in adults in general ([++][9], [-][10], [-][11], [+][12]), high job strain [-][13], and having children [-][14].

[1] Caperchione 2012; [2] Hooker 2011; [3] Berg 2002; [4] Im 2012; [5] Im 2013; [6] Yarwood 2005; [7] Vaughn 2009; [8] Meadows 2001; [9] Babakus 2012; [10] Vrazel 2008; [11] Trost 2002; [12] Siddiqi 2011; [13] Fransson; [14] Eyler 2002.

- **Applicability:** Partially applicable. Of eight primary studies in midlife populations, five were conducted in US, one in Australia, one in Latin America and one in Canada. Two of the systematic reviews were based on studies in the US and the others included international studies. Consistency of findings including in men and women, and across different ethnic groups suggest broad application although no studies in UK.

**1.3.2PA Barrier: Lack of knowledge**. This was raised in one primary qualitative study [+][1] in middle-aged women in Iran and one systematic review in adults in general [+][2].

[1] Enjezab 2012; [2] Siddiqi 2011

- **Applicability**: Not applicable. One primary study in midlife women was conducted in Iran. The systematic review included international studies.

**1.3.3PA Barrier: Self-consciousness or social concerns (in women).** Concerns about social discomfort or self-consciousness about participation in PA programmes or in the gym were raised in three qualitative primary studies ([+][1], [+][2], [+][3]), all in midlife women.

[1] Berg 2002; [2] Folta 2008; [3] Vaughn 2009

- **Applicability**: Partially applicable. Three primary studies in midlife populations were conducted in US. All the studies were conducted in women, none were conducted in the UK.

**1.3.4PA Barrier: Socioeconomic status**. From systematic reviews in adults in general, six systematic reviews ([+][1], [-][2], [-][3], [+][4] [-][5], [-][6]) linked higher socioeconomic status, education or income with higher levels of PA. One review[7] reported however that lower occupation status was associated with higher total physical activity and some reviews ([+][4], [-][6]) commented on the higher level of occupational PA in those in lower socioeconomic groups while those with high socioeconomic position were more physically active during leisure time.

[1] Kirk 2011; [2] Eyler 2002; [3] Gidlow 2005; [4] Gidlow 2006; [5] Trost 2002; [6] Beenackers 2012; [7] Kirk 2011

- **Applicability**: Partially applicable. All the systematic reviews included international studies, but focus on general population not specifically mid-life.

**1.3.5PA Barrier: More time at home.** One qualitative study was conducted by the Department of Health about behaviour change strategies (including for PA) in middle-aged adults [-][1]. Key activity risk behaviours identified were spending more time at home being sedentary as there was less desire to socialise and more desire to invest time at home. Once children had left home, more time spent in front of computer or TV as less need perceived to

create activities at home. One systematic review [-][2] found that changing conditions at work and reduced income were associated with decreased PA in young women (from one primary study in Australian women), but with increased PA in middle-aged women; however, no information was given in the review or primary study about the specific changes involved.

[1] DH Insight report 2010; [2] Engberg 2012

- **Applicability**: Partially applicable. One study in midlife populations was conducted in the UK but quality of study is low.

**1.3.6PA Facilitator: Support.** Supportive partners, family or friends, often having a companion to do PA with were also cited as a facilitator of PA in 3 qualitative primary studies, one in men ([+][1]) and two in women ([+][2] , [+][3]). Conversely, lack of support was cited as a barrier in three studies, in particular in ethnic minority groups, both in men ([+][1]) and women ([+][2], [+][4], [+][5]). Men also reported camaraderie and fellowship as being important [+][1]. From the systematic review evidence in adults in general, support from spouses, family and friends or from a physician was consistently correlated with PA [-][6]. A systematic review in adult women in general [-][7] found that social support and social support networks were an important influence on PA in women. One quantitative systematic review of adults in general [-][8] found there was repeatedly documented association between social support and PA in adults in general.

[1] Hooker 2011; [2] Berg 2002; [3] Di-Julio 2010; [4] Im 2012; [5] Im 2013; [6] Eyler 2002; [7] Vrazel 2008; [8] Trost 2002

- **Applicability**: Partially applicable. Five primary studies in midlife populations were conducted in US. The systematic reviews included international studies. Consistency of findings including in men and women, and across different ethnic groups suggest broad application although no studies in UK.

**1.3.7PA Facilitator: Being a good role model (in men).** Two qualitative primary studies in men ([+][1], [+][2]) reported being a good role model for children and others as being a motivator for physical activity in men.

[1] Hooker 2012; [2] Caperchione 2012

- **Applicability**: Partially applicable. One primary study in midlife populations was conducted in the US, and the other primary study was conducted in Australia. Unclear consistency of findings in women, and across different ethnic groups, no studies in UK.

## 1.4PA Physical environment

**1.4.1PA Barrier: Neighbourhood safety.** Two qualitative primary studies, one in men [+][1] and one in women [+][2] reported that unsafe neighbourhoods were a barrier to PA. In 3 systematic reviews about adults in general ([+][3], [-][4], [++][5]), concerns about neighbourhood safety were also cited.

[1] Im 2013; [2] Vaughn 2009; [3] Siddiqi 2011; [4] Eyler 2002; [5] Babakus 2012

- **Applicability**: Partially applicable. Both primary studies were conducted in the US. The systematic reviews included international studies. Unclear consistency of findings in women, and across different ethnic groups, no studies in UK.

**1.4.2PA Barrier: Weather.** Two qualitative primary studies in women ([+][1], [+][2]) reported the weather as a barrier to PA participation

[1] Folta 2008; [2] Vaughn 2009

- **Applicability**: Partially applicable. Both primary studies were conducted in the US. The systematic reviews included international studies. Unclear consistency of findings in women, and across different ethnic groups, no studies in UK.

**1.4.3PA Barrier: Driving instead of walking.** In a mainly qualitative study by the DH in midlife adults [+][1], a tendency to drive instead of walk was a barrier, with cars presented as a symbol of status and security.

[1] DH Insight report 2010

- **Applicability**: Directly applicable. The only study in midlife populations was conducted in the UK.

## 1.5PA Access (to facilities and resources)

**1.5.1PA Barrier: Financial costs**. Three qualitative primary studies in midlife populations reported that the costs of organised PA or gym membership were a barrier to taking part in PA. One study was in men ([+][1]) and two in women ([+][2], [+][3]). Cost was also raised as an issue in one systematic review [+][4].

[1] Hooker 2012; [2] Berg 2002; [3] Yarwood 2005; [4] Siddiqi 2011

- **Applicability**: Partially applicable. Two studies were conducted in the US and one was from New Zealand. The systematic review included international studies. Consistency of findings including in men and women suggest broad application although no studies in UK.

**1.5.2PA Barrier: Transport.** Inconvenience e.g. having to drive to take part in PA was cited as a barrier in one qualitative primary study in midlife men [+][1]. Lack of transport was a barrier to PA in one study in midlife women [+][2] and in one systematic review in adults in general [-][3].

[1] Hooker 2011; [2] Berg 2002; [3] Eyler 2012

- **Applicability**: Partially applicable. Both primary studies were conducted in the US. Unclear consistency of findings in women, and across different ethnic groups, no studies in UK.

**1.5.3PA Barrier: Lack of availability or access to community PA programmes or facilities.** One qualitative primary study in midlife men [+][1] and one in midlife women [+][2] highlighted limited places on PA programme, access to places to do PA including recreational space, gyms, lack of availability of programmes as a barrier. This was also mentioned in one systematic review in adults in general [-][3].

[1] Hooker 2011; [2] Vaughn 2009; [3] Eyler 2002

- **Applicability**: Directly applicable: Both primary studies were conducted in the US. The systematic review included international studies. Unclear consistency of findings across different ethnic groups, no studies in UK.

**1.5.4PA Barrier: Programmes delivered by mobile phones/social networking.** One primary qualitative study [+][1] examined the attitude of midlife Australian men to website and mobile phone delivered PA (and nutrition) interventions. Use of mobile phones as a method of intervention delivery was not of interest to most participants, though they were more open to the idea if they had a smartphone. Time was a major limiting factor in the midlife population interviewed so social networking was not a high priority.

[1] Vandelanotte 2013

- **Applicability**: Partially applicable. The primary study was conducted in Australia. Unclear consistency of findings in women, and across different ethnic groups, no studies in UK.

**1.5.5PA Facilitator: Fast, easy to use websites**. One primary qualitative study [+][1] examined the attitude of midlife Australian men to website and mobile phone delivered PA (and nutrition) interventions. Preferred website characteristics in the middle-aged men interviewed were fast, easy to use, with clutter-free pages, concise language, reliable factual information. Specific website features that were viewed positively were interactive features that could give feedback, podcasts, instructional videos and step-by-step pictures. The

concept of self-monitoring tools for PA was supported but there was concern that it might be inconvenient and time-consuming. However, no information was reported comparing website delivery compared to other means of delivery.

[1] Vandelanotte 2013

- **Applicability**: Partially applicable: The primary study was conducted in Australia. Unclear consistency of findings in women, and across different ethnic groups, no study in UK.

## 1.6PA Psychological factors

**1.6.1PA Barrier: Lack of motivation.** This was specifically reported in three primary qualitative studies in midlife populations, two in men ([+][1], [+][2]) and one in women [+][3] and in one systematic review in adults in general [-][4].

[1] Caperchione 2012; [2] Hooker 2012; [3] Vaughn 2009; [4] Siddiqi 2011

- **Applicability**: Partially applicable: The primary studies were conducted in Australia and the US. The systematic review included international studies.

**1.6.2PA Barrier: Low self-efficacy.** Self-efficacy is a measure of the belief in one's own ability to complete tasks and reach goals. Three systematic reviews in adults in general found a relationship between self-efficacy and PA. One systematic review [+][1] found that PA maintainers had higher self-efficacy and intention compared with those who relapsed, another [+][2] that there was repeatedly documented association between self-efficacy and PA, and a systematic review of mediators of PA from intervention studies [-][3] found that self-efficacy was the most important determinant of PA.

[1] Amireault 2013; [2] Trost 2002; [3] Lewis 2002

- **Applicability**: Partially applicable: All systematic reviews included international studies.

**1.6.3PA Barrier: Perception of lack of capability (in women).** This barrier was cited in 2 primary qualitative studies ([+][1], [+][2]) both in midlife women.

[1] Berg 2002; [2] Im 2012

- **Applicability**: Partially applicable: Both primary studies were conducted in the US. Unclear consistency of findings in men, and across different ethnic groups, no studies in UK.

**1.6.4PA Barriers: Entrenched attitudes and behaviours in midlife**. One qualitative study conducted by the Department of Health in the UK [-][1] in midlife adults reported such

behaviours. In particular, structured PA an unimportant part of their self-identity or had become associated with a fear of being judged for decreasing abilities. Additionally, one cohort study in middle-aged adults in Germany [+][2] found that a positive view of ageing was associated with increased sporting activity 6 years later in those who were healthy enough to take part.

[1] DH Insight report 2010; [2] Wurm 2008

- **Applicability**: Partially applicable. The primary qualitative study in midlife populations was conducted in the UK. The cohort study was conducted in the US.

**1.7PA Subpopulations (gender, ethnic groups, addressing inequalities)**

Many of the barriers or facilitators cited for sub populations were also cited in broader population groups so they have been listed previously. Only those that are more specific to subpopulation groups are listed here.

**Subpopulation: Ethnic minority groups**

**1.7.1PA Barrier: Language barriers.** In two primary qualitative studies of women in midlife ([+][1], [+][2]) language was highlighted as a barrier.

[1] Im et al 2012; [2] Vaughn 2009

- **Applicability**: Partially applicable. Both studies were conducted in the US, one in an Asian population and one in a Latin-American population. Unclear consistency of findings in men, no studies in UK. While the populations may differ between the US and UK, the language issues are very likely to be similar.

**1.7.2PA Barrier: Cultural barriers.** Traditional roles and cultural beliefs that for women the focus should be on family and domestic duties in three qualitative primary studies in midlife populations ([+][1] [+][2], [+][3]). Differences in cultural background from others taking part in PA programmes was a barrier in one study. The emphasis of intellectual activity over physical activity was also a barrier in an Asian population [+][1]. From systematic reviews [++][4], culturally inappropriate facilities included mixed sex swimming pools and male instructors. One systematic review of South Asian populations in the UK [+][5] found that South Asian men and women men were less likely to meet current PA guidelines and interventions need to take into account religious, cultural and social factors in this population.

[1] Im 2012; [2] Im 2013; [3] Vaughn 2009; [4] Babakus 2012; [5] Fischbacher 2004

- **Applicability**: Partially applicable. All three studies were conducted in the US; two were in an Asian population ([+][1], [+][2]) and one was in a Latin-American population [+][3]. The UK Asian population may differ from the US Asian population [+][5].

**1.7.3PA Facilitator: Type of activity**. Walking was most commonly recommended physical activity followed by sports-related activities in one qualitative primary study in midlife African American men [+][1].

[1] Hooker 2011

- **Applicability**: Partially applicable: The study was conducted in the US. Unclear consistency of findings in women, no studies in UK.

**1.7.4PA Facilitator: Having exercise equipment at home**. In one systematic review [++][1] facilitators of PA in the South Asian population were knowledge and understanding of the health benefits and having exercise equipment at home.

[1] Babakus 2012

- **Applicability**: Partially applicable: The systematic reviews in adults in general included international studies.

**Sub-Population: Gender**

**1.7.5PA Barrier: Female gender and gender roles.** This was referred to by four primary qualitative studies in midlife women. Three were specific to PA ([+][1], [+][2], [+][3]) and one [+][4] related to health behaviours in general including PA. This was also referenced in three systematic reviews in adults in general, two in South Asian women ([++][5], [+][6]). Additionally one systematic review [-][7] found that women were more likely to begin exercise referral schemes but less likely to maintain participation.

[1] Im 2012; [2] Im 2013; [3] Vaughn 2009; [4] Smith-DiJulio 2010; [5] Babakus 2012; [6] Fischbacher 2004; [7] Pavey 2005

- **Applicability**: Partially applicable: The four primary studies in midlife populations were conducted in the US. The systematic reviews in adults in general included UK and international studies.

**1.7.6PA Barrier: Hair maintenance.** One systematic review in adults in general [+][1] set in the US examined PA in African Americans. Hair maintenance was perceived as a barrier to PA in that sub-population.

[1] Siddiqi 2011

- **Applicability**: Partially applicable: The systematic reviews in adults included studies from the US. Unclear consistency of findings in men.

**1.7.7PA Facilitator: Physically active, adult, female role models.** One systematic review in adult women in general found [-][1] that having role models and open community support would help them to feel comfortable and confident about adding PA to their lifestyles.

[1] Vrazel 2008

- **Applicability**: Partially applicable: The systematic reviews in adults in general included international studies. Unclear consistency of findings in men.

**Subpopulation – People with disabilities**

One primary qualitative study [+][1] reported in detail on barriers and facilitators to PA participation among people with disabilities in the US. This paper reported 178 barriers and 130 facilitators. Only those that meet the inclusion criteria for this review are reported here. Due to space issues the main barriers/facilitators are reported below, further details are in the original paper.

[1] Rimmer 2004

**1.7.8PA Barrier: Built and natural environment.** Lack of curb cuts, inaccessible access routes, doorways too narrow for wheelchair access, facility front desk too high for people in wheelchairs, lack of elevators.

**1.7.9PA Barrier: Cost.** Membership and transportation costs.

**1.7.10PA Barrier: Equipment related.** Insufficient space between equipment for wheelchair access, poor equipment maintenance, lack of adaptive and/or accessible equipment.

**1.7.11PA Barrier: Information-related**. Lack of information on available and accessible facilities and programmes, lack of information for fitness professionals about adaptive equipment, and lack of knowledge among fitness/recreation staff.

**1.7.12PA Barrier: Perceptions and attitudes relating to accessibility and disability.** Negative attitude of fitness and recreation professionals towards participation of people with disabilities in PA.

**1.7.13PA Barrier: Emotional and psychological**. Perception that fitness/recreation facilities are unfriendly environments, negative attitudes and behaviour relating to disabilities among staff and users of facilities, self-consciousness, fear of the unknown, concerns about needing and requesting assistance and lack of support from friends and family to access and participate in PA programmes.

**1.7.14PA Barrier: Lack of resources**. Lack of transport, accessible facilities, and lack of PA programmes accessible to people with disabilities.

**1.7.15PA Facilitator: Facilitators relating to the built and natural environment.** In fitness centres family changing rooms are required to enable parents to help children with disabilities, or for help by a personal assistant or family member, providing non-slip mats in locker rooms, accessible parking spaces, push-button operated doors, multilevel front desks that can accommodate both wheelchair and non-wheelchair users, lowering or removing door thresholds, providing ramp access to whirlpools and hot tubs, in new buildings zero-depth entry pools should be built.

**1.7.16PA Facilitator: cost.** Sliding fees or scholarships to persons with low incomes, which often include disabled people.

**1.7.17PA Facilitator: Equipment related.** Pool water chairs, Velcro straps to enable gripping of exercise equipment, upper-body aerobic exercise equipment, strength equipment that does not require transferring from a wheelchair to the machine, facilities to seek input from persons with disabilities when purchasing equipment.

**1.7.18PA Facilitator: Information-related.** Support for staff training and education related to accessibility issues for people with disabilities.

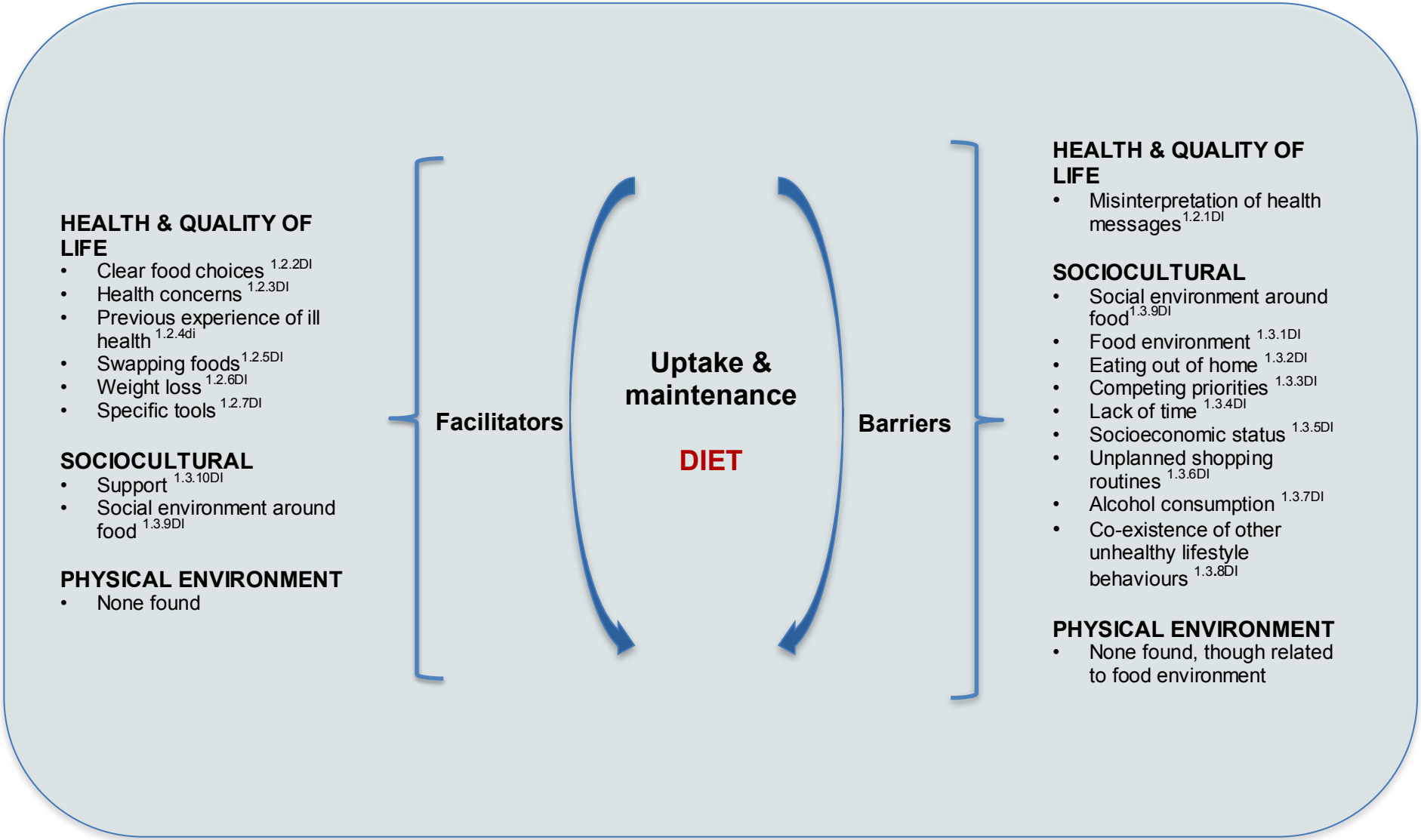
**1.7.19PA Facilitator: Emotional and psychological.** Making facilities and staff friendlier to disabled people, passes to allow testing of the facilities, peer support, facility orientations, rehabilitation professionals to assist with the transition from rehabilitation to community programmes.

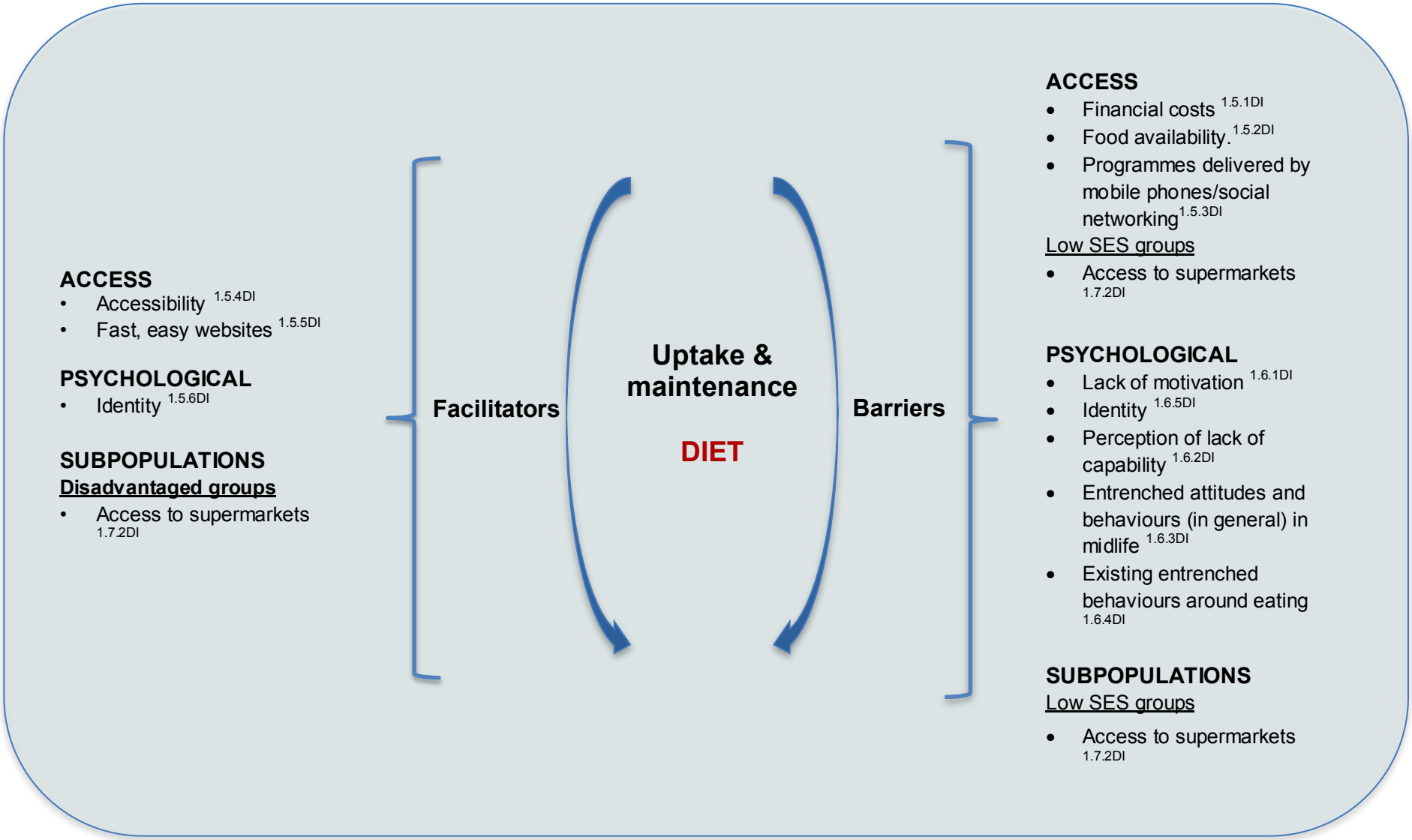
**1.7.20PA Facilitator: Perceptions and attitudes relating to accessibility and disability.** To view the costs associated with accessibility for people with disabilities as an investment in view of increasing numbers of people with disabilities and family and friends who will use the facilities.

**1.7.21PA Facilitator: Resources.** Free or reduced fee transportation, pooling of resources by neighbouring communities, hiring volunteers/ student interns with relevant training as an inexpensive way to address staff resources.

- **Applicability**: Partially applicable: The primary qualitative study was conducted in the US.

**Figure 4. Summary of barriers and facilitators for DIET (with reference to evidence statements)**




ACCESS
• Accessibility 1.5.4DI
• Fast, easy websites 1.5.5DI
PSYCHOLOGICAL
• Identity 1.5.6DI
SUBPOPULATIONS
Disadvantaged groups
• Access to supermarkets 1.7.2DI
Facilitators
Uptake & maintenance
DIET
Barriers
ACCESS
• Financial costs 1.5.1DI
• Food availability. 1.5.2DI
• Programmes delivered by mobile phones/social networking 1.5.3DI
Low SES groups
• Access to supermarkets 1.7.2DI
PSYCHOLOGICAL
• Lack of motivation 1.6.1DI
• Identity 1.6.5DI
• Perception of lack of capability 1.6.2DI
• Entrenched attitudes and behaviours (in general) in midlife 1.6.3DI
• Existing entrenched behaviours around eating 1.6.4DI
SUBPOPULATIONS
Low SES groups
• Access to supermarkets 1.7.2DI

### 3.4 Evidence statements for DIET (DI)

**1.1DI Summary for Diet**

The evidence found for diet comprises five qualitative primary studies with data specific to midlife populations (four qualitative studies were in women and one was in a mixed population. Two primary cohort studies (one in women, one in men and women) with data specific to midlife populations and seven systematic reviews with data for adults in general (men and women). Additionally two systematic reviews reported on outcomes related to diet and obesity and have been included here. No systematic reviews that aimed to examine predictors, barriers or facilitators to good diet or eating behaviours in midlife specifically were found.

**1.2DI Health and quality of life**

**1.2.1DI Barrier: Misinterpretation of health messages**. In a DH report of qualitative research in middle-aged people [-][1], it was found that misinterpretation of food messages like eating five a day that meant food was being added to existing diet in an attempt to be healthy but was actually adding to daily food intake.

[1] DH Insight report 2010

- **Applicability:** Directly applicable. One primary study in midlife population was conducted in UK.

**1.2.2DI Facilitator: Clear and simple food decisions for overall health.** One primary qualitative study about bone health in women [++][1] found that midlife women preferred to have clear and simple food choices for overall health rather than focus on different diet decisions for different aspects of health.

[1] Jilcott 2009

- **Applicability**: Partially applicable. The one qualitative primary study in midlife populations was conducted in Canada. Unclear consistency of findings in men, and across different ethnic groups, no studies in UK.

**1.2.3DI Facilitator: Health concerns.** In one qualitative study [++][1], both home and workplace food choices were affected by personal health concerns.

[1] Jilcott 2009

- **Applicability**: Partially applicable. The one qualitative primary study in midlife populations was conducted in women in the US. Unclear consistency of findings in men, and across different ethnic groups, no studies in UK.

**1.2.4DI Facilitator: Previous experience of ill health.** In one qualitative primary study [+][1] a motivating factor for changes in diet relating to bone health was diagnosis of osteoporosis in a family member.

[1] Hammond 2010

- **Applicability**: Partially applicable. The one qualitative primary study in midlife populations was conducted in Canada.

**1.2.5DI Facilitator: Focus on swapping unhealthy or high calorie foods with healthier or low calorie foods.** A DH qualitative report in middle-aged adults [-][1] reported that promotion of 'snack swap' (to reduce unhealthy compulsive snacking by replacing snacks with healthy ones or healthy meals) or 'portion swap' (to reframe the need to reduce main meal portion sizes by providing strategies for replacing high calorie meal components with lower calorie ones) or 'find the fibre' (to increase the amount of fibre consumed by providing new and interesting ways to add fibre to the diet) were behaviour change messages that engaged the target audience of midlife adults. Messages that were less effective in this middle-aged group were 'fat swap', 'begin with breakfast', 'five a day' (not considered a new message, and the adoption of this idea was seen as complex and difficult to quantify), 'sugar swap' and 'think about drink' (reducing alcohol consumption was the least motivating strategy explored due to the pleasure associated with drinking alcohol.

[1] DH Insight report 2011

- **Applicability**: Directly applicable. Study conducted in UK in middle-aged adults.

**1.2.6DI Facilitator: Weight loss.** A DH qualitative report in middle-aged adults [-][1] reported that promotion of weight loss was a facilitator with the proviso that this was supported by information on other short term benefits.

[1] DH Insight report 2010

- **Applicability**: Directly applicable. The primary study in midlife populations was conducted in UK.

**1.2.7DI Facilitator: Supplying the specific tools to make and sustain behaviour changes**. In a DH report of qualitative research in middle-aged people [-][1], most people felt they were broadly aware of the changes they needed to make but lacked the specific information, tips and strategies they needed to make the changes in their daily lives.

[1] DH Insight report 2010

- **Applicability**: Directly applicable. Study conducted in UK in middle-aged adults.

**1.3DI Sociocultural factors**

**1.3.1DI Barrier: Food environment.** In one primary qualitative study conducted in midlife women [++][1], food chosen at home and at work was influenced by the surrounding food environment including the type of food available and convenience of access to food sources. In two systematic reviews ([-][2], [-][3]), the food environment (greater access to supermarket or less access to takeaway outlets) was associated with lower BMI and prevalence of overweight and obesity but mixed associations were found with dietary behaviours [-][2].

[1] Jilcott 2009; [2] Giskes 2011; [3] Lovasi 2009

- **Applicability**: Partially applicable. The one qualitative primary study in midlife populations was conducted in women in the US. The systematic reviews included international studies.

**1.3.2DI Barrier: Eating out of home.** In one systematic review [+][1], eating out of home was associated with higher total energy intake, higher energy contribution from fat and lower micronutrient intake. The analysis included foods and drinks so incorporated solid food as well as alcoholic and non-alcoholic drinks.

[1] Lachat 2012

- **Applicability**: Partially applicable. The one systematic review included international studies.

**1.3.3DI Barrier: Competing priorities.** One systematic review [-][1] identified competing priorities as a barrier. Food choice values not always related to food can include enjoyment, cost, managing relationships and convenience. Food choice values may be influenced by personal factors, ideals, resources, social context and food contexts.

[1] Bisogni 2012

- **Applicability**: Partially applicable. The systematic review included international studies in developed countries.

**1.3.4DI Barrier: Lack of time.** Insufficient time was highlighted in one systematic review [-][1] often related to family schedules and work demands (and other competing priorities, see above), leading to lack of time for home-prepared meals.

[1] Bisogni 2012

- **Applicability**: Partially applicable. The systematic review included international studies in developed countries.

**1.3.5DI Barrier: Socioeconomic status**. Three systematic reviews of international studies ([++][1], [-][2], [-][3]) found that measures of SES were associated with consumption of fruit and

vegetables. An association between SES and food consumption was found when studies measured nutrient intake but the differences among socioeconomic groups were small. Lower household income was also associated with lower fruit and vegetable consumption [++][1]. Consumption of less fibre, fruit and veg in lower socioeconomic groups was found in another review [-][2], while high SES in both men and women was linked to significantly greater consumption [-][3]. A higher total fat intake was found in lower socioeconomic groups [-][2]. Additionally one systematic review found that fast food restaurants were more prevalent in low income areas compared to middle or higher income areas [-][4] although dietary outcomes were not reported.

[1] Kamphuis 2006; [2] Giskes 2011; [3] De Irala-Estevez 2000; [4] Fleischacker 2011

- **Applicability**: Partially applicable. The systematic reviews included international studies.

**1.3.6DI Barrier: Unplanned shopping routines.** In a DH report of qualitative research [-][1] in middle-aged people, it was found that unplanned shopping routines encouraged impulsive and indulgent purchases over planned staples.

[1] DH Insight report 2010

- **Applicability**: Directly applicable. The primary study in midlife populations was conducted in UK.

**1.3.7DI Barrier: Alcohol consumption**. In a DH report of qualitative research in middle-aged people [-][1], it was reported that alcohol consumption added calories to the overall diet and encouraged indulgent and unhealthy food choices.

[1] DH Insight report 2010

- **Applicability**: Directly applicable. The primary study in midlife populations was conducted in UK.

**1.3.8DI Barrier: Co-existence of other unhealthy lifestyle behaviours.** In one cohort study [+][1], those who were drinkers, smokers or overweight were more likely to consume moderate or high amounts of fatty sweetened foods or fatty salted foods.

[1] Mejean 2011

- **Applicability**: Partially applicable. The one cohort primary study in midlife populations was conducted in women in France. Unclear consistency of findings in men, and no studies were undertaken in UK.

**1.3.9DI Barrier/facilitator: Social environment around food.** In one primary qualitative study conducted in midlife women [++][1] food chosen at home was influenced by family members and food chosen at work was influenced by co-workers. In one systematic review

[-][2] social relationships and social processes were identified as influencing how people interpret healthy eating.

[1] Jilcott 2009; [2] Bisogni 2012

- **Applicability**: Partially applicable. The one qualitative primary study in midlife populations was conducted in women in the US. The systematic review included international studies in developed countries.

**1.3.10DI Facilitator: Support.** Family support was a determinant of the uptake and maintenance of healthy eating behaviour in one cohort study [+][1] and identified as a factor influencing eating behaviour in one systematic review [-][2].

[1] Yates 2012; [2] Bisogni 2012

- **Applicability**: Partially applicable. The primary study in midlife women was conducted in the US. The systematic review included international studies in developed countries.

**1.4DI Physical environment**

No barriers or facilitators specific to the physical environment were found although 1.3.1DI relates to some aspects of the surrounding environment.

**1.5DI Access (to facilities and resources)**

**1.5.1DI Barrier: Financial costs**. One systematic review [-][1] found that people reported that healthy eating costs are too expensive. Examples given were the view that fruit, vegetables, meat and cereals were costly or that organic or natural food was too highly-priced. The systematic review included international studies in developed countries.

[1] Bisogni 2012

- **Applicability**: Partially applicable. The systematic review included international studies in developed countries.

**1.5.2DI Barrier: Food availability.** Widespread availability of unhealthy food such as junk food and lower availability of healthy food was reported in a systematic review [-][1]. One example given was 'you can't buy broccoli at a movie theatre'. The systematic review included international studies in developed countries.

[1] Bisogni 2012

- **Applicability**: Partially applicable. The systematic review included international studies in developed countries.

**1.5.3DI Barrier: Interventions delivered by mobile phones/social networking.** One primary qualitative study [+][1] examined the attitude of Australian men to website and mobile phone delivered nutrition (and PA) interventions. Use of mobile phones as a method of

intervention delivery was not of interest to most participants, though they were more open to the idea if they had a smartphone. Time was a major limiting factor in the midlife population interviewed so social networking was not a high priority.

[1] Vandelanotte 2013

- **Applicability**: Partially applicable: The primary study was conducted in Australia. Unclear consistency of findings in women, and across ethnicities, no studies undertaken in UK.

**1.5.4DI Facilitator: Accessibility or availability.** One systematic review [++][1] found some limited evidence that fruit and vegetable consumption was higher when more easily available. Having your own vegetable garden or a supermarket in the residence area were associated with higher fruit and vegetable consumption in studies conducted in the UK and US.

[1] Kamphuis 2006

- **Applicability**: Directly applicable: The systematic review included UK studies.

**1.5.5DI Facilitator: Fast, easy to use websites**. One primary qualitative study [+][1] examined the attitude of Australian men to website and mobile phone delivered nutrition (and PA) interventions. Preferred website characteristics in the middle-aged men interviewed were fast, easy to use, with clutter-free pages, concise language, and reliable factual information. Specific website features that were viewed positively were interactive features that could give feedback, podcasts, instructional videos and step-by-step pictures. The concept of self-monitoring tools for PA was supported but there was concern that it might be inconvenient and time-consuming; however, no information was reported comparing website delivery compared to other means of delivery.

[1] Vandelanotte 2013

- **Applicability**: Partially applicable: The primary study was conducted in Australia. Unclear consistency of findings in women, and across ethnicities, no studies undertaken in UK.

**1.6DI Psychological factors**

**1.6.1DI Barrier: Lack of motivation.** This was reported in one systematic review [-][1] in which motivation was consistently associated with fruit and vegetable intake.

[1] Guillaumie 2010

- **Applicability**: Partially applicable. The systematic review included international studies.

**1.6.2DI Barrier: Perception of lack of capability.** This was cited in one systematic review [-][1] in which beliefs about capabilities and knowledge were was consistently associated with fruit and vegetable intake.

[1] Guillaumie 2010

- **Applicability**: Partially applicable. The systematic review included international studies.

**1.6.3DI Barrier: Existing entrenched behaviours around eating.** In a DH report of qualitative research in middle-aged people [-][1], it was reported that many risk behaviours around eating were deeply embedded, such as continuous snacking, bingeing to alleviate boredom and escape problems, heavy use of convenience foods, skipping meals, oversized portions, junk food 'addictions', fussy eating habits retained from childhood.

[1] DH Insight report 2010

- **Applicability**: Directly applicable. The primary qualitative study in midlife populations was conducted in the UK.

**1.6.4DI Barrier/facilitator: Identity.** One systematic review [-][1] identified a person's identity or self-concept as being involved in how they eat. Examples given include some people who hold healthy eating in high esteem and desire to be healthy eaters whereas others viewed healthy eating as weird or picky.

[1] Bisogni

- **Applicability**: Partially applicable. The systematic review included international studies in developed countries.

**1.7DI Subpopulations (gender, ethnic groups, addressing inequalities)**

Many of the barriers or facilitators cited for subpopulations were also cited in broader population groups so they have been listed previously. Only those that are more specific to subpopulation groups are listed here.

**Subpopulation: Disadvantaged groups**

**1.7.1DI Barrier: Food environment**

In two systematic reviews ([-][1], [-][2]), the food environment (greater access to supermarket or less access to takeaway outlets) was associated with lower BMI and prevalence of overweight and obesity but mixed associations were found with dietary behaviours [-][2].

[1] Giskes 2011; [2] Lovasi 2009

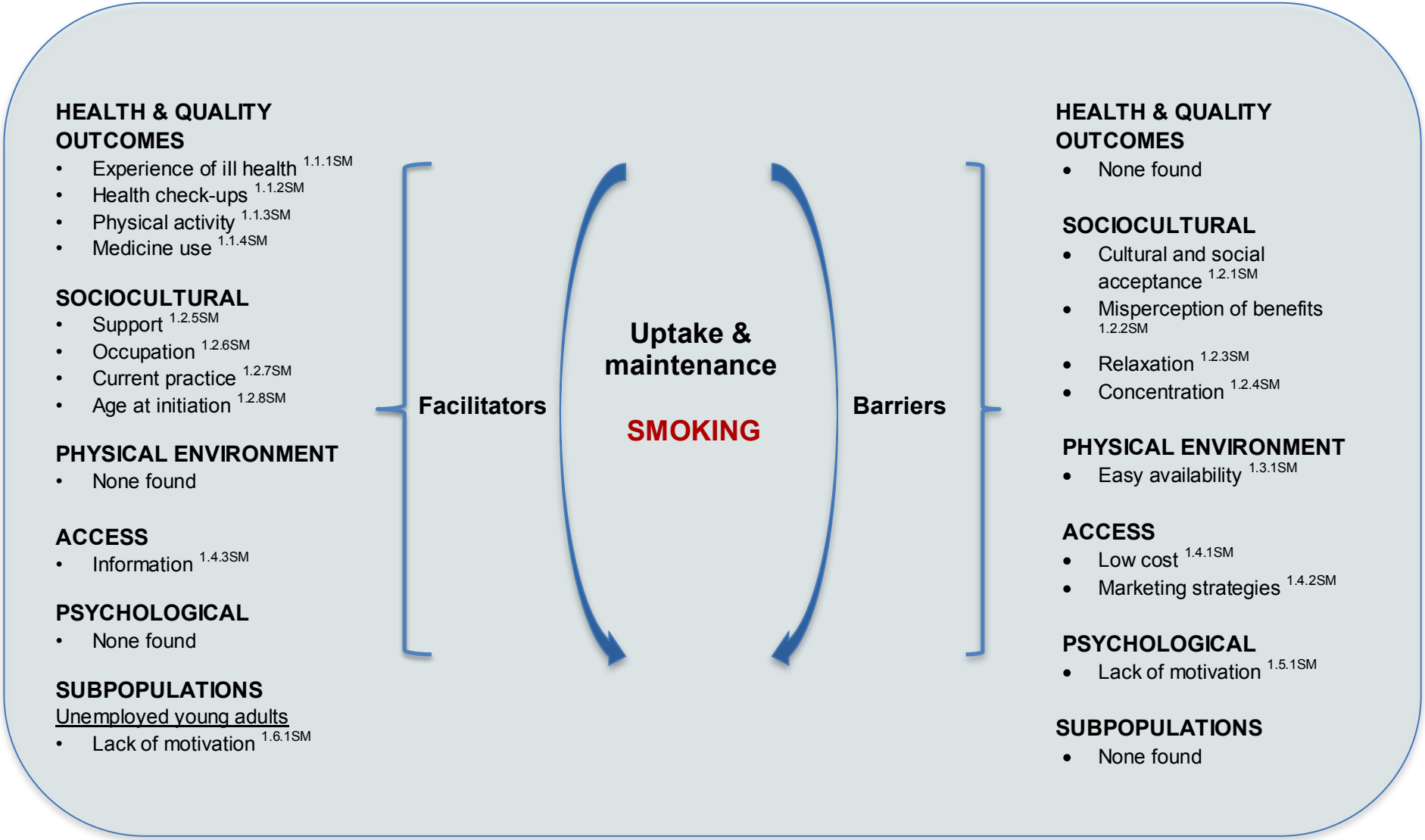
- **Applicability**: Partially applicable. The one qualitative primary study in midlife populations was conducted in women in the US. The systematic reviews included international studies. Unclear consistency of findings in men.

**1.7.2DI Barrier/facilitator: Access to supermarkets**. One systematic review in disadvantaged groups (low SES, black or Hispanic ethnicity) [-][1] found that greater access to supermarkets was associated with lower BMI, and prevalence of overweight and obesity in these populations. However, limited data was reported.

[1] Lovasi

- **Applicability**: Partially applicable. The review included disadvantaged populations in the US.

**Figure 5. Summary of barriers and facilitators for SMOKING (with reference to evidence statements)**



### 3.5 Evidence statement for SMOKING (SM)

**1.1SM Summary for SM** - The evidence found for smoking comprises one qualitative primary study with data specific to midlife populations and four systematic reviews with data for adults in general (men and women). No systematic reviews that aimed to examine predictors, barriers or facilitators to smoking in midlife specifically were found. Additionally some studies on health promotion in general reported on factors relevant to smoking.

**1.2SM Health and quality of life**

**1.2.1SM Facilitator: Experience of ill health.** One cohort study [+][1] found that the development of diseases was a significant predictor of smoking cessation.

[1] Honjo 2010

- **Applicability:** Partially applicable: Cohort study was conducted in Japan. Unclear consistency of findings across ethnicities and no studies undertaken in UK.

**1.2.2SM Facilitator: Participation in health check-ups.** One cohort study [+][1] found participation in health check-ups is a significant predictor of smoking cessation.

[1] Honjo 2010

- **Applicability:** Partially applicable: Cohort study was conducted in Japan. Unclear consistency of findings across ethnicities and no studies undertaken in UK.

**1.2.3SM Facilitator: Physical activity.** One cohort study [+][1] found that frequency of physical activity was a significant predictors of smoking cessation.

[1] Honjo 2010

- **Applicability:** Partially applicable: Cohort study was conducted in Japan. Unclear consistency of findings across ethnicities and no studies undertaken in UK.

**1.2.4SM Facilitator: medicine use.** One cohort study [+][1] found that initiation of prescribed drug use was a significant predictor of smoking cessation.

[1] Honjo 2010

- **Applicability:** Partially applicable: Cohort study was conducted in Japan. Unclear consistency of findings across ethnicities and no studies undertaken in UK.

**1.3SM Sociocultural factors**

There are inconsistent findings regarding sociocultural influences on smoking behaviours. Three systematic reviews are included in this analysis. One [-][1] assessed tobacco use in South Asian communities. The UK South Asian population probably differs from that of the Indian subcontinent, and care should be taken while extrapolating results from one

population to another; another [-][2] assessed tobacco use in general population samples; one systematic review [-][3]was focussed on socioeconomically disadvantaged populations. A cohort study [+][4] was also included which was conducted in Japan. A fourth review was found [-][5] which assessed smoking in unemployed young adults. The results for this disadvantaged group are presented separately.

[1] Kakde 2012; [2] Vangeli 2011; [3] Niederdeppe 2008; [4] Honjo 2010; [5] Bader 2007

**1.3.1SM Barrier: Cultural and social acceptance.** One systematic review [-][1] examined the cultural and social acceptance of tobacco use in South Asian communities. In the UK, reasons for use varied widely; the main reasons were tobacco use in the family (parents or siblings), taste, and coping with frustration, depression, anger and boredom. Peer pressure in South Asian communities was reported to impact on individual decision-making regarding the cessation of smoking. Studies included in this review also reported that peer pressure and isolation were the main reasons for resuming the habit, as abstinence restricted their social life with friends who used tobacco products.

[1] Kakde 2012

- **Applicability:** Partly applicable: studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

**1.3.2SM Barrier: Misperceptions of benefits.** One systematic review [-][1] found that in some UK South Asian communities there are perceived health and dental benefits associated with tobacco use. These reported benefits included relief of abdominal problems, enhanced digestion, stress relief and oral hygiene aids. A low level of awareness was also detected between smokeless tobacco use and cancer. The review found evidence to suggest that while there was some awareness about harmful effects of tobacco use; however individuals could not delineate specific ill effects other than cancer.

[1] Kakde 2012

- **Applicability:** Partly applicable: studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

**1.3.3SM Barrier: Physical and mental relaxation.** In one systematic review [-][1] conducted in South Asian communities five studies reported that physical and mental relaxation were reasons for commencing tobacco use.

[1] Kakde 2012

- **Applicability:** Partly applicable: studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

**1.3.4SM Barrier: Aid to concentration**. In one systematic review [-][1] conducted in South Asian communities five studies reported that tobacco use was believed to be an aid to concentration and this justified tobacco use.

[1] Kakde 2012

- **Applicability:** Partly applicable: studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

**1.3.5SM Facilitator: social, physical and emotional support.** One systematic review [-][1] including 14 cross-sectional, two qualitative and one mixed-method study investigated the reasons for smoking in South Asian communities. The review reported that support provided by parents, close family and friends is important for supporting individual efforts to quit.

[1] Kakde 2012

- **Applicability:** Partly applicable: studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

**1.3.6SM Facilitator: Occupation.** One review [-][1] reported that higher social grade was predictive of quit attempt success, but this was examined in only two studies. Another review [-][2] found that smoking abstinence was more prevalent in higher SES populations. Conversely one review [-][3] containing 8 non-intervention prospective studies, reported that indicators of affluence (i.e. income, education, employment status) were not found to be predictive of either making a quit attempt or quit attempt success. In this review [-][3], none of the socio-demographic variables were found to be predictive of making a successful quit attempt. One cohort study [+][4] found that occupation was a significant predictor of smoking cessation.

[1] Kakde 2012; [2] Niederdeppe 2008; [3] Vangeli 2011; [4] Honjo 2010

- **Applicability:** Partially applicable: studies conducted in Asian communities. Some settings were not directly comparable to UK settings (India, Pakistan, Nepal[1]). Some settings were in the UK or other similar countries (Canada, Australia and Western Europe) and included young adults [2,3]. One cohort study was conducted in Japan[4].

**1.3.7SM Facilitator: Current smoking practice.** One cohort study [+][1] found that an individual's current smoking practices were significant predictors of smoking cessation. Five of the six included studies reported that the more cigarettes smoked, the less likely the quit attempt was to be successful.

[1] Honjo 2010

- **Applicability:** Partially applicable: Cohort study was conducted in Japan. Unclear consistency of findings across ethnicities and no studies undertaken in UK.

**1.3.8SM Facilitator: Age at initiation of smoking.** One cohort study [+][1] found that older age of initiation of smoking was a strong predictors for smoking cessation.

[1] Honjo 2010

- **Applicability:** Partially applicable: Cohort study was conducted in Japan. Unclear consistency of findings across ethnicities and no studies undertaken in UK.

**1.4SM Physical Environment**

**1.4.1SM Barrier: Easy availability.** One systematic review [-][1] reported that the wide-spread availability of tobacco products was a key factor for tobacco use in South Asian populations.

[1] Kakde 2012

- **Applicability:** Partially applicable: Studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

**1.5SM Access (to facilities and resources)**

**1.5.1SM Barrier: Low cost.** One systematic review [-][1] reported that low cost of tobacco products was one of the primary reasons for current use in South Asian populations.

[1] Kakde 2012

- **Applicability:** Partially applicable: Studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

**1.5.2SM Barrier: Marketing strategies.** In one systematic review [-][1] conducted in South Asian communities five studies reported that marketing strategies by tobacco companies was a reason for individuals commencing tobacco use.

[1] Kakde 2012

- **Applicability:** Partially applicable: Studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

**1.5.3SM Facilitator: Information.** One systematic review [-][1] reported that the provision of information was important when making decisions around smoking cessation. The main sources of information were parents, educational institutions and the media. Other sources were other family members and friends, neighbours, doctors and dentists. In total 39% of respondents asked identified that doctors/dentists play a significant role in decision making; however, this advice was devalued when doctors were users themselves.

[1] Kakde 2012

- **Applicability:** Partially applicable: Studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

**1.6SM Psychological factors**

**1.6.1SM Barrier: Motivation**. One systematic review [-][1] conducted in South Asian communities found that an individual's lack of motivation to quit was influential on decision making.

[1] Kakde 2012

- **Applicability:** Partially applicable: studies conducted in Asian communities. Some settings were in the UK, some not directly comparable to UK settings (India, Pakistan, Nepal).

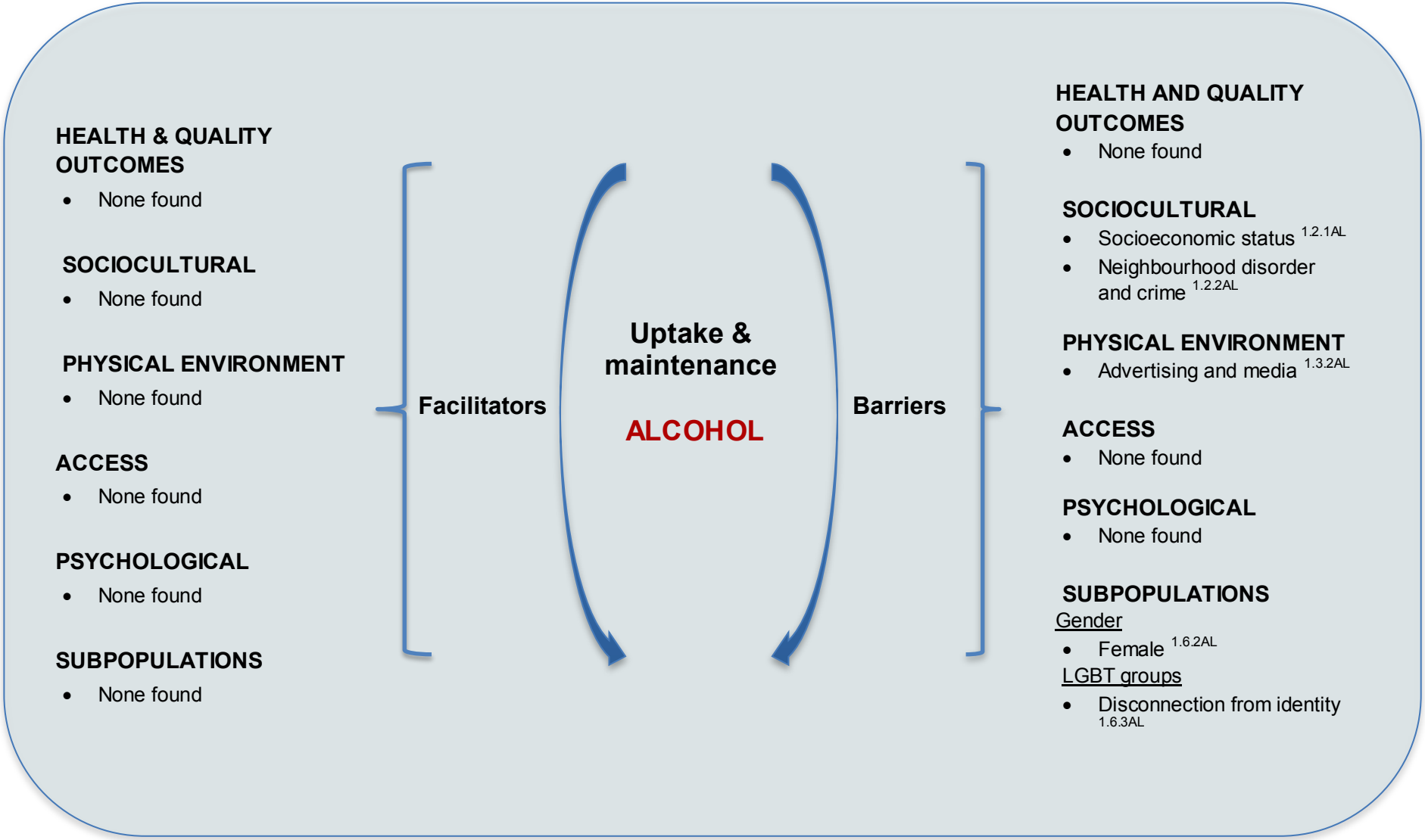
**1.7SM Subpopulations (gender, ethnic groups, addressing inequalities)**

**1.7.1SM** One review [-][1] assessed cessation among employed or unemployed young adults aged 18 to 24 years. The review reported lack of enthusiasm was a potential barrier to smoking cessation. Problematically, there is a lack of data on employed and unemployed adults in midlife or older adults in the literature. There is also a lack of evidence across the different communities.

[1] Bader 2007

**Applicability:** Partially applicable: Review included studies involving unemployed young adults but does not specify countries.

**Figure 6. Summary of barriers and facilitators for ALCOHOL (with reference to evidence statements)**



### 3.6 Evidence statements for ALCOHOL (AL)

**1.1AL Summary for AL** - The evidence found for alcohol is comprised of one qualitative primary study in women only with data specific to midlife, one primary cohort studies and three systematic reviews with data for adults in general (men and women). No systematic reviews that aimed to examine predictors, barriers or facilitators to alcohol in midlife specifically were found. Additionally some studies on health promotion in general reported on factors relevant to alcohol.

**1.2AL Health and quality of life**

No evidence found.

**1.3AL Sociocultural factors**

**1.3.1AL Barrier: Socioeconomic status.** One cohort study [++][1] conducted in the UK found that socioeconomic disadvantage across the life course was consistently linked to midlife moderate-binge, non-/occasional and problem drinking but not low-problem heavy drinking. Evidence from one systematic review [+][2] found the association between community-level socio-economic factors (deprivation, income, employment) and alcohol use was inconclusive (especially among studies that focused on deprivation and poverty), with some indication that alcohol use may be greater in high-income communities but also in communities with higher unemployment levels.

[1] Caldwell 2008; [2] Bryden 2013

- **Applicability:** Directly applicable: review included studies conducted in community-based settings in the UK or other similar countries (USA). Cohort study conducted in UK community setting.

**1.3.2AL Barrier: Neighbourhood disorder and crime.** Evidence from one systematic review [+][1] found some indication that alcohol use may be higher in communities with greater social disorders. Five of the studies were in adults and 4 out of the 5 studies found a significant association.

[1] Bryden et al. 2013

- **Applicability:** Partially applicable: The 4 studies that found a positive association were conducted in the US. The one study that found no significant association was conducted in the UK. Over 70% of the primary data is for adolescents and young adults.

**1.4AL Physical Environment**

**1.4.1AL Barrier: Availability (i.e. outlet density, distance to nearest outlet).** One systematic review [+][1] of longitudinal and cross-sectional studies assessed the relationship

between alcohol use and availability from commercial sources at the community level. Results were not significant in the included studies in adults overall. While the findings were inconclusive, there was some indication that higher outlet density, defined as shops, bars and restaurants, in a community may be associated with an increase in alcohol use in adolescents and students. Findings were inconclusive for distance to nearest outlet and local changes to licensing regulations.

[1] Bryden 2012

- **Applicability:** Partially applicable: review included studies conducted in community-based settings in the UK or other similar countries (USA). Over 70% of the primary data is for adolescents and young adults.

**1.4.2AL Barrier: Advertising and media.** One systematic review [+][1] assessed the relationship between alcohol use and advertising at the community level. Only one of the included studies for this exposure was conducted in adults (in women) but that study reported a significant relationship between advertising and alcohol use.

[1] Bryden 2012

- **Applicability**: Partially applicable: review included studies conducted in community-based settings in the UK or other similar countries (USA). Over 70% of the primary data is for adolescents and young adults.

**1.5AL Access (to facilities and resources)**

No evidence found (though 1.4.1AL also relates to access).

**1.6AL Psychological factors**

No evidence found.

**1.7AL Subpopulations (ethnic minorities, gender, disadvantaged groups, disabilities)**

**1.7.1AL** No studies were identified that were designed to examine whether particular population groups encounter different barriers and facilitators compared with other populations.

**1.7.2AL Barrier: Gender.** A narrative review [-][1] suggests that while women with alcohol use disorders are more likely to seek help, they are less likely to be identified by their physicians. Common barriers to seeking help include: fear of abandonment by partner; fear of loss of children; and financial dependency, past history of sexual and/or physical abuse also increases the risk for alcohol use disorders in women.

[1] Brienza 2002

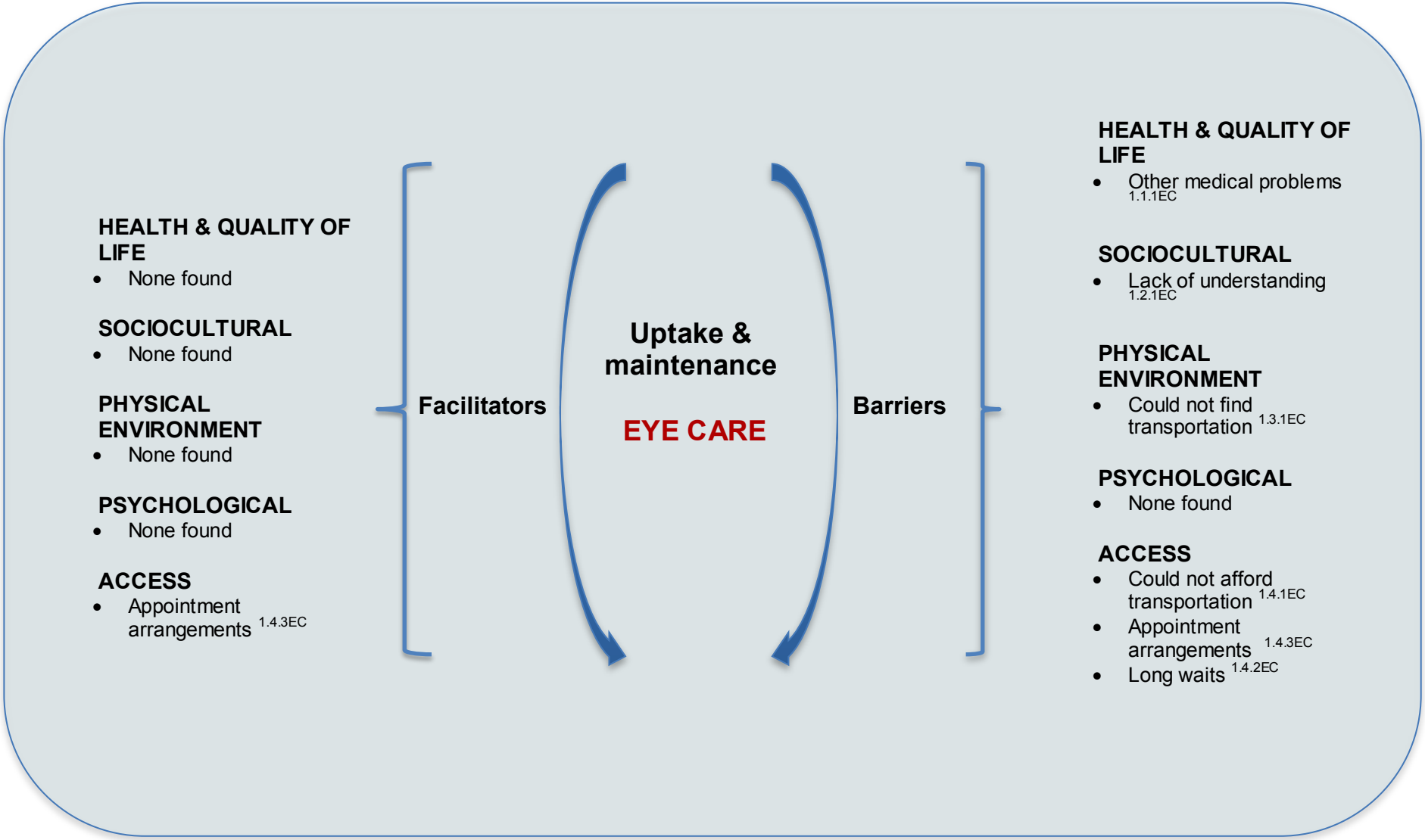
- **Applicability**: Partially applicable: review included studies conducted in community-based settings in the UK or other similar countries (USA).

**1.7.3AL Barrier: Identity.** One qualitative primary study paper reporting interviews [+][1] with13 midlife/older lesbians recovering from alcohol misuse suggests that the (mis)use of alcohol is associated with a disconnection from an individual's identity; in particular with their lesbian identity but also a disconnection from their roles such as student, partner, employee and parent or from childhood issues/family of origin.

[1]Pettinato 2005

- **Applicability:** Partially applicable: review conducted in the USA in lesbian women with a history of alcohol abuse, and small sample size; only source evidence available for that subgroup of the population.

**Figure 7. Summary of barriers and facilitators for EYE CARE (with reference to evidence statements)**



### 3.7 Evidence statement for EYE CARE (EC)

**1.1EC Summary for EC.**

The evidence found for eye care comprises one qualitative primary study in men and women with data specific to midlife populations. No systematic reviews that aimed to examine predictors, barriers or facilitators to eye care in midlife specifically were found. Additionally some studies on health promotion in general reported on factors relevant to eye care.

**1.2EC Health and quality of life**

**1.2.1EC Barrier: Other medical problems requiring attention.** One qualitative study [+][1] in a population in the US with little or no health insurance interviewed a sample of individuals who missed their scheduled examination. Eight respondents believed that another medical problem needed their attention first.

[1] Gower 2013

- **Applicability:** Partially applicable: study conducted in USA.

**1.3EC Sociocultural factors**

**1.3.1EC Barrier: Lack of understanding of information.** One qualitative study [+][1] in a population in the US with little or no health insurance asked a sample of individuals who missed their scheduled exam and 12.9% of respondents did not understand that they were recommended to have a follow-up eye exam.

[1] Gower 2013

- **Applicability:** Partially applicable: study conducted in USA.

**1.4EC Physical Environment**

**1.4.1EC Barrier: Could not find transportation.** One qualitative study [+][1] in a population in the US with little or no health insurance asked a sample of individuals who missed their scheduled exam and nearly one quarter said they were unable to find transportation.

[1] Gower 2013

- **Applicability:** Partially applicable: study conducted in USA.

**1.5EC Access (to facilities and resources)**

There is a paucity of evidence regarding economic influences on eye care behaviours.

**1.5.1EC Barrier: Could not afford transportation.** One qualitative study [+][1] in a population in the US with little or no health insurance asked a sample of individuals who missed their scheduled exam and nearly one quarter (24%) stated they could not afford transportation.

[1] Gower 2013

- **Applicability:** Partial applicability: study conducted in USA.

**1.5.2EC Barrier: Long waits.** One qualitative study [+][1] in a population in the US with little or no health insurance found that respondents who missed a scheduled examination complained of long waiting-times, however, only one said this was responsible for failing to attend.

[1] Gower 2013

- **Applicability:** Partially applicable: study conducted in USA.

**1.5.3EC Barrier/facilitator: Appointment arrangements.** One qualitative study [+][1] in a population in the US with little or no health insurance asked a sample of individuals who missed their scheduled exam about reasons why. Factors raised were forgetting the appointment, had turned up for their appointment but were not seen by the clinician, had something else scheduled that day and were unable to attend, no information to contact the clinic or didn't know the clinic location. Respondents identified that appointment reminders, for example phone calls or postcards would facilitate better attendance, also same day appointments, better information about appointment location and contact information for the clinic would facilitate improved attendance.

[1] Gower 2013

- **Applicability:** Partially applicable: study conducted in USA.

**1.5.5EC Facilitator: Different hours/days.** One qualitative study [+][1] in a population in the US with little or no health insurance asked a sample of individuals who missed their scheduled exam and they responded that having different clinic hours or days would facilitate better attendance.

[1] Gower 2013

- **Applicability:** Partially applicable: study conducted in USA.

**1.5.6EC Facilitator: Free transportation.** One qualitative study [+][1] in a population in the US with little or no health insurance asked a sample of individuals who missed their scheduled exam and 10 (14.3%) of those who responded said that free transportation would facilitate better attendance.

[1] Gower 2013

- **Applicability:** Partially applicable: study conducted in USA.

**1.5.7EC Facilitator: Decreased wait times.** One qualitative study [+][1] in a population in the US with little or no health insurance interviewed a sample of individuals who missed their

scheduled exam and six individuals (8.6%) said that decreased waiting times would facilitate better attendance.

[1] Gower 2013

- **Applicability:** Partially applicable: study conducted in USA.

**1.6EC Psychological factors**

No evidence found

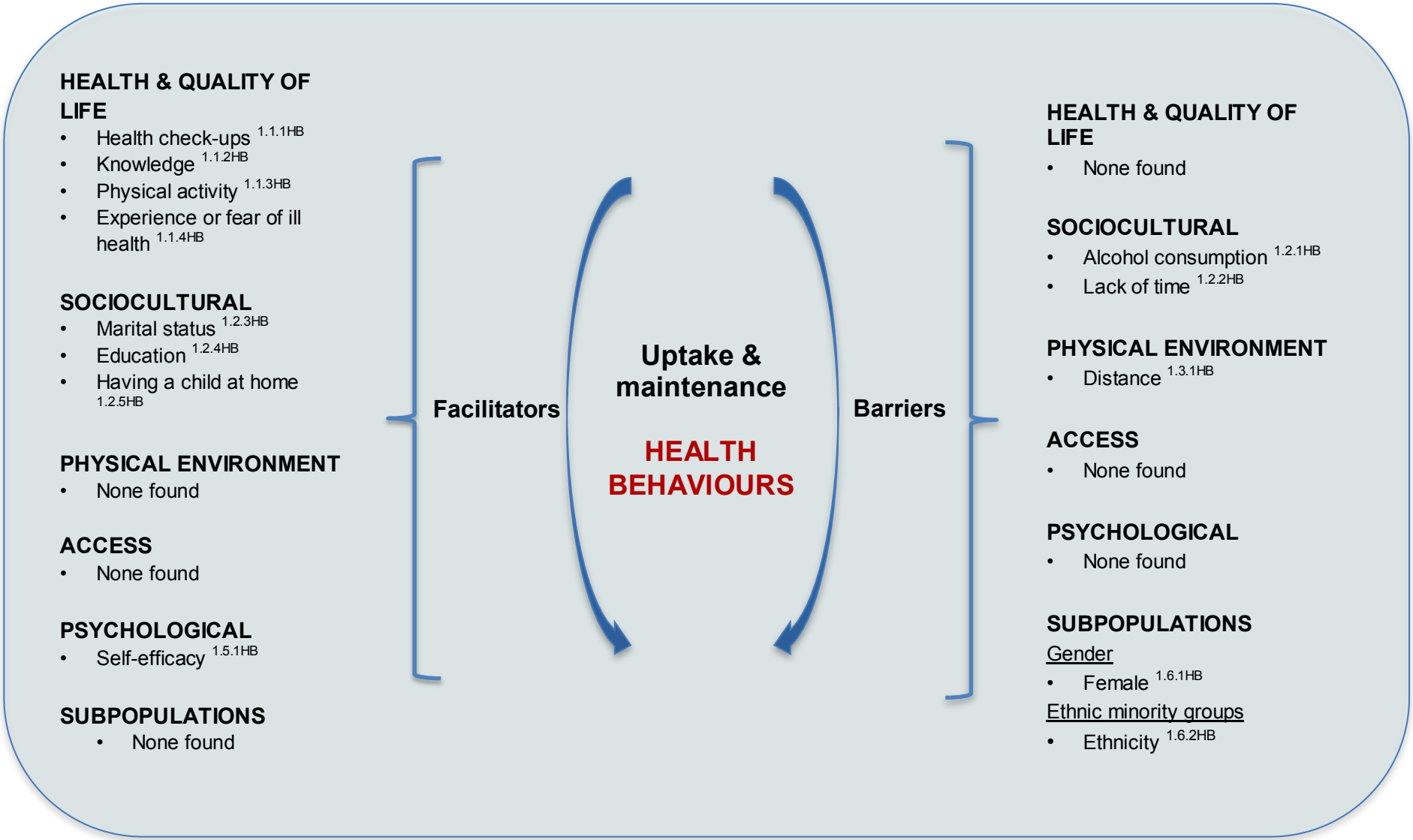
**1.7EC Subpopulations (gender, ethnic groups, addressing inequalities)**

**1.7.1EC** All the evidence for eye care is from one study in a population in the US with little or no health insurance [+][1]. No statistically significant demographic differences were reported between those who expressed interest in an eye exam and those who did not.

[1] Gower 2013

- **Applicability:** Partially applicable: study conducted in USA.

**Figure 8. Summary of barriers and facilitators for HEALTH BEHAVIOURS (with reference to evidence statements)**



### 3.8 Evidence statement for Health Behaviours In General (HB)

**1.1HB. Summary for HB**

The evidence found for health behaviours in general comprises four qualitative primary studies with data specific to midlife populations (one in women only and three in men and women), four primary cohort studies (two in men and women, one in men and one in women) with data specific to midlife populations and six systematic reviews with data for adults in general (men and women). No systematic reviews that aimed to examine predictors, barriers or facilitators to health behaviours in general in midlife specifically were found. Studies where the findings were null or where the evidence suggests that the factors examined were neither barriers nor facilitators are included in the evidence tables but are not reported here.

**1.2HB Health and quality of life**

**1.2.1HB Facilitator: Health check-ups.** One cohort study [+][1] conducted in Sweden attempted to determine factors that contribute to change in health-related behaviours. There was a high degree of stability for many health behaviours with longitudinal correlations including breast self-exam, mammography and cervical screening with those attending more likely to be engaged with healthy behaviours. In a qualitative study [++][2] conducted in rural midlife women in the USA most participants reported going for regular, quick annual check-ups; however women seeking healthcare often reported that dismissive statements from healthcare professionals prevented them seeking preventive health care.

[1] Benzies 2008; [2] Meadows 2001

- **Applicability:** Partial applicability: One study conducted in Sweden. One study conducted in USA. Unclear consistency of findings in men, and no studies were undertaken in UK.

**1.2.2HB Facilitator: Knowledge of healthy behaviour.** One qualitative study [+][1] conducted with women in Iran found that knowledge of health-promoting behaviours, was related to health-promoting behaviours.

[1] Enjezab 2012

- **Applicability:** Partial applicability: One study conducted in Iran. Unclear consistency of findings in men, and across ethnicities, no studies were undertaken in UK.

**1.2.3HB Facilitator: Physical activity.** One cohort study [+][1] conducted in Sweden attempted to determine factors that contribute to change in health-related behaviours, while undertaking exercise decreased risks for CVD and obesity, it also had a positive effect on mental health which is associated with health-related behaviours. Another Swedish cohort study [+][2] conducted with a predominantly rural population reported that physical activity was

a factor for success in lifestyle change. In a review [-][3] conducted in American communities a lack of exercise experience was found to be a barrier to adopting health-promoting behaviours.

[1] Benzies 2008; [2] Petersson 2008; [3] Hart 2005;

- **Applicability:** Partial applicability: Two studies conducted in Sweden. One review conducted in USA.

**1.2.4HB Facilitator: Experience or fear of ill health.** In one qualitative study [+][1] conducted with women in Iran found that affliction or fear of affliction to chronic disease in some persons, observing the disease in the families and relations, and also observing the side effects of these diseases caused the women pay more attention to performing the health-promoting behaviours.

[1]Enjezab 2012

- **Applicability:** Low applicability: Study conducted in Iran. Unclear consistency of findings in men, and across ethnicities, no studies were undertaken in UK.

**<u>1.3HB Sociocultural factors</u>**

**1.3.1HB Barrier: Alcohol consumption.** In a Swedish cohort study [+][1] conducted with a predominantly rural population alcohol consumption; lower alcohol intake is associated with positive lifestyle changes.

[1] Petersson 2008

- **Applicability:** Partial applicability: One study conducted in Sweden. Unclear consistency of findings in urban population, no studies were undertaken in UK.

**1.3.2HB Barrier: Lack of time.** In a review [-][1] conducted in American communities lack of time was found to be a significant barrier to the adoption of health-promoting behaviours. One review [-][2] conducted in mixed settings (USA, UK and New Zealand) found that some clinicians had no time to spend on preventive medicine or felt that lifestyle advice during routine consultations should not be part of their job. In one qualitative study [++][3] conducted in rural midlife women in the USA, lack of time was reported to be a barrier to accessing the healthcare system from a rural residence. These women also reported that their physicians were very busy and overworked which prevented access to healthcare.

[1] Hart 2005; [2] Bock 2012; [3] Meadows 2001

- **Applicability:** Partial applicability: One review conducted in USA, one review conducted in mixed settings and one study conducted in USA.

**1.3.3HB Facilitator: Marital status.** One review [-][1] assessed the extent knowledge impacts on preventative health behaviours. Marital status was found to affect attendance rates with

non-attenders for health checks more likely to be single. One international review [-][2] found that not being married, or not living with a partner or being single was consistently associated with uptake of lifestyle change. Absence of a partner was commonly predictive of non-uptake of healthy behaviours. One cohort study [+][3] conducted in Sweden attempted to determine factors that contribute to change in health-related behaviours; marital status was one of the strongest predictors of a positive change in specific health behaviours. In another cohort study [+][4] conducted in Sweden marital status did not show significant associations with the success rate of lifestyle change.

[1] Dryden 2012; [2] Murray 2012; [3]Benzies 2008; [4] Petersson 2008

- **Applicability:** Partial applicability: One international review. Two studies conducted in Sweden. One study conducted in USA.

**1.3.4HB Facilitator: Education.** One review [-][1] assessed the extent knowledge impacts on preventative health behaviours. Those not engaging with preventative health practices were shown to be less well educated. In a review conducted in German populations [-][2] people with higher levels of education tended to be more physically active. In one review [+][3] people who engaged in self-care activities were likely to be well educated. One international review [-][4] found that less education, awareness and knowledge, for example, perceptions of greater consequences to illness and attribution of more symptoms to illness were most consistently predictive of uptake. One cohort study [+][5] conducted in Sweden attempted to determine factors that contribute to change in health-related behaviours. Education was one of the strongest predictors of a positive change in specific health behaviours. In another cohort study [+][6] conducted in Sweden educational level did not show significant associations with the success rate of lifestyle change. In another cohort study [++][7] a college education was a strong predictor of switching to a healthier lifestyle.

[1] Dryden 2012; [2]Jansen 2012; [3] Ryan 2009; [4] Murray 2012; [5] Benzies 2008; [6] Petersson 2008;[7] King 2007

- **Applicability:** Partial applicability: Two studies conducted in Sweden. One study conducted in Iran. Systematic reviews were international.

**1.3.5HB Facilitator: Having a child at home.** One cohort study [+][1] conducted in midlife population in Sweden attempted to determine factors that contribute to change in health-related behaviours. Having a child at home was one of the strongest predictors of a positive change in specific health behaviours. In a review [-][2] conducted in American communities role, caretaking responsibilities and family obligations were found to be barriers to health-promoting behaviour.

[1] Benzies 2008; [2] Hart 2005

- **Applicability:** Partial applicability: One cohort study conducted in Sweden and one review undertaken in US communities.

**1.3.6HB Facilitator: Support.** In one qualitative study [+][1] women found it difficult to sustain healthy practices if they had no one supportive of their efforts. One systematic review [-][2] found that physicians did not feel prepared to offer counselling for nutrition and their perceived self-efficacy in helping patients change their lifestyle was also generally low in the areas of smoking, nutrition, exercise, and alcohol consumption.

[1] Smith-DiJulio 2010; [2] Bock 2012

- **Applicability:** Partial applicability: One cohort study in midlife women conducted in US. One systematic review included international studies.

**1.4HB Physical Environment**

**1.4.1HB Barrier: Distance.** One international review [-][1] found that longer commute time and greater distances from healthcare facilities, or problems with transport, were consistently associated with poorer uptake at lifestyle programmes. In one qualitative study [++][2] conducted in rural midlife women in the USA, geography was reported to be a barrier to accessing healthcare systems.

[1] Murray 2012 [2;] Meadows 2001

- **Applicability:** Partial applicability: One international review and one study conducted in USA.

**1.5HB Access (to facilities and resources)**

No specific evidence found.

**1.6HB Psychological factors**

**1.6.1HB Facilitator: Self-efficacy.** One international review [-][1] found that factors most consistently associated with uptake of lifestyle programmes were around lower self-efficacy, understanding of illness, denial of severity of illness. One cohort study [-][2] was conducted with middle aged men from Japan found that a high value placed on health was independently associated with positive change of general health practice and was inversely associated with negative change. The same study also found that consciously seeking health information was positively associated with positive change after controlling for socioeconomic and health status. One review [-][3] assessed the extent knowledge impacts on preventative health behaviours. Those not engaging with preventative health practices were shown to value health less strongly, have low self-efficacy, feel less in control of their health and be less likely to believe in the efficacy of health checks. In one qualitative study [+][4] conducted with women in Iran those who valued their health, were more likely to undertake

health-promoting behaviours, but most people failed to do so even when they knew its importance.

[1] Murray 2012; [2] Shi 2004; [3] Dryden 2012; [4] Enjezab 2012

- **Applicability:** Partial applicability: Two international reviews. One primary study conducted in Japan, and one in Iran.

**1.6.2HB Barriers: Entrenched attitudes and behaviours in midlife**. One qualitative study conducted by the Department of Health in the UK [-][1] in midlife adults reported such behaviours. In particular, Self-indulgence was sometimes seen as a 'right' that had been earned through a life of hard work or hard knocks, particularly in those with fewer responsibilities e.g. no dependent children, retirement or less involvement in work; lack of confidence to redefine middle-age on their own terms often leading to 'giving in' to the ageing process and 'giving up' on certain aspects of their lives, view that what happened to them later in life was out of their control, view of health services as 'paternalistic', resistance to the idea of change, reluctance to be told what to do and a belief that benefits of behaviour change needed to be experienced before they would adopt it long term, a view that general decline in health in older age seen as unavoidable, a reactive view of health so they were only more likely to adopt behaviour change once they had experienced the effects of ill health, belief that the only those who were puritanical and obsessive were able to achieve a healthy weight, structured PA an unimportant part of their self-identity or had become associated with a fear of being judged for decreasing abilities.

[1] DH Insight report 2010

- **Applicability**: Partially applicable. The primary qualitative study in midlife populations was conducted in the UK but low quality.

**<u>1.7HB Subpopulations (ethnic minorities, gender, disadvantaged groups, disabilities)</u>**

**1.7.1HB Barrier: Gender.** One review [-][1] assessed the extent knowledge impacts on preventative health behaviours, for example attending clinics. The review found that relationship between health beliefs and health behaviours are complex. Men were among the least likely to attend health checks. In a cohort study [++][2] conducted in the United States men were less likely to adopt a healthy lifestyle. In one qualitative study [++][3] conducted in rural midlife women in the USA the roles a women fulfilled may have also prevented access to the healthcare system. Roles included caring for homes, jobs, volunteering, helping adult children and grandchildren, caring for parents, attending church, leisure activities and hobbies, friends and family. One qualitative study [+][4] conducted with women in Iran found that all the social responsibilities inside and outside home interfered with performing the health behaviours.

[1] Dryden 2012; [2] King 2007; [3] Meadows 2001; [4] Enjezab 2012

- **Applicability:** Partial applicability: One international review, two studies conducted in USA and one study conducted in Iran.

**1.7.2HB Barrier: Ethnicity.** One review [-][1] assessed the extent knowledge impacts on preventative health behaviours. Findings suggest that white individuals were more likely to engage with services than individuals from other ethnic backgrounds. In another cohort study [++][2] conducted in the United States those from African American, BME communities were less likely to adopt a healthy lifestyle.

[1] Dryden 2012; [2] King 2007

- **Applicability:** Partial applicability: One international review and one study conducted in USA.

## 4. DISCUSSION

Findings into context & implications of findings

This review sought to identify issues that prevent or limit the uptake and maintenance of healthy behaviours by people in midlife or from disadvantaged populations. A comprehensive search of the academic literature was undertaken and a large number of primary studies and systematic reviews were identified and included in this review. The evidence in this review comprises of 34 primary studies and 46 systematic reviews with data for adults in general and to midlife populations (men and women). We found a broad range of barriers and facilitators that either prevent or limit, or which help or motivate individuals to take up and maintain healthy behaviours in midlife. Evidence was found relating to barriers and facilitators to physical activity, diet and eating, smoking, alcohol, eye care and health behaviours in general, in particular in relation to prevention of cardiovascular disease. Evidence was sought, but not found, for other relevant health behaviours. The evidence found was derived from three types of studies: 1) primary qualitative studies of adults at midlife; 2) primary cohort studies that examined behavioural predictors of health behaviours at midlife; 3) systematic reviews of qualitative or quantitative studies in adults in general (from a broader age range than just midlife adults).

Gaps in evidence

Evidence directly applicable to the UK is scarce Few UK focused studies (primary studies n=2/34; reviews n=3/46) are included in the evidence statements; however, most of the available evidence is from OECD countries (European nations, USA, Canada, Australia and New Zealand). Evidence was found for men and women at midlife and for some disadvantaged groups. Problematically, there is a lack of evidence on barriers and facilitators of uptake or maintenance of healthy behaviours between and within populations, in particular there is a paucity of research in midlife for LGBT groups, travellers and other groups protected under the equality and diversity legislation. Where evidence is available, different subpopulations were researched for different health behaviours. For physical activity there was detailed information on people with disabilities, and relating to gender and ethnic minority groups. For diet, information for low socioeconomic status groups (including ethnic minority groups) was reported. For smoking, unemployed young adults were represented; and for lesbian women there is limited data relating to high levels of alcohol consumption. There is also data relating to gender and ethnicity for eye care and health behaviours in general.

Limitations of the review

Whilst the search strategy and inclusion criteria were broad in order to identify a significant number of barriers and facilitators, this review has several limitations. Firstly there is an issue

around the sample sizes of studies included in this review; qualitative studies in particular contained few participants compromising the generalizability of our findings to different setting and populations. It is also important to recognise that contexts and mechanisms will be different between and within communities and localities, and there is no method to reliably examine the extent to which these barriers and facilitators are transferrable between populations. This especially applies in relation to determining the magnitude of the impact of social and cultural determinants. Furthermore none of the quantitative survey or observational cohort studies recruited large samples reducing the reliability of statistical findings between associated barriers and facilitators. For many studies there was also an insufficient time period for follow-up, with many studies reporting periods of weeks or months rather than years; studies with greater duration are required to understand how the relationships between (change in) behavioural risks and health outcomes change through time.

Some systematic and narrative reviews included in this review contained both qualitative and quantitative studies. While mixed-methods reviews are not inherently biased, many reviews included quantitative cross-sectional studies; as cross-sectional studies assess variables at a single time point the reported associations are insufficient when trying to explain causality. To compensate for this we extracted and focused on longitudinal data as much as possible, without going back to individual primary studies.

Within all the papers (systematic reviews, qualitative and quantitative studies) included in this review there are both heterogeneous definitions and methods of operationalising individual a) behavioural risk factors and b) their associated health outcomes, this makes genuine comparison between studies problematic. There are also a number of limitations when measuring behaviours in that many are self-report and to some extent crudely measured, especially since the respondents may be asked about to recall alcohol consumption, smoking behaviours, physical activity and lifestyle conditions. Problematically this may result in biased differences in reported use, for example quantity of alcohol or tobacco consumed.

Potential impact on findings

A lack of UK studies means that most evidence statements are based on findings from studies conducted in other countries. While these are mainly developed OECD countries, different sociocultural, environmental and economic factors may influence health behaviours. The findings of this review based on cohort studies may also be limited by residual confounding, as they may have omitted some unknown confounders that were not controlled for; these unknown confounders may have affected their results.

## 5. Conclusion and recommendations

There are a number of factors in midlife that prevent or limit the uptake and maintenance of healthy behaviours, especially in individuals from disadvantaged populations. Information was found for physical activity, diet, smoking, alcohol, eye care and general health behaviours. The main barriers and facilitators identified in this review include sociocultural factors, the physical environment, availability and access to facilities and resources. In particular we observed that social factors (such as time and money) were more of a barrier to, than a facilitator of, sustainable healthy behavioural change. The most important appears to be time constraints, child care and finance as they cuts across several themes and populations. Another major barrier experienced was a lack of support for changing behaviour. This barrier created problems regarding take-up of the activity or exercise but also the ability to maintain behaviour change. Therefore, to achieve successful health behavioural changes, it is important to develop and maintain a social support structure based around the activity. This could increase an individual's self-efficacy and confidence and make it possible to achieve greater health outcomes while at the same time accommodating the preferences of those attempting to change their behaviours.

While it is preferable that healthy behaviours to be adopted in early in life, it is important to recognise that change can occur in mid-life; however due to the variety of factors within and between groups it is difficult to determine the relative importance of the factors identified in this review. It is also likely that many bespoke cultural and social barriers may not have been identified in the literature. Consequently, there is a level of uncertainty regarding transferability of findings between populations especially for those with limited financial and time resources. To facilitate healthy behavioural changes, this problem needs to be addressed on multiple levels in society. The current economic and political context imposes great challenges to those who are most vulnerable and there is a requirement to meet the needs of these populations.

In summary it could be interpreted that the barriers to behaviour change are more social and cultural rather than individual. This implies that healthy behavioural changes may be facilitated by removing societal barriers that prevent change rather than retaining a focus on individual and individual change; conversely it also implies that it may be difficult for individuals to substitute unhealthy behaviours with healthier alternatives if societal barriers are not removed or reduced significantly.

**Recommendations**

**Physical activity**

1. **Improve availability, accessibility and affordability of exercise and physical activity prescriptions:** Evidence suggests that the reintroduction of structured activity and exercise into lifestyles can be more acceptable if the individual enjoys and wants to do the activity (good wellbeing, energy, positive feelings or self-esteem and physical appearance were also motivating factors for physical activity in midlife populations). It is therefore important that a plurality of exercises and activity choices are available to the local population, also that those options of exercise and physical activity be driven by local need/priorities. In particular the provision of subsidised physical activity groups (i.e. local sports teams) and of subsidised gym membership for those with low socio-economic status and the most disadvantaged (including provision of services and information in languages other than English) may produce greatest benefit for those worst off; professionals may be needed to assist with the transition to community programmes.
2. **Improve availability, accessibility and affordability of family/social network exercise and physical prescriptions:** Evidence suggests that a lack of support prevents and limits individuals from taking up healthy behaviours. Conversely if an individual has a companion, role model or open community support also engaged in physical activity, healthy behaviours are more likely to be adopted and maintained. If there was an expansion in the availability of exercise groups it may be more beneficial to also involve the individual's family or social network.
3. **Improve availability of recreational spaces and community amenities:** Evidence suggests local amenities such as community gyms deter individuals due to social discomfort or self-consciousness about participation in physical activity programmes. These centres could be made more comfortable for a greater number of people (including culturally appropriate facilities/services), which may promote and maintain participation. There also needs to be an increase in the provision of health centres and gyms in the poorest communities to reduce commute time and travelling distances. Other improvements to the built environment include more buildings with wheelchair access, family changing rooms, and zero-depth entry pools (there would also be a need to increase provision of information for fitness professionals about adaptive equipment for those people with disabilities).
4. **Improve availability of internet services:** Evidence suggests that internet services are beneficial to some individuals, but not all, when attempting to change behaviour. There could be an increase in the provision of internet-based monitoring and reporting tools;

however these must be an adjunct to existing care packages and not seen or used as a replacement for services.

**Diet**

1. **Improve food labelling:** Evidence suggests that despite recent efforts there is still a level of uncertainty regarding healthier food choices. A combination of improved food labelling (to be more clear and simple), health messages around healthy eating and quantities of food that are sustainable (environmentally) and adequate (good portion sizes) may reduce intake.
2. **Expand workplace food choices:** Evidence suggests that poor food choices/availability in the workplace may be conducive to poor diet. There is therefore a need to improve workplace food choices and increase provisions of healthy options, for example, improving the availability of salads, fruits and vegetables.
3. **Subsidise healthier foods:** Evidence suggests that the price of food deters people from making healthier purchases. Guidelines should consider affordability of healthy foods through various mechanisms (e.g. subsidising healthier food options) to increase consumption of fresh fruit and vegetables across settings (e.g. work environment, green spaces, health centres etc.)
4. **Change the food environment:** Evidence suggests that poor food availability may encourage unhealthy eating. Consideration should be given to increasing community green spaces and create more community based gardens and farms for local production of foodstuffs (with provision of support or training to local community on gardening etc.).

**Smoking**

1. **Increase support:** There are inconsistent findings regarding sociocultural influences on smoking behaviours; however where evidence is strongest it suggests that the support provided by family and friends is important for supporting individual efforts to quit. An expansion in the availability of support groups may be more beneficial and reduce smoking levels.

**Alcohol**

1. **Community renovation programmes:** Social disturbance and concerns over safety have impacts on alcohol intake in poorer areas; investments in community renovation

programmes may reduce social disorders and in turn reduce both alcohol consumption and the harms of alcohol consumption.

2. **Reduce alcohol outlet density:** Evidence on the sociocultural influences of alcohol consumption is complex and the associations are not clear. However, it appears that the availability of alcohol may have an impact on consumption; it may be feasible to reduce alcohol outlet density, defined as shops, bars and restaurants in communities.
3. **Limits to advertising of alcohol:** Advertising also appears to have an impact on consumption and research suggests that limited exposure to the advertising of alcohol consumption may reduce intake.

**Eye care**

1. **Transport:** Research suggests that the lack of transport is an important factor for missing or not attending appointments for those with poor eye-sight. Subsidised transportation for those in low socio-economic groups and disadvantaged communities may increase attendance and improve outcomes.

**Health in general**

1. **Creation of community ventures:** The social environment impacts on both the uptake and maintenance of healthy or unhealthy behaviours. The creation of community ventures whose aim is to increase knowledge of health-promoting behaviours and lifestyle change with a focus on preventive medicine could be explored to help address social inequities which exist in the population.
2. **Alleviating caretaking responsibilities**: Evidence suggests that time constraints, conflicting demands of work, child care, family and household responsibilities prevent and limit individuals (particularly women) from engaging in healthy behaviours. The generation of structures for the alleviation of caretaking responsibilities and family obligations which will assist in health promotion is therefore required; such programmes could include expanding existing community-based childcare programmes.
3. **Redistribution of wealth and resource:** Evidence suggests that low socioeconomic status, low level of education and lower incomes have negative effects on health and prevent uptake of healthy behaviours. Careful consideration should be given to the potential for intervention generated inequalities in these highly heterogeneous groups and sub-groups of the population.

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