Physical activity and the environment

Review Four:

POLICY

NICE guideline PH8 (published January 2008) has been updated and replaced by NG90.

New recommendations have been added on strategies, policies and plans to increase physical activity in the local environment (1.1.1 to 1.1.3); active travel (1.2.1 to 1.2.4 and 1.2.6 to 1.2.9); public open spaces (1.3.1 to 1.3.3). NICE has deleted some recommendations from the 2008 guideline because the evidence has been reviewed and the recommendations have been updated.

This evidence review is relevant to the updated guideline.

See the guideline for more details.

NICE Public Health Collaborating Centre – Physical activity
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CONTENTS

Executive Summary

This report investigates the extent to which public policies on the environment, operating at either national or local levels, can influence changes in physical activity (or an outcome associated with physical activity).

Studies were included if they assessed the impact of a stated policy (from any public body including the government, or a private body such as employers) on an aspect of the physical environment, and related this either to a direct measure of physical activity, or an outcome closely related to physical activity (such as footpath use).

Three studies were included. These were cross-sectional 'post only' design that described the implementation of a policy (or policies) and related this to levels of physical activity. They varied in scale from international comparisons through to national and regional level. They were all uncontrolled post-intervention only studies that described changes to policy on the built or natural environment, and related these to changes in physical activity or in factors related to physical activity.

The studies that were identified by the broad search strategy tended to fall into three different categories, depending on their focus and level of operation:

- National policy on health and physical activity (Vuori 2004)
- National transport policy (Pucher & Djikstra 2000)
- National/ Regional planning policy (Schwanen et al 2004)

National policy on health and physical activity

The evidence from one (3-) study suggests there may be an association between national policies on physical activity which include a focus on improving the environment, and increased recreational physical activity and sport.

National transport policy

The evidence from one (3-) study suggests there may be an association between national transport related policies that include an environmental modification component and improved levels of walking and cycling compared to countries without such policies.

National/ Regional planning policy

The evidence from one (3-) study suggests there may be an association between national spatial planning policies and levels of walking and cycling, particularly in more urbanised areas.

Included studies

Pucher J,.Dijkstra L. Public health matters. Promoting safe walking and cycling to improve public health: lessons from the Netherlands and Germany. *American Journal of Public Health***2003 Sep; 93**:1509-16.

Schwanen T, Dijst M, Dieleman F M. Policies for urban form and their impact on travel: The Netherlands experience
Urban Studies. Mar 2004 41(3) pp579-603

Vuori I, Lankenau B, Pratt M. Physical activity policy and program development: the experience in Finland. *Public Health Reports* 2004;**119**:331-45.

1. Introduction

1.1. Background to this review

The National Institute for Health and Clinical Excellence ('NICE' or 'the Institute') has been asked by the Department of Health (DH) to develop guidance on a public health programme aimed at modifying the environmental factors that promote physical activity.

This guidance is in response to a number of developments in the fields of physical activity and public health in recent years, including:

- A growing recognition of the influence of the environment as a determinant of the behaviour of individuals and communities;
- A corresponding increase in published research on the environment and physical activity;
- A desire by public health professionals to work in partnership with local authorities and other key agencies on public health programmes;
- A need to complement interventions targeted at individuals with programmes that have the potential to have a larger population impact.

1.2. The need for guidance

1.2.1. Physical activity and ill health

Increasing activity levels will contribute to the prevention and management of over 20 conditions and diseases including coronary heart disease, diabetes, cancer, and weight management; and can help to improve mental health.

In 2004 the DH estimated the cost of inactivity in England to be £8.2 billion annually – including the rising costs of treating chronic diseases such as coronary heart disease and diabetes. The contribution of inactivity to obesity is estimated to cost a further £2.5 billion each year.

Around 35% of men and 24% of women (aged 16 plus) are physically active enough to meet the current national recommendations (achieving at least 30 minutes of at least moderate activity on 5 or more days a week). Seventy per cent of boys and sixty-one percent of girls aged 2-15 years achieve the recommended physical activity levels (at least 60 minutes of at least moderate intensity physical activity each day). Physical activity varies according to age, gender, class and ethnicity.

1.2.2. Trends in physical activity

Trends between Health Surveys for England in 1997, 1998, 2003 and 2004 found small increases in physical activity levels between 1997 and 2004 (Department of Health 2006). Other data from national travel surveys show that the distance people walk and cycle has declined significantly in the last three decades while travel by car has increased (Department for Transport, 1995; Department for Transport., 2005). Although there are limitations with these estimates, including the absence of published confidence intervals, the use of different questionnaire items and potential misclassification, there is concern about the generally low levels of physical activity undertaken by the population as a whole, and particular concern regarding the prevalence of participation amongst specific sub population groups (women, older adults, lower socio-economic class, minority ethnic groups).

1.2.3. Physical activity and the environment

The environment can influence people's ability to be active (Department of Health., 2004). For example, the design and layout of neighbourhoods, towns and cities can encourage or discourage access on foot or by bike, while building design can encourage (or discourage) the use of stairs. Access to parks, the countryside and other green space, as well as specific features of green space, can help people to be more active.

Many components of the environment can be modified by public sector agencies through changes to policy and practice. Action can be taken in partnership with workplaces or other key organisations. This review focuses specifically on

aspects of public policy that can be modified to help create environments that support physical activity.

1.3. The role of policy

1.3.1. Definition of policy

The term 'policy' refers to a statement of intent, or a plan of action, usually issued by an organisation (Wikipedia, 2006). Sallis et al (1998) defined policy for physical activity as 'Legislative, regulatory or policy-making actions that have the potential to affect physical activity'. Public health policy is diverse, covering areas such as: immunisation; water fluoridation; or health and safety regulations. Examples of legislation can be found in support of some of these areas of public health policy, (such as speed limits or health and social protection), but it is important to understand that policy and legislation are separate issues. Primary legislation is influenced by policy and will often simply be an expression of the policy of the government. However, in many cases public policy leads only to guidance – such as planning policy statements issued to local authorities.

1.3.2. The relationship between UK policy, the environment and physical activity

Since the late 1990s, UK policy documents have made reference to the role of the environment in promoting physical activity. As long ago as 1998 the New Deal for Transport (Dept for Transport 1998) was the first to recognise the impact that transport had on health. In later documents such as *Choosing Activity: a physical activity action plan* (Department of Health, 2005b), the environment was recognised as a means or setting for promoting physical activity.

Choosing Activity set out the contribution of the environment as (i) creating and maintaining a wide range of opportunities for activity through sport, (ii) ensuring high-quality, well targeted and attractive facilities for walking and cycling, (iii) continuing to make our public spaces and the countryside more accessible and attractive.

In *Choosing Activity*, the environment was placed in a supportive role, helping people build more active lifestyles, similar to one of the five principles of the 1986 Ottawa Charter for Health Promotion (World Health Organization, 1986). The environment can be seen to play a role through creating opportunities for physical activity by "the delivery of cleaner, safer and greener public spaces and improvement of the quality of the built environment in deprived areas", as outlined in the Public Service Agreement of the Office of the Deputy Prime Minister (ODPM) (Office of the Deputy Prime Minister, 2002). The environment could also promote walking and cycling for travel, a central policy of the Department of Transport's (DfT) walking and cycling action plan (Department of Transport, 2004). The policy describes the contribution of the environment to promoting walking and cycling via "access to well-maintained, safe walking and cycling routes, attractive and affordable leisure and sports facilities, playgrounds, parks and the countryside" (Department of Health, 2005a).

1.4. The nature of evidence on this topic

1.4.1. The nature of evidence on the environment

Over the past five years or so, there has been a shifting focus within the field of public health and physical activity to emphasise the importance of the physical environment. This has been reflected in the accumulation of a large body of evidence exploring which features of the environment are associated with different types of physical activity. Typically these studies use a cross sectional design, are undertaken in defined areas, may use new or existing behavioural data on physical activity and collect new environmental data, using either objective measures or perceptions of the environment. Some studies collect environmental data within a specific geographical area around the respondent's residential home. Much of the published work has been undertaken in developed countries, specifically in North America and Australia, and has mostly focussed on adult populations. Objective measures of the environment (e.g. traffic speed or volume) as well as subjective measures (e.g., perceived attractiveness or

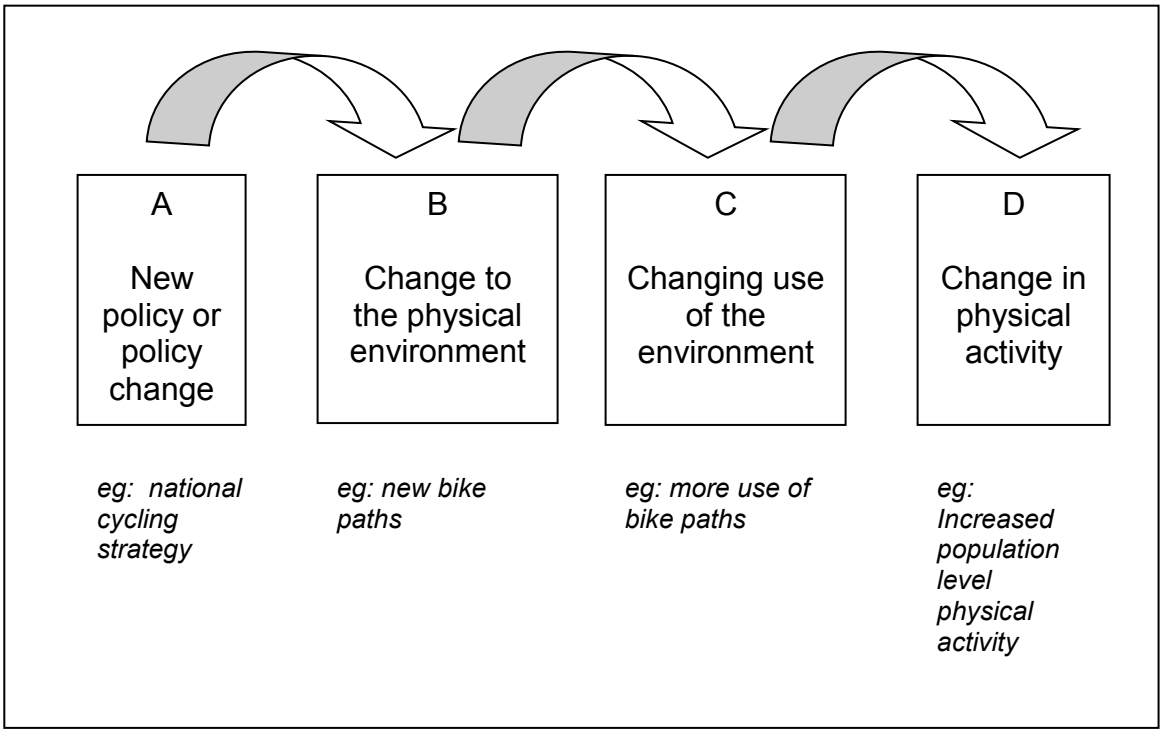
distance) can be used separately and in combination. To date, approximately 100 published papers reporting primary studies and 9 reviews of the area have been conducted along with one recent descriptive review of reviews (Gebel et al., 2005).

1.4.2. The nature of evidence on physical activity policy

As discussed in previous NICE programme reviews, there are specific methodological challenges associated with reviewing studies of the relationship between the environment and physical activity, and these extend to studies of the impact of policy interventions that aim to change the environment. For example, the search strategy needs to be broad enough to capture studies from non-traditional sources; the 'grey' literature may need to be searched; and account needs to be taken of a wider range of study types that tends to be used with more of a focus on descriptive case studies or post-only measures, increasing the risk of bias.

There is also a specific issue relating to any review of the literature on physical activity policy. The last 10 years or so has seen a growing interest in the influence of the environment on physical activity among physical activity researchers. This has led to an increase in articles studying what have been termed 'environment and policy interventions' (Sallis et al 1998). However, much of the literature tends to conflate the two issues of an environmental change (such as the building of a new bike path) with the policy change that preceded it (such as a cycle strategy or similar statement setting out the intention to promote cycling through building more bike paths). The vast majority of these studies do not specifically isolate the policy component of these interventions, but focus on the actual change to the physical environment. This makes it difficult to tease out the specific effect of any policy change. This review deliberately separates the two issues and ensures that the focus is on the components of public policy that might support effective interventions to promote physical activity through environmental change, or will provide a favourable background to the promotion of physical activity.

Fig 1. Conceptual model of physical activity promoting policy and the environment



This is illustrated in figure 1, which shows a conceptual model of how policy on the environment might be seen to influence levels of physical activity. Much of the 'policy and environment' literature identifies changes in physical activity (box D) or use of a specific aspect of the environment (box C) that have arisen due to a change in the physical environment (box B). But studies rarely look at the policies that led to these changes in the first place (box A).

1.5. Scope of the reviews

1.5.1. Aspects of the environment that will be covered

NICE guidance will be based on the findings from five reviews on specific aspects of the environment:

- Transport
- Urban planning and design
- The natural environment (urban and rural)

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- Building design
- National, regional or local policy influencing physical activity through the environment.

This report presents the findings from the policy review. This looks at the extent to which public policies, operating at either national or local levels, relating to the environment can influence changes in physical activity (or an outcome associated with physical activity). Environmental factors of particular focus for this review (see section 2.1.1) include safety, land use, aesthetics and access.

1.5.2. Population groups that will be covered

The general population, including both children and adults. The guidance will investigate the effectiveness of policy interventions across the broad social gradient, rather than focusing on those in the poorest circumstances and those in the poorest health.

1.5.3. Areas that will not be covered

The influence of national fiscal policy on physical activity levels.

1.5.4. Outcomes

The primary aim of this review is to produce material which will enable the PDG to develop recommendations for policy initiatives that will either support effective interventions to promote physical activity through environmental change or will provide a favourable background to the promotion of physical activity.

1.5.5. Review team

This review has been carried out by a team from the Public Health Collaborating Centre (CC) for Physical Activity. The Collaborating Centre is an alliance between the British Heart Foundation Health Promotion Research Group (University of Oxford) and the British Heart Foundation National Centre for Physical Activity and Health (Loughborough University).

2. Methodology

2.1. Literature Search

Literature searches were conducted using the terms and databases listed below. References were downloaded into a Reference Manager database and de-duplicated resulting in 12,623 references. Experts were contacted and personal files searched (resulting in an additional four references), and relevant web resources browsed, including Social Policy Digest (resulting in an additional 23 references). Searching all the databases took seven days in total.

2.1.1. Search terms

All search strategies were designed by the CC and NICE. Tailored search terms were used appropriate to a particular database. Search terms followed the same order (1) policy and environment terms and (2) physical activity terms. The review aimed to focus on the environmental factors of safety, land use, aesthetics and access, and the search terms reflected this. Typical search terms included:

policy, recommendation, strategy AND land use, safety, aesthetics, access, environment AND physical activity, exercise, sport, walk, running, jogging, bike or biking, rollerblading, rollerskating, skating, recreation, play.

A full search for MEDLINE is presented in Appendix C.

All searches were performed from January 1990 to the most recently published version of the database (July 2006).

2.1.2. Databases searched

Medline; Embase; Cinahl; PsycInfo; Global Health; HMIC; SIGLE; Cambridge Scientific Abstracts (CSA) Physical Education Index; CSA DAAI (Design and Applied Arts Index); CSA ERIC; PolicyFile; ISI Science Citation Index and Social Science Citation Index; Cochrane Library; SportDISCUS; PAIS International; Urbadoc

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2.1.3. Selection of studies for inclusion

The agreed search strategy resulted in 12,623 titles, which were initially screened for potential relevance by one person. Additionally, the Reference Manager databases containing the relevant citations from the four other NICE reviews (urban planning, building design, natural environment and transport) were searched to identify relevant citations regarding policy. Altogether, 805 citations were deemed to be potentially relevant in this initial screening stage.

The 805 titles and abstracts were screened a second time by the reviewer: 46 citations were found to be relevant, and the full papers requested for full paper screening.

The full papers were read by the lead reviewer and reviewed against the inclusion criteria. Studies were included if they assessed the impact of a stated policy (from any public body including the government, or a private body such as employers) on an aspect of the physical environment, and related this either to a direct measure of physical activity, or an outcome closely related to physical activity, such as footpath use. This was thought to be more appropriate for a review of public policies where an acceptable outcome might be an intermediate variable, and where physical activity might not be reported. However, no studies of this type were found, as studies either tended to describe a policy change, or describe the effect of an environmental change on physical activity, but rarely both. The three studies identified for inclusion in this review all contained a measure of physical activity. Physical activity measures varied in type and quality and included national level physical activity data, and measures of travel mode from national transport surveys.

The three included studies were cross-sectional 'post only' design that described the implementation of a policy (or policies) and related this to levels of physical activity. They varied in scale from international comparisons through to national and regional level.

Three papers that were requested for full paper screening were not available to be reviewed within the time available: in most cases this was due to the

reference being in a relatively unusual journal and not readily available through the British Library inter library loans system.

Appendix B shows the reasons for excluding studies. The main reason for exclusion of studies was that they did not explicitly focus on a policy intervention, or they described an environmental change and made only passing reference to the policy context. Many studies were 'thinkpieces' or descriptive review articles rather than intervention studies.

Table 1 Search strategy results by source

	Initial hits	**Total references identified as relevant**	**Studies requested to be reviewed against inclusion criteria**	**Data extraction and quality appraisal**	**Papers not available**
Main policy searches	11,912	456	32	3	3
Urbadoc: Accompline	165	36	5	0	
Urbadoc: Urbamet	196	8	1	0	
Urbadoc: other databases	350	0	0	0	
Citations from other NICE reviews	294	294	0	0	
Social policy digest	19	0	0	0	
Web	4	4	1	0	
Personal files/expert leads	4	4	4	0	
Citations from published reviews	3	3	3	0	
Total	**12,940**	**805**	**43**	**3**	**3**

2.2. *Study Type and Quality Appraisal*

Each study was categorised by study type (categorised as type 1-3) and graded for quality using a code '++', '+' or '-', based on the extent to which the potential sources of bias had been minimised (NICE, 2006b, p27.). The studies were categorised into the following study types:

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Type 1 Systematic reviews, meta-analyses of RCTs (randomised controlled trials), or RCTs

Type 2 Systematic reviews of, or individual, non-randomised controlled trials, case-control studies, cohort studies, controlled before-and-after (CBA) studies, interrupted time series (ITS) studies, correlation studies.

Type 3 Non-analytic studies (for example, case reports, case series studies, after only studies)

Studies were quality appraised against NICE quality criteria (NICE 2006) appropriate for study types, and subsequently classified into one of three categories (++, + or -).

NICE Quality Criteria

Does the study describes its methods and results
Where was the study published?
Who published the study?
Was the study peer reviewed?
Who funded the study?
Were the study samples shown to be representative of the study population in baseline and follow-up (where applicable)?
Was the method/instrument used to assess physical activity or travel mode appropriate to the research question(s) of the study? (i.e. capable of measuring the outcome under consideration)
Did the study provide details of the measures used?
Did the study take into account any potential confounders?

++ **All or most** of the data are adequately described and the conclusions of the study are thought very unlikely to alter (low risk of bias).

\+ **Some** of the data are adequately described and the conclusions of the study are thought unlikely to alter (risk of bias)

\- **Few or no** data are adequately described and the conclusions of the study are thought likely to alter (high risk of bias)

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No Type 1 or Type 2 studies were found. The three included studies were categorised as type 3. All studies were categorised as (-) quality. The main reasons for studies being assessed as (-) quality were that studies were unable to account for potential confounders: most were descriptive in nature and so were not able to attribute changes in physical activity directly to the effect of to the policy intervention in question.

2.3. Study categorisation

2.3.1. Description of studies

The three studies are described in Section 4 and presented in the Evidence Table. They were all uncontrolled post-intervention only studies that described changes to policy on the built or natural environment, and related these to changes in physical activity or in factors related to physical activity. The studies that were identified by the broad search strategy tended to fall into three different categories, depending on their focus and level of operation:

- National policy on health and physical activity (Vuori 2004)
- National transport policy (Pucher & Djikstra 2000)
- National/ Regional planning policy (Schwanen et al 2004)

2.3.2 Country of studies

Table 3 presents the studies by country and lead author.

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Table 3 Summary of studies by country under investigation

Country of origin	Authors
Finland	Vuori 2004
Netherlands, Germany, USA	Pucher & Djikstra 2000
Netherlands	Schwanen et al 2004

2.3.3 Length of outcome measures

All of the studies reported long term outcomes (over 12 months follow up).

The nature of policy research means that it is often extremely difficult to make firm conclusions about the link between the policy change in question and any changes in physical activity or intermediate outcome. In many cases it is necessary to rely on observed associations using cross sectional data.

2.4. Assessing applicability

Each study was assessed on its external validity: that is, whether or not it was directly applicable to the UK target population(s) and setting(s) outlined in the scope. This assessment took into account whether the study was conducted in the UK and any barriers to implementation in the UK identified by studies or the review team, with references as appropriate, (NICE, 2006).

2.5. Synthesis

It was not appropriate to use meta-analysis to synthesise the outcome data as interventions, methods and outcomes were heterogeneous. This review is restricted to a narrative overview of all studies that met the inclusion criteria and contained sufficient data for data extraction and quality assessment. The effects

of interventions were examined within the categories of the type of policy intervention, stratified by study quality. The evidence statements were developed using NICE criteria (NICE, 2006, p37), outlined below.

- The best available evidence of the effect of an intervention
- The strength (quality and quantity) of supporting evidence and its applicability to the populations and settings in question
- The consistency and direction of the evidence base

The policy interventions were constructed at a national level but also implemented at a regional or city levels. Evidence statements were drafted for each section but due caution should be taken in generalizing due to the limited number of studies. Indeed, to conclude there might be an effect on population levels of physical activity from the development and implementation of physical activity policies is speculative. All three papers in this review comment on this limitation. For example, Vuori et al (2004) state “it is impossible to conclude with any certainty what effect the applied policies and measures have on the observed trend” (p119). Despite this limitation all three papers attempted to assess if there was any relationship between the implementation of specific policies and levels of physical activity or active transport.

This review did not produce any evidence statements based upon cost-effectiveness data.

3. National policy on health and physical activity: summary of findings

3.1. The studies

The study included in this category is an analysis of national policies from a broad range of different sectors of government, including education, sports provision, health and transport. These multi-sectoral policies included some degree of supportive policy change towards the environment for physical activity. One (3-) Finnish study reported evidence of the effectiveness of national policy implementation upon physical activity outcomes.

Vuori et al (2004) assessed the influence of sports and physical activity policies (including policies relating to the environment) on national physical activity trends in Finland. The paper reported changes in self-reported levels of physical activity, between the 1970s and 2004, using annual public health surveys.

The study identifies supportive policy change across a broad range of sectors, including education and sport; the health sector; transport sector; and multisectoral policies. Many of these policy changes included a focus on the environment. Significant examples included:

- The Sports Act 1999, which led to the Ministry of Education directing a major proportion of state support for the construction and maintenance of sites for the promotion of physical activity for people in their daily environments (eg small parks; playgrounds; and cycle paths)

- The national health program *Health for All by the Year 2000* (1986), which recommended an increase in the availability of recreational areas and walking and cycling paths, and to develop land use and community planning to provide opportunities for all population groups to participate in physical activity in their own environments

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- The 1992 Ministry of Transport Finnish Cycling Policy, which set a goal to double the number of cycle trips made by Finns in seven years, by improving the conditions for cycling

- Renewed efforts by the Ministry of Transport in 2001 to focus on cycling with a new cycling policy; and a walking policy

- Multisectoral policies, notably the 2003 Government Resolution on Health Enhancing Physical Activity by the State Cabinet. This set out the obligation for municipalities to promote the well being of all residents, including through physical activity. The resolution includes principles that emphasise collaboration among government sectors, increased consideration of physical activity in land use and environmental planning.

3.2. Evidence of efficacy

One (3-) study, conducted in Finland, reported annual trend data for adult population levels of self reported physical activity between 1978 and 2002. Vuori et al (2004) reported a year on year increase in the proportions of adults (aged 15 to 64 years) reporting 2 or more occasions of at least 30 minutes leisure time physical activity in both women and men (62% of men, 66% of women in 2002 from 44% of men, 40% in 1978). Physical activity was also assessed in children and young people. The proportion of children and young people (3-18 years) reporting occasions of vigorous physical activity at least 4 times per week increased between 1995 to 2002, from 76% to 92%. The trend was similar for males and females within this age group. A slight increase (+4%) in the proportion of elderly adults (65-84 years) reporting their participation in physical activities (excluding walking) was reported between 1993 and 2001 . However, the authors also reported a decrease in the proportion of adults (15 to 64 years) taking at least 15 minutes per day to travel and at least 30 minutes per day to travel to and from work walking or cycling between 1978 and 2002.

Supportive evidence for the impact of these policies on the Finnish population comes from a number of evaluation studies reported in the paper. For example, a survey showed that the most popular venues for physical activity were outdoor

sites especially walking and cycling trails, used by at least nine out of ten Finns; and a study of perceptions among adults in Finnish regions showed that over 75% agreed with the statement that there are many possibilities in the vicinity of their residence to be physically active. The authors concluded 'the findings…indicate that policies promoting physical activity in Finland are perceived by the population as at least satisfactory'. Other possible confounding factors or social changes may have influenced the self reported levels of physical activity. One example could include an increase in the population's knowledge and awareness of the public health recommendations perhaps leading to over reporting of physical activity levels in the annual surveys.

In conclusion, Vuori et al (2004) present balanced and cautious conclusions regarding the impact of physical activity promotion policies on population increases in physical activity, and recognised the limitations of studies of this type. However their conclusions are strengthened by the consistent use of the same population physical activity measure over twenty years.

The evidence from one (3-) study suggests there may be an association between national policies on physical activity which include a focus on improving the environment, and increased recreational physical activity and sport.

3.3. Applicability (of evidence from efficacy studies) to UK population/setting.

It is difficult to assess the extent to which the data from this study are applicable to the UK population or setting. There are many cultural and political differences that may mean that the findings from this study are unique to the Finnish situation. However, it also may be likely that the study illustrates findings that are applicable to many other settings or countries. In the reviewers' opinions the central finding - that Finland's comprehensive approach to policy development has led to increases in physical activity - has important implications for policy in the UK.

3.4. Implementability of intervention.

As above, there are likely to be many cultural or political issues that affect implementation of policy on sport and physical activity at a national level. However there are also likely to be many aspects of policy that are directly transferable. For example the Finns created a strong policy commitment to integrate the promotion of physical activity across different national and local government sectors (e.g. health, education and transport). The Fit for Life campaign made an agreement with the Ministry of Education and the Ministry of Social Affairs and Health to start a five-year co-operation programme for the 40 to 60-year age group. Before this agreement, the Ministry of Social Affairs and Health had included physical activity and sport in its national programme “Health for All 2000”. The integration of physical activity promotion within national strategies allowed the national programme to support local physical activity promotion, with national support. This support stimulated and then reinforced the need for physical activity at the regional and local levels and could be used by local physical activity promoters to justify resources and commitment for local activity (see Foster (2000) for further details).

There are insufficient data reported in the paper to provide any more detailed analysis.

4. National transport policy on walking and cycling: summary of findings

4.1. The studies

The study in this category (Pucher and Dijkstra (2003) focused upon the development of national transport policies to support increased levels of walking and cycling. Pucher and Dijkstra (2003) examined the national differences between active travel and traffic fatality rates in the USA and Germany and The Netherlands. They examined the relationship between population levels of travel related walking and cycling and the presence of supportive policies to promote these behaviours. They described the types of policies adopted by Germany and the Netherlands that may have contributed to higher levels of walking and cycling and lower levels of fatalities. These policies could be implemented at national, regional and local level. Examples of policies related to spatial planning, urban design including land use, traffic calming and cycling provision, restrictions on car use, traffic education, traffic regulations and enforcement. Of all policies identified, those including an environmental modification component included:

- Better facilities for walking and cycling. For pedestrians this has included 'auto-free' (car free) zones that cover many city centres. For cyclists the most notable policies have been heavy investment in cycle facilities. From 1976 to 1996 the Dutch more than doubled the extent of their 'already massive' network of bike paths and lanes from 9,282km to 18,948km. From 1976 to 1995 the Germans almost tripled the extent of their bikeway network from 12,911km to 31,236km. Both countries also employ a number of engineering and planning measures to give bicycles priority over cars. (e.g. changes to road infrastructure by building cycle lanes).

- Traffic calming of residential neighbourhoods. In both the Netherlands and Germany, 30kph traffic calming is used on an area-wide basis, using physical barriers such as raised intersections or 'midblock street closures'.

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- Urban design orientated to people and not cars. New suburban developments in both the Netherlands and Germany are designed to provide safe and convenient pedestrian and bicycling access, and residential developments include facilities and services that can be reached easily on foot or by bike.

- Restrictions on motor vehicle use. Dutch and German cities restrict auto use not only through traffic calming, auto-free zones and dedicated rights-of-way for pedestrians and cyclists, but also lower general speed limits, and restrictions on parking.

Active travel behaviour and traffic fatalities were assessed using national travel survey data over multiple time points.

4.2. Evidence of efficacy

One (3-) international study examined the effects of policies for transport related walking and cycling on population rates of active travel and accidents. Pucher and Dijkstra (2003) assessed active travel behaviour using national travel survey data, and examined the variation of walking and cycling trips between countries. They compared the proportion of annual trips in urban areas made by walking and cycling in the USA, Canada and ten European countries (England and Wales, France, Italy, Switzerland, Germany, Austria, Sweden, Denmark and The Netherlands). The modal split for cycling and walking in the USA was 1% and 6% respectively, compared to 12% and 22% in Germany and 28% and 18% in The Netherlands. They reported the proportion of trips made in urban areas made by cycling and walking in the USA, Germany and the Netherlands, by age group, in 1995. They showed striking variations between the USA and other two European countries by age. For example in the USA for adults over 75 years the proportion of trips made in urban areas made by cycling and walking was 0.2% and 6%, 7% and 48% in Germany, and 24% and 24% in the Netherlands.

The study compared the pedestrian and cycling fatality and injury rates per trips and distance travelled between the three countries. Both fatality and injury rates

were considerably higher in the USA compared to Germany and The Netherlands. Trends in pedestrian and cycling fatalities were reported as a proportion of a baseline level taken in 1975 to 2001. The rate of fatalities fell across all three countries however the rate of decline was far steeper and finally much lower in Germany and The Netherlands compared to the USA.

Six categories of traffic related policy were identified based on their analysis of a range of publications, four of which included an environmental modification component:

- Better facilities for walking and cycling
- Traffic calming of residential neighbourhoods
- Urban design orientated to people and not cars
- Restrictions on motor vehicle use

The authors did not specify how these publications were selected or the methods to generate their categories. Furthermore, the impacts of policies were presented by listing the types of changes seen within each category but they did not outline which policies were relevant to which changes.

In conclusion, Pucher and Dijkstra (2003) present an argument that the presence of supportive policies for promotion of walking and cycling for transport is responsible for higher rates of these behaviours compare to the USA (presented as a country with unsupportive policy). Their approach makes this link overt and simplistic and unlike Vouri et al (2004) they do not present any limitations to their study method or conclusions.

The evidence from one (3-) study suggests there may be an association between national transport related policies that include an environmental modification component and improved levels of walking and cycling compared to countries without such policies.

Policy evidence review.

4.3. Applicability (of evidence from efficacy studies) to UK population/setting.

Data from the UK were included in the study, but there was no specific analysis of UK transport policy, and no comparison with policies of the Netherlands or Germany. It is therefore difficult to assess the extent to which these findings are applicable to the UK. As above, there is likely to be a high degree of cultural and political variation between countries that may influence the applicability of the evidence.

4.4. Implementability of intervention.

Many aspects of the policy approaches detailed above could be (and indeed are being) implemented in the UK. However it may be likely that it is matter of scale and emphasis: countries that have been successful at promoting safe walking and cycling appear to have given higher national priority to the issue.

5. National/ Regional planning policy: summary of findings

5.1. The studies

The study included in this category focused upon developing spatial and urban planning policies that had the potential to influence individual travel behaviour. These included policies related to land use mix and urban renewal.

Schwanen et al (2004) examined the impact that spatial policies and different urban forms in the Netherlands may have had on travel mode choice, and travel time and distance.. Non-motorised transport behaviour was assessed using national travel survey data, sampled within populations living in areas of different urban density.

The policies identified in the paper included:

- Policies to counter urban sprawl, including the accommodation of urban growth outside the existing cities in a number of designated overspill or 'growth centres';

- Investments in urban renewal, particularly in the old cores of the largest cities, focusing on the old private rental housing stock in the urban cores. This has led to the Big Cities Policy that includes the aim to renew and partially replace the social housing estates built in the 1950s and 1960s.

- A policy for the centralised location of firms that aimed to discourage the use of the private car and to promote the use of public transport together with cycling and walking.

5.2. Evidence of efficacy

One (3-) study examined the effects of these types of policies on active travel behaviour and travel time and distances at different level of urban density. Schwanen et al (2004) described an evaluation of the possible impacts of the

Netherlands' national physical planning policy on travel behaviour. They described four phases of planning between 1970 and 2000. They examined the possible impacts of these policies by comparing modal split by different areas of urbanisation. They examined modal split for commuting and shopping trips. Modal split by commuting and level of urbanisation for cycling was higher for adults living in more urbanised areas compared to less urbanised areas (32.1% v 22.6%). They reported a smaller difference between adults living in more urbanised areas for walking (5.2% and 4.0%). Modal split for shopping trips and level of urbanisation for cycling was slightly higher for adults living in more urbanised areas compared to less urbanised areas (33.8% v 30.0%). They reported a greater difference between adults living in more urbanised areas for walking as part of shopping trips (23.6% and 14.7%). They also compared the average daily travel distance (km) and time (minutes) per person for shopping activities, by cycling and walking. They reported that adults living in more urbanised areas travel further and longer by cycling for shopping trips. They reported a difference between the average distances walked for shopping trips by adults living in more urbanised areas compared to less urban areas, but no difference in time travelled.

The authors then summarised these findings against the possible impacts of national spatial planning policies in terms of travel efficiency/mode. These impacts were summarised in one of three categories. They concluded that policies related to retail planning (supporting centralised retails development) and urban renewal supported stimulation of cycling and walking. The authors argued that such policies also supported the development of integrated public transport systems within urban areas. Planning policies of the 1970's supporting decentralising living, shopping and employment development made a negative contribution to supporting cycling and walking trips.

In conclusion, Schwanen et al (2004) highlight the relationship between national spatial planning policies and their impacts on walking and cycling in areas where they were adopted differently. They draw tentative conclusions that in the areas

where the policies were adopted and implemented there are some positive effects on walking and cycling compared to non adopting areas. Their conclusions are strengthened by using trend data for travel behaviour and a clear method to identify comparison areas using geographical information systems (GIS) and urban density data.

The evidence from one (3-) study suggests there may be an association between national spatial planning policies and levels of walking and cycling, particularly in more urbanised areas.

5.3. Applicability (of evidence from efficacy studies) to UK population/setting.

This evidence is likely to be applicable to the UK, particularly in urbanised areas,with some significant adaptations to take account of the town planning and system in the UK, as well as the existing layouts of towns and cities.

5.4. Implementability of intervention.

Many aspects of the policy approaches detailed above could be (and indeed are being) implemented in the UK.

Evidence Tables

Category	Author and Date	Study design and research type/ quality	Research question	Study population, setting, country, sample size	Description of intervention	Length of follow-up	Physical activity outcome variables (inc measures)	Short term findings (<1 year)	Long term findings (>1 year)	Non physical activity outcomes	Confounders/ potential sources of bias	Applicable to the UK
National policy – health and physical activity	Vuori 2004	Post only 3 (-)	To describe the development of physical activity policies and programmes in Finland	Finland Country level Sample size not stated (nationally representative samples)	Ongoing development of national-level supportive physical activity policy including Sports Act; Finland on the Move Program; Government resolution on health.	Describes policy from 1995 to present Surveys 1970 – 2004	Self-assessed physical activity measured through successive population surveys.		Increase in the proportions of adults (aged 15 to 64 years) reporting 2 or more occasions of at least 30 minutes leisure time physical activity in both women and men (62% of men, 66% of women in 2002 from 44% of men, 40% in 1978). Proportion of children and young people (3-18 years) reporting occasions of vigorous physical activity at least 4 times per week increased between 1995 to 2002, from 76% to 92%. The trend was similar for males and females within this age group. Slight increase (+4%) in the proportion of elderly adults (65-84 years) reporting their participation in physical activities (excluding walking) was reported between 1993 and 2001 . Decrease in the proportion of adults (15 to 64 years) taking at least 15 minutes per day to travel and at least 30 minutes per day to travel to and from work walking or cycling between 1978 and 2002.	Increased opportunities for regular physical activity in Finns' daily living environments (as a result of Ministry of Education shift in funding policy) Increased consideration of physical activity in land use and environmental planning; inclusion of physical activity as an explicit part of municipal wellness policy (as a result of Government Resolution on Health Enhancing Physical Activity 2002)	Link between the policies and outcome measures of physical activity are speculative However their conclusions are strengthened by the consistent use of the same population physical activity measure over twenty years.	Possibly

Category	Author and Date	Study design and research type/ quality	Research question	Study population, setting, country, sample size	Description of intervention	Length of follow-up	Physical activity outcome variables (inc measures)	Short term findings (<1 year)	Long term findings (>1 year)	Non physical activity outcomes	Confounders/ potential sources of bias	Applicable to the UK
National transport policy on walking and cycling	Pucher et al (2003)	Post only study (3-)	To assess the effect of supportive transport policies on transport related cycling and walking and accident rates	Pedestrians and cyclists International comparisons between USA and European countries, with particular focus on The Netherlands and Germany Not reported	Impact of six categories of supportive policies Better facilities for walking and cycling Traffic calming of residential neighbourhoods Urban design orientated to people and not cars Restrictions on motor vehicle use Traffic education Traffic regulations and enforcement	The Netherlands & Germany 26 years 1975-2001	Modal choice for active transport, walking and cycling assessed using different methods of National Transport Surveys: USA used 1995 Nationwide Personal Transportation Survey and 2001 National Household Travel Survey. Germany used 1999 and 2002 German Ministry of Transportation data and German Institute of Economic Research data. The Netherlands used surveys from 2002 Statistics Netherlands and the Dutch Ministry of Transport 2002.	Not reported	Approximate differences in modal split for walking and cycling between USA, Germany and The Netherlands were reported. For walking the proportions were USA – 6%, Germany 22% and The Netherlands 18%, and for cycling were USA – 1%, Germany 12% and The Netherlands 28%. Greater levels of trips in urban areas cycling and walking were reported for both Germany and The Netherlands compared to the USA by age groups. Pedestrian and cycling fatalities and injuries were greater in the USA compared to Germany and The Netherlands.	Accident data on traffic fatalities and injuries. USA used 2002 US Department of Transportation and 2002 Center for Disease Control and Prevention data. Germany used data from the Federal Statistical Office and 2002 the Federal Traffic Institute. The Netherlands used surveys from 2002 Statistics Netherlands and the Dutch Ministry of Transport 2002.	Potential confounders not reported. Methods for transport surveys or selection of policies not reported Possible misclassification of modal share. Link between the policies and outcome measures of modal choice are speculative	Possibly

Category	Author and Date	Study design and research type/ quality	Research question	Study population, setting, country, sample size	Description of intervention	Length of follow-up	Physical activity outcome variables (inc measures)	Short term findings (<1 year)	Long term findings (>1 year)	Non physical activity outcomes	Confounders/ potential sources of bias	Applicable to the UK
National/ Regional policy – planning	Schwanen et al (2004)	Post only study (3-)	To assess the effect of Netherlands planning policy for individual travel behaviour	Pedestrians and cyclists Population survey sampled at different levels of urban form The Netherlands Sample size not reported	Impact of degree of urban form, as shaped by planning policies. These policies related to high density, a land use mix, and short distances to the urban core and suburban concentrations of employment or retailing.	1966 - 1998	Modal choice for active transport, walking and cycling, assessed using 1998 Netherlands National Travel Survey. Travel behaviour assessed for one day	Not reported	Greater levels of cycling and walking for commuting and shopping in areas of high urbanisation, as means of accessing public transport systems. Modal split by commuting and level of urbanisation for cycling was higher for adults living in more urbanised areas compared to less urbanised areas (32.1% v 22.6%). smaller difference between adults living in more urbanised areas for walking (5.2% and 4.0%). Modal split for shopping trips and level of urbanisation for cycling was slightly higher for adults living in more urbanised areas compared to less urbanised areas (33.8% v 30.0%). Greater difference between adults living in more urbanised areas for walking as part of shopping trips (23.6% and 14.7%). Adults living in more urbanised areas travel further and longer by cycling for shopping trips. Difference between the average distances walked for shopping trips by adults living in more urbanised areas compared to less urban areas, but no difference in time travelled.	Car use. This declined as a proportion of modal split in high urban areas for both commuting and shopping purposes	Link between the policies and outcome measures of modal choice are speculative	Yes

Appendix A – Included studies

Pucher J,.Dijkstra L. Public health matters. Promoting safe walking and cycling to improve public health: lessons from the Netherlands and Germany. *American Journal of Public Health***2003 Sep; 93**:1509-16.

Vuori I, Lankenau B, Pratt M. Physical activity policy and program development: the experience in Finland. *Public Health Reports* 2004;**119**:331-45.

Schwanen T, Dijst M, Dieleman F M. Policies for urban form and their impact on travel: The Netherlands experience
Urban Studies. Mar 2004 41(3) pp579-603

Appendix B – Excluded Studies

	Reference	Reason
1	Active for life campaign launched: physical activity strategy statement published. Ref ID: 4895	Not policy intervention
2	Walking forward. What government and local councils need to do to get people walking. 8. 1996. Pedestrians Policy Group (GB).	No interventions
3	Environmental and policy interventions. / Interventions politiques et environnementales. *Research file/Dossier de la recherche (Gloucester, Ont.)* 1999;1.	Descriptive review
4	Bikerail. A measure of the success of integrated transport policies. CA-CRN-41, 4. 2001. Countryside Agency, Cheltenham (GB).	Reference not available in time
5	Designing Communities for Active Living. *JOPERD - The journal of physical education, recreation & dance (Reston, VA)* 2004;**75**:8.	Not an intervention
6	Aytur SA. Land use and transportation planning to promote physical activity in North Carolina. *Carolina.Planning* 2006;**31**:19-23.	Reference not available in time
7	Babey SH, Brown ER, Hastert TA. Access to safe parks helps increase physical activity among teenagers. *Policy Brief (Ucla Center for Health Policy Research).(PB2005-10):1-6,* 2005.	Cross sectional
8	Bercovitz KL. Canada's Active Living Policy: a critical analysis.	Not environmental

		policy
9	Blair SN. Development Of Public Policy And Physical Actvity Initiatives Internationally. *Sports Medicine [Sports Med].vol.21***211**:157-63.	Not a policy intervention
10	Brownson RC, Schmid TL, King AC, Eyler AA, Pratt M, Murayi T *et al*. Support for policy interventions to increase physical activity in rural Missouri. *American Journal of Health Promotion.Vol.12(4)()(pp 263-266), 1998.* 1998;263-6.	Not a policy intervention
11	Brownson RC, Haire-Joshu D, Luke DA. Shaping the context of health: A review of environmental and policy approaches in the prevention of chronic diseases. *Annual Review of Public Health* 2006;**27**:341-70.	Not a policy intervention
12	Crane R,.Crepeau R. Does neighborhood design influence travel?: A behavioral analysis of travel diary and GIS data. *Transportation-Research-Part-D:-Transport-and-Environment* 1998;**3D**:225-38.	Not policy intervention
13	Felton G, Saunders RP, Ward DS, Dishman RK, Dowda M, Pate RR. Promoting physical activity in girls: a case study of one school's success. *Journal of School Health.75(2):57-62,* 2005.	Not a policy intervention
14	Foster C,.Hillsdon M. Changing the environment to promote health-enhancing physical activity. *Journal of Sports Sciences.22(8):755-69,* 2004.	Not a policy intervention
15	Frank LD,.Engelke PO. The built environment and human activity patterns: Exploring the impacts of urban form on public health. *Journal-of-Planning-Literature* 2001;**16** :202-18.	Review - Not a policy intervention
16	Gaffron P. The implementation of walking and cycling policies in British local authorities. *Transport-Policy* 2003;**10**:235-44.	Descriptive only
17	Gorman D, Douglas MJ, Conway L, Noble P, Hanlon P. Transport policy and health inequalities: a health impact assessment of Edinburgh's transport policy. *Public*	policy intervention but no outcomes

	Health.117(1):15-24, 2003.	reported
18	Handy, Susan L., Boarnet, Marlon G., Ewing, Reid, and Killingsworth, Richard E. How the built environment affects physical activity: Views from urban planning. [References]. 2002.	Not policy intervention
19	Heath GW, Brownson RC, Kruger J, Miles R, Powell KE, Ramsey LT. The Effectiveness of Urban Design and Land Use and Transport Policies and Practices to Increase Physical Activity: A Systematic Review. *Journal of Physical Activity & Health* 2006;**3**:S55-S76.	Review – no true policy interventions
20	Kahn EB, Ramsey LT, Brownson RC, Heath GW, Howze EH, Powell KE *et al*. The effectiveness of interventions to increase physical activity: A systematic review. *American Journal of Preventive Medicine.Vol.22(4 SUPPL.1)()(pp 73-107), 2002.* 2002;73-107.	Not a policy intervention
21	King AC, Jeffery RW, Fridinger F, Dusenbury L, Provence S, Hedlund SA *et al*. Environmental and policy approaches to cardiovascular disease prevention through physical activity: issues and opportunities. *Health Education Quarterly.22(4):499-511,* 1995.	Descriptive
22	Librett JJ, Yore MM, Schmid TL. Government, politics, and law. Local ordinances that promote physical activity: a survey of municipal policies. *American Journal of Public Health***2003 Sep; 93**:1399-403.	Descriptive only
23	Mackett RL. Policies to attract drivers out of their cars for short trips. *Transport-Policy* 2001;**8**:295-306.	Not a policy intervention (survey of public views)
24	Matson-Koffman DM, Browstein JN, Neiner JA, Greaney ML. A site-specific literature review of policy and environmental interventions that promote physical activity and nutrition for cardiovascular health: What works? *American Journal of Health Promotion*	Review. No true policy

	2005;**19**:167-93.	interventions – most conflate policy and environment
25	Mindell J, Sheridan L, Joffe M, Samson-Barry H, Atkinson S. Health impact assessment as an agent of policy change: improving the health impacts of the mayor of London's draft transport strategy. *Journal of Epidemiology & Community Health.58(3):169-74,* 2004.	Describes a HIA of a policy not the implementation of the policy
26	Perdue WC, Gostin LO, Stone LA. Public health and the built environment: historical, empirical, and theoretical foundations for an expanded role. [Review] [86 refs]. *Journal of Law, Medicine & Ethics.31(4):557-66,* 2003.	Review – no suitable studies
27	Pollard T. Policy prescriptions for healthier communities. *American Journal of Health Promotion.18(1):109-13,* 2003;-Oct.	Descriptive
28	Sallis JF, Bauman A, Pratt M. Environmental and policy interventions to promote physical activity. *American journal of preventive medicine (New York)* 1998;**15**:379-97.	Review
29	Sallis JF, Cervero RB, Ascher W, Henderson KA, Kraft MK, Kerr J. An ecological approach to creating active living communities. *Annual Review of Public Health* 2006;**Vol 27**:-322.	Not a policy intervention
30	Sturm R. Economics and physical activity: a research agenda. [Review] [34 refs]. *American Journal of Preventive Medicine* 2005;**28**:141-9.	No intervention

31	Wolff SP,.Gillham CJ. Public-Health Versus Public-Policy - An Appraisal of British Urban Transport Policy. *Public Health* 1991;**105**:217-28.	Not an intervention
32	Worthington A . A joined up approach to the promotion of physical activity and health Leisure Manager. Aug 2004 22(8) pp14-16	Descriptive
33	Sloman L, Pedestrians Policy Group. Walking forward: what government and local councils need to do to get people walking Source 1996.	Duplicate
34	Rauh W, Koch H, Skala F. European Federation for Transport and Environment. Greening urban transport: pedestrian and cycling policy. Oct 1994 33pp.	Reference not available in time
35	Dora C A different route to health: implications of transport policies Source British Medical Journal. 19 Jun 1999 318(7199).	Descriptive
36	J.M. Linenger, C.V. Chesson and D.S. Nice, Physical fitness gains following simple environmental change. *Am J Prev Med* **7** (1991), pp. 298–310.	Not policy
37	Roberts, S. Dench, J. Minten and C. York. *Community response to leisure centre provision in Belfast* Sports Council, London, UK (1989).	Too old (pre 1990)

38	I.M. Vuori, P. Oja and O. Paronen, Physically active commuting to work: testing its potential for exercise promotion. *Med Sci Sports Exerc* **26** (1994), pp. 844–850	Not policy
39	Bull FC, Bellew B, Schöppe S, Bauman AE. Developments in National Physical Activity Policy: an international review and recommendations towards better practice. Journal of Science and Medicine in Sport. 2004 Apr; 7(1) Suppl: 93-104.	review of general physical activity policies with no specific environment focus
40	Peel GR, Booth ML. Impact evaluation of the Royal Australian Air Force health promotion program. Aviat Space Environ Med. 2001 Jan;72(1):44-51.	Not environmental intervention
41	Bauman AE, Nelson DE, Pratt M, Matsudo V, Schoeppe S. Dissemination of physical activity evidence, programs, policies, and surveillance in the international public health arena. Am J Prev Med. 2006 Oct;31(4 Suppl):S57-65.	Not environmental policy
42	Transportation Research Board (2005). TRB Special Report 282: Does the Built Environment Influence Physical Activity? Examining the Evidence	Policy section descriptive
43	Foo MA, Robinson J, Rhodes M, Lew LS, Chao M, Dy SS *et al*. Identifying policy opportunities to increase physical activity in the Southeast Asian community in Long Beach, California. *Journal of Health Education* **1999 Mar-Apr; 30**:Suppl-63.	No outcome reported

Appendix C – Example search strategy

Policy search

OVID Medline

Policy terms

1. (policy or policies).tw.

2. recommendation$.tw.

3. (strategy or strategies).tw.

4. exp Public Policy/

5. exp Policy Making/

6. 1 or 2 or 3 or 4 or 5

Environment terms (focusing on land use, safety, aesthetics and access)

1. (land$ adj5 us$).tw.

2. (aesthetic$ or esthetic).tw.

3. exp Esthetics/

4. safety.tw.

5. exp Safety/

6. access.tw.

7. environment$.tw.

8. exp Environment Design/

9. Environment/

10. exp confined spaces/ or exp "conservation of natural resources"/ or exp environment, controlled/

11. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10

Physical activity terms

1. (physical adj5 (fit$4 or train$3 or activ$3 or endur$4)).tw.

2. (exercis$3 adj5 (fit$4 or train$3 or activ$3 or endur$4)).tw.

3. (leisure adj5 (centre$1 or center$1 or facilit$)).tw.

4. (fitness adj5 (centre$1 or center$1 or facilit$)).tw.

5. ((promot$ or uptak$ or encourag$ or increas$ or start$ or adher$) adj5 gym$).tw.

6. ((promot$ or uptak$ or encourag$ or increas$ or start$ or adher$) adj5 physical activit$).tw.

7. ((promot$ or uptak$ or encourag$ or increas$ or start$ or adher$) adj5 (circuits or aqua$)).tw.

8. ((promot$ or uptak$ or encourag$ or increas$ or start$ or adher$) adj5 exercis$).tw.

9. ((promot$ or uptak$ or encourag$ or increas$ or start$ or adher$) adj5 (keep fit or fitness class$ or yoga)).tw.

10. ((decreas$ or reduc$ or discourag$) adj5 (sedentary or deskbound)).tw.

11. sport$3.tw.

12. walk$3.tw.

13. running.tw.

14. jogging.tw.

15. bicycl$3.tw.

16. (bike$1 or biking).tw.

17. (swim$1 or swimming).tw.

18. (exercis$3 adj5 aerobic$1).tw.

19. rollerblading.tw.

20. rollerskating.tw.
21. skating.tw.
22. exertion$1.tw.
23. travel mode$1.tw.
24. trip$1.tw.
25. active travel$1.tw.
26. active transportation.tw.
27. multimodal transportation.tw.
28. recreation$1.tw.
29. stair$.tw.
30. exp Exertion/
31. Physical Fitness/
32. exp "Physical Education and Training"/
33. exp Dancing/
34. exp Sports/

35. exp Yoga/

36. pilates.tw.

37. Exercise Therapy/

38. exp Fitness Centers/

39. Recreation/

40. "Play and Playthings"/

41. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40

Combine 6 (policy) AND 11 (environment) AND 41 (physical activity)

Appendix D - Glossary

CBA	Controlled before and after
CPHE	Centre for Public Health Excellence
DfT	Department for Transport
DH	Department of Health
CC	Collaborating Centre
NHS	National Health Service
NICE	The National Institute for Health and Clinical Excellence
NSF	National service frameworks
PDF	Portable document format
PHCC	Public Health Collaborating Centre
PDG	Programme Development Group
QALY	Quality-adjusted life year
RCT	randomised controlled trial

Policy evidence review.

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