

## Protocol for evidence reviews

### Evidence reviews to support the guideline on:

#### Physical activity and the environment update

Stage	Date completed
Review team – draft	C. Haynes 04/07/2016
Review team – finalised	C. Haynes 04/07/2016
Quality assurance – approval	A. Harding 04/07/2016
Review team – revision	C. Haynes 04/07/2016

Guideline webpage	<a href="#">Physical activity and the environment update</a>
Scope available at	<a href="#">Physical activity and the environment update: Final scope</a>
Committee	PHAC C

#### ***IGD team and gIS Lead***

Adrienne Cullum

Karen Peploe

Diana O'Rourke

Alice Murray

Paul Levay

Protocol signed off by: Andrew Harding

Date: 4/7/16

### **Introduction**

This guideline will focus on interventions in the built or natural environment that encourage and support physical activity among all population groups, including those with restricted mobility. It will replace the NICE guideline on physical activity and the environment (PH8). Some recommendations from PH8 will be updated and some new areas will be considered. Some recommendations in PH8 will not be updated but will be included in the final guideline. This protocol focuses on the new areas and

the areas that will be updated. These include transport interventions and the design and accessibility of public open spaces, which involve changes to the built or natural environment to encourage and support physical activity. There will be particular consideration of any variation in effectiveness and cost effectiveness of interventions among those who are less able to be physically active. Further details are provided in the scope in sections 1.2 and 1.3.

Two evidence reviews will be undertaken to address each of the topic areas.

Evidence of cost effectiveness will be included in these two evidence reviews where available.

## **Review questions**

### **Topic 1: Transport interventions in the built or natural environment**

1. Which transport interventions are effective and cost-effective in encouraging and supporting physical activity in all population groups, including those less able to be physically active?
2. Does the effectiveness and cost effectiveness vary for different population groups in terms of encouraging and supporting physical activity? In particular, does this vary for those groups who are less able to be physically active, and if so how?
3. Are there any adverse or unintended effects of transport interventions in terms of (1) physical activity; and (2) other aspects of health and wellbeing?
  - a. Do these vary for different population groups, in particular those who are less able to be physically active?
  - b. How can the effects of any unintended or adverse effects be minimised?
4. What factors relating to transport interventions to encourage and support physical activity, ensure that interventions are acceptable to all groups, including those less able to be physically active?

5. Who needs to be involved to ensure that transport interventions are effective and cost-effective for everyone in encouraging and supporting them to be physically active, including those less able to be physically active?

**Topic 2: Design and accessibility of public open spaces in the built or natural environment**

6. Which interventions related to the design and accessibility of public open spaces are effective and cost-effective at encouraging and supporting physical activity in all population groups, including those less able to be physically active?
7. Does the effectiveness and cost effectiveness of interventions related to the design and accessibility of public open spaces vary for different population groups in terms of encouraging and supporting physical activity? In particular, does this vary for those groups who are less able to be physically active, and if so how?
8. Are there any adverse or unintended effects of interventions related to the design and accessibility of public open spaces in terms of (1) physical activity; and (2) other aspects of health and wellbeing?
  - a. Do these vary for different population groups, in particular those who are less able to be physically active?
  - b. How can the effects of any unintended or adverse effects be minimised?
9. What factors relating to interventions which focus on the design and accessibility of public open spaces ensure that interventions are acceptable to all groups, including those less able to be physically active?
10. Who needs to be involved to ensure that interventions related to the design and accessibility of public open spaces are effective and cost-effective for

everyone in encouraging and supporting them to be physically active, including those less able to be physically active?

A number of elements within the protocols are common across each question, namely:

- searches;
- methods for selecting evidence (data screening);
- data extraction and quality assessment;
- strategy for data synthesis;
- any other information or criteria for inclusion or exclusion;
- strategy to manage low numbers of references;
- analysis of subgroups or subsets.

To reduce repetition these details are provided in the section below.

<p>Searches</p>	<p><b>Overview</b></p> <p>The identification of evidence for this review will conform to the methods set out in chapter 5 of the “<a href="#">Developing NICE Guidelines Manual</a>” (October 2014). The purpose of the search is to identify the best available evidence to address the questions without producing an unmanageable volume of results.</p> <p>Relevant databases and websites will be searched systematically to identify relevant effectiveness, qualitative and cost effectiveness evidence. There will be a set of database searches covering all of the questions relating to transport and a separate set of searches covering all of the questions on open space.</p> <p>The following methods will be used to identify the evidence:</p> <ul style="list-style-type: none"> <li>• The databases and websites listed in Appendix 1 will be searched systematically.</li> <li>• Publications relevant to the review questions will be extracted from the Evidence Update, the consultation on the draft scope and submissions from topic experts, committee members, stakeholders and others.</li> <li>• Primary studies will be extracted from any systematic reviews identified during the search process if they are relevant to the review questions.</li> </ul> <p><b>Database strategies</b></p> <p>The database strategies will be adapted as appropriate from the ones used to inform PH8, taking into account the resources available to this project, the subscriptions that NICE has, changes in indexing policies and the final</p>	<p>A call for evidence will be considered to address any gaps in the evidence identified at the data screening stage. Advice will be sought from PHAC.</p>
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	<p>scope for these evidence reviews. The database strategies will take these broad approaches:</p> <p>Topic 1 (Physical activity AND Transport interventions) OR Named interventions AND 2006-2016 AND Limits</p> <p>Topic 2 Physical activity AND Open space interventions AND 2006-2016 AND Limits</p> <p>The principal database strategies are listed in Appendix 2. Feedback on the principal database strategies was sought from the PHAC members at meeting 0 in June 2016.</p> <p>The principal search strategies will be developed in MEDLINE (Ovid interface) and then adapted, as appropriate, for use in the other sources listed in Appendix 1, taking into account their size, search functionality and subject coverage.</p> <p><b>Limits</b> Database functionality will be used, where available, to exclude:</p> <ul style="list-style-type: none"><li>• non-English language papers</li><li>• animal studies</li><li>• editorials, letters and commentaries</li><li>• conference abstracts and posters</li><li>• theses and dissertations</li></ul>	
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	<ul style="list-style-type: none"><li>• duplicates.</li></ul> <p>Sources will be searched from 2006 to 2016. This was chosen as the start date because the searches for PH8 were conducted in 2006.</p> <p>The database search strategies will not use any study search filters, in order to retrieve effectiveness, qualitative and cost effectiveness evidence at the same time. Given the overlap between the questions, the review team may identify some papers relevant to the transport or open space topics in their search results and these should be tagged and passed to the other topic for further screening.</p> <p><b>Website searching</b></p> <p>The websites listed in Appendix 1 will be browsed or searched once and a single list of results will be produced relevant to both the transport and the open space questions. The websites are focussed on finding evidence from a UK setting.</p> <p>The websites will be browsed on screen and documents relevant to any of the review questions will be added to a Word document. The review team will make an initial screening decision using the Word file. Any items selected for inclusion or further investigation at this stage will be added to the EndNote file for the relevant topic (transport, open space or both).</p> <p><b>Quality assurance</b></p> <p>The guidance Information Services team at NICE will quality assure the principal database search strategies and peer review the other strategies.</p> <p>Any revisions or additional steps will be agreed by the review team before</p>	
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	<p>being implemented. Any deviations and a rationale for them will be recorded alongside the search strategies.</p> <p><b>Search results</b></p> <p>The database search results will be downloaded to EndNote before duplicates are removed using automated and manual processes. The de-duplicated file will be uploaded into EPPI-Reviewer for data screening.</p> <p>The final flowchart of the literature will be based on the total number of items added to EndNote.</p>	
<p>Selecting evidence (data screening)</p>	<p>Stage 1. Title abstract screening</p> <p>All references from the searches will be downloaded, de-duplicated and screened on title and abstract against the criteria below.</p> <p>A randomly selected initial sample of 10% of records will be screened by two reviewers independently. The rate of agreement for this sample will be recorded, and, as agreed internally, if it is over 90% then remaining references will be screened by one reviewer only. Disagreement will be resolved through discussion.</p> <p>Where abstracts meet all the criteria, or if it is unclear from the study abstract whether it does, the full text will be retrieved.</p> <p>Stage 2. Full text screening</p> <p>Full-text screening will be carried out by two reviewers independently on a 10% sample and any differences resolved by discussion. The rate of agreement for this sample will be recorded, and if it is over 90% then remaining references will be screened by one reviewer only. Disagreement will be resolved through discussion. Reasons for exclusion at full paper will be recorded. Inter-rater agreement will be recorded.</p>	
<p>Data extraction and</p>	<p>Data extraction of included studies will be conducted using approaches</p>	<p>If more papers are included</p>



<p>quality assessment</p>	<p>described in <a href="#">Developing NICE guidelines: the manual</a>. Each included study will be data extracted by 1 reviewer and the data extraction sheet will be confirmed by a second reviewer. Any differences will be resolved by discussion or recourse to a third reviewer.</p> <p>Quality assessment for all included studies will be conducted using the tools in <a href="#">Developing NICE guidelines: the manual</a>. Each included study will be quality assessed by 1 reviewer and checked by another. Any differences in quality grading will be resolved by discussion or recourse to a third reviewer.</p>	<p>at full text for a particular review question than can be managed within the time and resources available for the project, the following may be implemented, in consultation with the PHAC:</p> <ul style="list-style-type: none"> <li>• Prioritising evidence of higher quality (e.g. RCTs or nRCTs compared to observational studies) in terms of study design for the population as a whole as well as for each population group, in particular those who are less able to be physically active</li> <li>• Prioritising evidence with critical or highly important outcomes (dependent on review question)</li> <li>• Consideration of a date cut off (on advice of topic expert as available and appropriate)</li> </ul>
<p>Strategy for data synthesis</p>	<p>Data will be grouped and synthesised into concise evidence statements in line with <a href="#">Developing NICE guidelines: the manual</a>. See below for potential a priori groupings.</p>	

	<p>If sufficiently homogeneous data are located, meta-analysis will be conducted.</p> <p>Synthesis for qualitative evidence will be in line with the simple approach outlined in the manual i.e. ‘papers reporting on the same factors can be grouped together to compare and contrast themes, focusing not just on consistency but also on any differences. The narrative should be based on these themes’.</p>	
<p>Any other information or criteria for inclusion or exclusion</p>	<p>Exclude</p> <ul style="list-style-type: none"> <li>• The epidemiology of physical activity and health</li> <li>• Dissertations and theses</li> <li>• Opinion pieces (e.g. letters, editorials, commentaries)</li> <li>• Conference abstracts</li> <li>• Poster presentations</li> <li>• Not English language</li> <li>• Not EU / OECD countries (see <a href="http://www.oecd.org/about/membersandpartners/list-oecd-member-countries.htm">http://www.oecd.org/about/membersandpartners/list-oecd-member-countries.htm</a> and <a href="http://europa.eu/about-eu/countries/index_en.htm">http://europa.eu/about-eu/countries/index_en.htm</a>)</li> </ul> <p>Only include papers where the full text is available</p>	
<p>Strategy to manage low number of references</p>	<ul style="list-style-type: none"> <li>• Call for Evidence</li> <li>• Expert Testimony</li> </ul>	
<p>Analysis of subgroups or subsets</p>	<p>Where the evidence allows, subgroup analysis will be undertaken where appropriate. For example</p>	

	<ul style="list-style-type: none"><li>• Older people</li><li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li><li>• Gender, age, BME, disadvantaged populations, carers and other protected characteristics</li></ul>	
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Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
<b>Review question 1</b>	Which transport interventions are effective and cost-effective in encouraging and supporting physical activity in all population groups, including those less able to be physically active?	
Context and objectives	<p>To determine the effectiveness and cost effectiveness of interventions that focus on transport, including the planning and provision of walking and cycling routes, prioritising the needs of active transport users and the provision of public transport, to:</p> <ul style="list-style-type: none"> <li>• support and encourage people to build physical activity into their daily lives</li> <li>• increase opportunities for, and uptake of, formal or informal recreational activity</li> <li>• reduce sedentary time</li> <li>• increase the opportunity for, and uptake of, active travel such as walking or cycling (including the use of adapted cycles)</li> </ul>	
Types of study to be included/excluded	<p>Inclusions:</p> <p>Comparative studies including:</p> <ul style="list-style-type: none"> <li>• Randomised or non-randomised controlled trials</li> <li>• Before and after studies</li> <li>• Cohort studies</li> <li>• Case-control studies</li> </ul> <p>Economic studies:</p> <ul style="list-style-type: none"> <li>• Economic evaluations</li> <li>• Cost-utility (cost per QALY)</li> <li>• Cost benefit (i.e. Net benefit)</li> <li>• Cost-effectiveness (Cost per unit of effect)</li> <li>• Cost minimisation</li> </ul>	<ul style="list-style-type: none"> <li>• If there is a large number of includes for the question, evidence may be prioritised, where available, by study design (e.g. RCTs prioritised over observational studies) in consultation with PHAC. Where there is a lack of higher quality evidence for different population groups, in particular those who are less able to be</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• Cost-consequence</li> </ul>	<p>physically active, a lower quality of evidence may be considered.</p> <ul style="list-style-type: none"> <li>• It is unlikely that cross-sectional and other surveys will be included in the review unless there is an absence of other evidence. This will be agreed with PHAC as appropriate.</li> <li>• Systematic reviews will only be used as a source for primary evidence.</li> <li>• Only full economic analyses will be included – papers reporting costs only will be excluded.</li> </ul>
Participants/population	<p>Whole population (adults and children) with particular consideration of groups who are less able to be physically active including:</p> <ul style="list-style-type: none"> <li>• Older people</li> <li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li> </ul>	
Intervention(s)	Interventions which prioritise the needs of pedestrians, cyclists and	The following

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<p>users of other modes of active transport, including:</p> <ul style="list-style-type: none"> <li>• re-allocating road space to support physically active modes of transport such as cycling and walking e.g. shared road space</li> <li>• interventions that enable people with restricted mobility to be physically active by ensuring their local environments are accessible and can be used by all groups e.g. road crossing times, introduction/improvement of pedestrian crossings</li> <li>• planning and providing walking and cycling networks (such as Connect2), infrastructure links with existing networks and facilities e.g. signed only and segregated walking/cycle paths, wayfinding networks/signage, on-street cycle parking</li> <li>• public transport provision, networks, links and facilities (e.g. cycle parking)</li> <li>• parking restrictions and charges e.g. controlled parking zones, parking charges, waiting and loading restrictions</li> <li>• traffic-calming measures to restrict vehicle speeds e.g. sign only speed limits, physical interventions such as road humps and speed cushions</li> <li>• speed restrictions</li> <li>• road-user charging schemes e.g. congestion zones, local emission zones (LEZs)</li> <li>• temporary road closures e.g. ciclovia, ‘School Streets’</li> <li>• Other named interventions e.g. ‘Cycling Cities’, ‘Walking Cities’</li> </ul>	<p>interventions will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical activity as part of managing chronic or other conditions.</li> <li>• Interventions that aim to change individual behaviour by providing and encouraging people to take up activities that take place in the built or natural environment e.g. exercise classes, green gyms and organised walks.</li> <li>• Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers the design, deliver and promotion of interventions within the environment rather than changes to the physical environment itself.</li> <li>• Re traffic calming,</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
		<p>speed cushions and speed restrictions to be aware that may be overlap with PH31 and PH29</p>
<p>Comparator(s)/control</p>	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>• Other interventions</li> <li>• Status quo/do nothing/control</li> <li>• Time (before and after) or area (i.e. matched city a vs b) comparisons</li> </ul>	
<p>Outcome(s)</p>	<p>The outcomes that will be considered when assessing the impact on physical activity are:</p> <p>Primary outcomes:</p> <ul style="list-style-type: none"> <li>• total physical activity (as measured by e.g. time/distance/number of steps/levels of activity/levels of recommended PA)</li> <li>• total sedentary time (as measured by time)</li> <li>• Domain-specific physical activity levels (active travel or physical activity in everyday life (such as measures of walking, cycling or active play))</li> <li>• public transport use (as a proxy measure of physical activity)</li> </ul> <p>Secondary outcomes:</p> <ul style="list-style-type: none"> <li>• changes to road environment e.g. introduction of traffic calming measures</li> <li>• changes to transport (such as changes in modal share)</li> <li>• vehicle speeds</li> </ul>	<ul style="list-style-type: none"> <li>• Included studies should have an indicator of physical activity reported.</li> <li>• Included studies reporting any health outcomes will be noted in EPPI/the evidence tables and forwarded on to EMU for economic modelling and not for the purposes of this review.</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>car use</li> </ul>	

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
<b>Review question 2</b>	Does the effectiveness and cost effectiveness vary for different population groups in terms of encouraging and supporting physical activity? In particular, does this vary for those groups who are less able to be physically active, and if so how?	
Context and objectives	To determine any variation in the effectiveness and cost effectiveness of transport interventions (such as the planning and provision of walking and cycling routes, prioritising the needs of active transport users and the provision of public transport) between different population groups, in particular for groups who are less able to be physically active.	
Types of study to be included/excluded	<p>Inclusions:</p> <p>Comparative studies including:</p> <ul style="list-style-type: none"> <li>Randomised or non-randomised controlled trials</li> <li>Before and after studies</li> <li>Cohort studies</li> <li>Case-control studies</li> </ul> <p>Economic studies:</p> <ul style="list-style-type: none"> <li>Economic evaluations</li> <li>Cost-utility (cost per QALY)</li> <li>Cost benefit (i.e. Net benefit)</li> </ul>	<ul style="list-style-type: none"> <li>If there is a large number of includes for the question, evidence may be prioritised, where available, by study design (e.g. RCTs prioritised over observational studies) in consultation with PHAC. Where there is a lack of higher quality evidence for different</li> </ul>



Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• Cost-effectiveness (Cost per unit of effect)</li> <li>• Cost minimisation</li> <li>• Cost-consequence</li> </ul>	<p>population groups, in particular those who are less able to be physically active, a lower quality of evidence may be considered.</p> <ul style="list-style-type: none"> <li>• It is unlikely that cross-sectional and other surveys will be included in the review unless there is an absence of other evidence. This will be agreed with PHAC as appropriate.</li> <li>• Systematic reviews will only be used as a source for primary evidence.</li> <li>• Only full economic analyses will be included – papers reporting costs only will be excluded.</li> </ul>
Participants/population	<p>Whole population (adults and children) with particular consideration of groups who are less able to be physically active including:</p> <ul style="list-style-type: none"> <li>• Older people</li> <li>• People with disabilities including mental, physical, sensory and</li> </ul>	

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	learning impairments which impact on their ability to be physically active	
Intervention(s)	<p>Interventions which prioritise the needs of pedestrians, cyclists and users of other modes of active transport, including:</p> <ul style="list-style-type: none"> <li>• re-allocating road space to support physically active modes of transport such as cycling and walking e.g. shared road space</li> <li>• interventions that enable people with restricted mobility to be physically active by ensuring their local environments are accessible and can be used by all groups e.g. road crossing times, introduction/improvement of pedestrian crossings</li> <li>• planning and providing walking and cycling networks (such as Connect2), infrastructure links with existing networks and facilities e.g. signed only and segregated walking/cycle paths, wayfinding networks/signage, on-street cycle parking</li> <li>• public transport provision, networks, links and facilities (e.g. cycle parking)</li> <li>• parking restrictions and charges e.g. controlled parking zones, parking charges, waiting and loading restrictions</li> <li>• traffic-calming measures to restrict vehicle speeds e.g. sign only speed limits, physical interventions such as road humps and speed cushions</li> <li>• speed restrictions</li> <li>• road-user charging schemes e.g. congestion zones, local emission zones (LEZs)</li> <li>• temporary road closures e.g. ciclovia, ‘School Streets’</li> <li>• Other named interventions e.g. ‘Cycling Cities’, ‘Walking Cities’</li> </ul>	<p>The following interventions will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical activity as part of managing chronic or other conditions.</li> <li>• Interventions that aim to change individual behaviour by providing and encouraging people to take up activities that take place in the built or natural environment e.g. exercise classes, green gyms and organised walks.</li> <li>• Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers the design, deliver and promotion of interventions within the environment rather than changes to the</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
		<p>physical environment itself.</p> <ul style="list-style-type: none"> <li>• Re traffic calming, speed cushions and speed restrictions to be aware that may be overlap with PH31 and PH29</li> </ul>
Comparator(s)/control	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>• Other intervention</li> <li>• Status quo Time (before and after) or area (i.e. matched city a vs b) comparisons</li> </ul>	
Outcome(s)	<p>The following outcomes will be considered when assessing variation in factors such as age, disability, special needs:</p> <p>Primary outcomes:</p> <ul style="list-style-type: none"> <li>• total physical activity (as measured by e.g. time/distance/number of steps/levels of activity/levels of recommended PA)</li> <li>• total sedentary time (as measured by time)</li> <li>• Domain-specific physical activity levels (active travel or physical activity in everyday life (such as measures of walking, cycling or active play)).</li> <li>• public transport use (as a proxy measure of physical activity) according to factors such as age disability special needs etc</li> </ul> <p>Secondary outcomes:</p> <ul style="list-style-type: none"> <li>• car use according to factors such as age, disability, special</li> </ul>	<ul style="list-style-type: none"> <li>• Included studies should have an indicator of physical activity reported.</li> <li>• Included studies reporting any health outcomes will be noted in EPPI/the evidence tables and forwarded on to EMU for economic modelling and not for the purposes of this review.</li> </ul>

<b>Topic 1</b>	<b>Transport interventions in the built or natural environment</b>	
Component of protocol	Description	Additional comments
	needs etc	

<b>Topic 1</b>	<b>Transport interventions in the built or natural environment</b>	
Component of protocol	Description	Additional comments
<b>Review question 3</b>	<p>Are there any adverse or unintended effects of transport interventions in terms of (1) physical activity and (2) other aspects of health and wellbeing?</p> <p>a. Do these vary for different population groups, in particular those who are less able to be physically active?</p> <p>b. How can the effects of any unintended or adverse effects be minimised?</p>	
Context and objectives	To determine if transport interventions which encourage and support physical activity have any unintended or adverse effects in all groups, particularly in those groups that are less able to be physically active.	
Types of study to be included/excluded	<p>Inclusions:</p> <p>Comparative studies including:</p> <ul style="list-style-type: none"> <li>• Randomised or non-randomised controlled trials</li> <li>• Before and after studies</li> <li>• Cohort studies</li> <li>• Case-control studies</li> </ul> <p>Economic studies:</p>	<ul style="list-style-type: none"> <li>• If there is a large number of includes for the question, effectiveness evidence may be prioritised, where available, by study design (e.g. RCTs prioritised over observational studies) in consultation with PHAC. Where there is</li> </ul>

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	<ul style="list-style-type: none"> <li>• Economic evaluations</li> <li>• Cost-utility (cost per QALY)</li> <li>• Cost benefit (i.e. Net benefit)</li> <li>• Cost-effectiveness (Cost per unit of effect)</li> <li>• Cost minimisation</li> <li>• Cost-consequence</li> </ul> <p>Qualitative studies:</p> <ul style="list-style-type: none"> <li>• Focus groups</li> <li>• Interviews</li> </ul>	<p>a lack of higher quality evidence for different population groups, in particular those who are less able to be physically active, a lower quality of evidence may be considered.</p> <ul style="list-style-type: none"> <li>• It is unlikely that cross-sectional and other surveys will be included in the review unless there is an absence of other evidence. This will be agreed with PHAC as appropriate.</li> <li>• Systematic reviews will only be used as a source for primary evidence.</li> <li>• Only full economic analyses will be included – papers reporting costs only will be excluded.</li> </ul>

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		<p>Only qualitative studies from the UK which provide insight into the unintended consequences or adverse effects of specific interventions and how these vary by population group will be included. Studies will be limited to the UK (rather than EU/OECD countries as for effectiveness studies) as the context (national legislation, local government structures and powers etc) will be particularly relevant here.</p> <p>Qualitative studies which are linked to interventions identified through reviews 1 and 2 may be prioritised if the volume of studies is high. This would be agreed with PHAC.</p>
Participants/population	Whole population (adults and children) with particular consideration of	

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<p>groups who are less able to be physically active including:</p> <ul style="list-style-type: none"> <li>• Older people</li> <li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li> </ul>	
Intervention(s)	<p>Interventions which prioritise the needs of pedestrians, cyclists and users of other modes of active transport, including:</p> <ul style="list-style-type: none"> <li>• re-allocating road space to support physically active modes of transport such as cycling and walking e.g. shared road space</li> <li>• interventions that enable people with restricted mobility to be physically active by ensuring their local environments are accessible and can be used by all groups e.g. road crossing times, introduction/improvement of pedestrian crossings</li> <li>• planning and providing walking and cycling networks (such as Connect2), infrastructure links with existing networks and facilities e.g. signed only and segregated walking/cycle paths, wayfinding networks/signage, on-street cycle parking</li> <li>• public transport provision, networks, links and facilities (e.g. cycle parking)</li> <li>• parking restrictions and charges e.g. controlled parking zones, parking charges, waiting and loading restrictions</li> <li>• traffic-calming measures to restrict vehicle speeds e.g. sign only speed limits, physical interventions such as road humps and speed cushions</li> <li>• speed restrictions</li> <li>• road-user charging schemes e.g. congestion zones, local emission zones (LEZs)</li> </ul>	<p>The following interventions will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical activity as part of managing chronic or other conditions.</li> <li>• Interventions that aim to change individual behaviour by providing and encouraging people to take up activities that take place in the built or natural environment e.g. exercise classes, green gyms and organised walks.</li> <li>• Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• temporary road closures e.g. ciclovia, ‘School Streets’</li> <li>• Other named interventions e.g. ‘Cycling Cities’, ‘Walking Cities’</li> </ul>	<p>the design, deliver and promotion of interventions within the environment rather than changes to the physical environment itself.</p>
Comparator(s)/control	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>• Other intervention</li> <li>• Status quo</li> </ul> <p>Time (before and after) or area (i.e. matched city a vs b) comparisons</p>	
Outcome(s)	<p><u>From comparative studies</u></p> <p>Indicators of physical activity and variation in these according to factors such as age, disability, special needs:</p> <ul style="list-style-type: none"> <li>• decrease in total physical activity</li> <li>• increase in total sedentary time</li> <li>• decrease in domain-specific physical activity levels</li> <li>• decrease in public transport use (as a proxy measure of physical activity)</li> </ul> <p>Other aspects of health and wellbeing and variation in these according to factors such as age, disability, special needs, including:</p> <ul style="list-style-type: none"> <li>• Rates/numbers of accidents, injuries or fatalities e.g. road traffic accidents, falls</li> </ul>	<ul style="list-style-type: none"> <li>• Included studies should have an indicator of physical activity reported.</li> <li>• Included studies reporting any health outcomes will be noted in EPPI/the evidence tables and forwarded on to EMU for economic modelling and not for the purposes of this review.</li> </ul>



Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<p><u>From qualitative studies</u></p> <p>Adverse/unintended effects of interventions in terms of:</p> <ul style="list-style-type: none"> <li>• Intentions to be physically active</li> <li>• Perceptions (such as barriers, stigma, safety, isolation, feeling of exclusion, lack of sense of belonging and connectedness, increased fear of crime)</li> </ul>	

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
<b>Review question 4</b>	What factors relating to transport interventions to encourage and support physical activity, ensure that interventions are acceptable to all groups, including those less able to be physically active?	
Context and objectives	To identify any factors relating to transport interventions that may facilitate the uptake of opportunities to be physically active or conversely prevent uptake of those opportunities. In particular to identify factors which may facilitate uptake by one group but in doing so create barriers for others.	
Types of study to be included/excluded	<p>Inclusions:</p> <p>Qualitative studies:</p> <ul style="list-style-type: none"> <li>• Focus groups</li> <li>• Interviews</li> </ul>	<p>Exclusions:</p> <ul style="list-style-type: none"> <li>• All quantitative studies</li> <li>• Systematic reviews will only be included as a source for primary evidence.</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
		<p>Only qualitative studies from the UK which provide insight into the unintended consequences or adverse effects of specific interventions and how these vary by population group will be included. Studies will be limited to the UK (rather than EU/OECD countries as for effectiveness studies) as the context (national legislation, local government structures and powers etc) will be particularly relevant here.</p> <p>Qualitative studies which are linked to interventions identified through reviews 1 and 2 may be prioritised if the volume of studies is high. This would be agreed with PHAC.</p>
Participants/population	Whole population (adults and children) with particular consideration of groups who are less able to be physically active including:	

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• Older people</li> <li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li> </ul>	
Intervention(s)	<p>Interventions which prioritise the needs of pedestrians, cyclists and users of other modes of active transport, including:</p> <ul style="list-style-type: none"> <li>• re-allocating road space to support physically active modes of transport such as cycling and walking e.g. shared road space</li> <li>• interventions that enable people with restricted mobility to be physically active by ensuring their local environments are accessible and can be used by all groups e.g. road crossing times, introduction/improvement of pedestrian crossings</li> <li>• planning and providing walking and cycling networks (such as Connect2), infrastructure links with existing networks and facilities e.g. signed only and segregated walking/cycle paths, wayfinding networks/signage, on-street cycle parking</li> <li>• public transport provision, networks, links and facilities (e.g. cycle parking)</li> <li>• parking restrictions and charges e.g. controlled parking zones, parking charges, waiting and loading restrictions</li> <li>• traffic-calming measures to restrict vehicle speeds e.g. sign only speed limits, physical interventions such as road humps and speed cushions</li> <li>• speed restrictions</li> <li>• road-user charging schemes e.g. congestion zones, local emission zones (LEZs)</li> <li>• temporary road closures e.g. ciclovia, ‘School Streets’</li> <li>• Other named interventions e.g. ‘Cycling Cities’, ‘Walking Cities’</li> </ul>	<p>The following interventions will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical activity as part of managing chronic or other conditions.</li> <li>• Interventions that aim to change individual behaviour by providing and encouraging people to take up activities that take place in the built or natural environment e.g. exercise classes, green gyms and organised walks.</li> <li>• Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers the design, deliver and promotion of interventions within</li> </ul>

<b>Topic 1</b>	<b>Transport interventions in the built or natural environment</b>	
Component of protocol	Description	Additional comments
		the environment rather than changes to the physical environment itself.
Comparator(s)/control	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>• Other intervention</li> <li>• Status quo</li> </ul> <p>Time (before and after) or area (i.e. matched city a vs b) comparisons</p>	
Outcome(s)	<ul style="list-style-type: none"> <li>• Intentions (e.g. to be physically active)</li> <li>• Perceptions (e.g. feelings of inclusion, increased sense of belonging and connectedness, increased sense of safety, reduced fear of crime)</li> <li>• Preferences (e.g. for different modes of transport)</li> <li>• Knowledge / Attitudes / beliefs (e.g. of interventions)</li> <li>• Acceptability of interventions</li> </ul>	

<b>Topic 1</b>	<b>Transport interventions in the built or natural environment</b>	
Component of protocol	Description	Additional comments
<b>Review question 5</b>	Who needs to be involved to ensure that transport interventions are effective and cost-effective for everyone in encouraging and supporting them to be physically active (including those less able to be physically active)?	
Context and objectives	To determine what the key characteristics of the people involved in the development and delivery of transport interventions (e.g. job roles and competencies) are which affect an intervention's effectiveness and cost effectiveness.	

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
Types of study to be included/excluded	<p>Inclusions:</p> <p>Comparative studies including:</p> <ul style="list-style-type: none"> <li>• Randomised or non-randomised controlled trials</li> <li>• Before and after studies</li> <li>• Cohort studies</li> <li>• Case-control studies</li> </ul> <p>Economic studies:</p> <ul style="list-style-type: none"> <li>• Economic evaluations</li> <li>• Cost-utility (cost per QALY)</li> <li>• Cost benefit (i.e. Net benefit)</li> <li>• Cost-effectiveness (Cost per unit of effect)</li> <li>• Cost minimisation</li> <li>• Cost-consequence</li> </ul> <p>Qualitative studies:</p> <ul style="list-style-type: none"> <li>• Focus groups</li> <li>• Interviews</li> </ul>	<ul style="list-style-type: none"> <li>• If there is a large number of includes for the question, effectiveness evidence may be prioritised, where available, by study design (e.g. RCTs prioritised over observational studies) in consultation with PHAC. Where there is a lack of higher quality evidence for different population groups, in particular those who are less able to be physically active, a lower quality of evidence may be considered.</li> <li>• It is unlikely that cross-sectional and other surveys will be included in the review unless there is an absence of other evidence. This will be agreed with PHAC as appropriate.</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
		<ul style="list-style-type: none"> <li>• Systematic reviews will only be used as a source for primary evidence.</li> <li>• Only full economic analyses will be included – papers reporting costs only will be excluded.</li> </ul> <p>Only qualitative studies from the UK which provide insight into the unintended consequences or adverse effects of specific interventions and how these vary by population group will be included. Studies will be limited to the UK (rather than EU/OECD countries as for effectiveness studies) as the context (national legislation, local government structures and powers etc) will be particularly relevant here.</p> <p>Qualitative studies which</p>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
		are linked to interventions identified through reviews 1 and 2 may be prioritised if the volume of studies is high. This would be agreed with PHAC.
Participants/population	<p>Whole population (adults and children) with particular consideration of groups who are less able to be physically active including:</p> <ul style="list-style-type: none"> <li>• Older people</li> <li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li> </ul>	
Intervention(s)	<p>Interventions which prioritise the needs of pedestrians, cyclists and users of other modes of active transport, including:</p> <ul style="list-style-type: none"> <li>• re-allocating road space to support physically active modes of transport such as cycling and walking e.g. shared road space</li> <li>• interventions that enable people with restricted mobility to be physically active by ensuring their local environments are accessible and can be used by all groups e.g. road crossing times, introduction/improvement of pedestrian crossings</li> <li>• planning and providing walking and cycling networks (such as Connect2), infrastructure links with existing networks and facilities e.g. signed only and segregated walking/cycle paths, wayfinding networks/signage, on-street cycle parking</li> <li>• public transport provision, networks, links and facilities (e.g. cycle parking)</li> <li>• parking restrictions and charges e.g. controlled parking zones, parking charges, waiting and loading restrictions</li> <li>• traffic-calming measures to restrict vehicle speeds e.g. sign only</li> </ul>	<p>The following interventions will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical activity as part of managing chronic or other conditions.</li> <li>• Interventions that aim to change individual behaviour by providing and encouraging people to take up activities that take place in the built or natural environment e.g. exercise classes,</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<p>speed limits, physical interventions such as road humps and speed cushions</p> <ul style="list-style-type: none"> <li>• speed restrictions</li> <li>• road-user charging schemes e.g. congestion zones, local emission zones (LEZs)</li> <li>• temporary road closures e.g. ciclovia, ‘School Streets’</li> <li>• Other named interventions e.g. ‘Cycling Cities’, ‘Walking Cities’</li> </ul>	<p>green gyms and organised walks.</p> <ul style="list-style-type: none"> <li>• Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers the design, deliver and promotion of interventions within the environment rather than changes to the physical environment itself.</li> <li>• Re traffic calming, speed cushions and speed restrictions to be aware that may be overlap with PH31 and PH29</li> </ul>
<p>Comparator(s)/control</p>	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>• Other interventions</li> <li>• Status quo/do nothing/control</li> <li>• Time (before and after) or area (i.e. matched city a vs b) comparisons</li> </ul>	
<p>Outcome(s)</p>	<p>The outcomes that will be considered when assessing the impact on physical activity are:</p> <p>Primary outcomes:</p> <ul style="list-style-type: none"> <li>• total physical activity (as measured by e.g. time/distance/number of steps/levels of activity/levels of</li> </ul>	<ul style="list-style-type: none"> <li>• Included effectiveness studies should have an indicator of physical activity reported.</li> <li>• Included studies</li> </ul>



Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<p>recommended PA)</p> <ul style="list-style-type: none"> <li>• total sedentary time (as measured by time)</li> <li>• Domain-specific physical activity levels (active travel or physical activity in everyday life (such as measures of walking, cycling or active play))</li> <li>• public transport use (as a proxy measure of physical activity)</li> </ul> <p>Secondary outcomes:</p> <ul style="list-style-type: none"> <li>• changes to road environment e.g. introduction of traffic calming measures</li> <li>• changes to transport (such as changes in modal share)</li> <li>• vehicle speeds</li> <li>• car use</li> </ul> <p>Qualitative outcomes:</p> <ul style="list-style-type: none"> <li>• Perceptions (e.g. of the key characteristics of the people involved in the development and delivery of transport interventions which make them effective)</li> <li>• Preferences (e.g. for the person delivering the intervention)</li> </ul> <p>Descriptive outcomes:</p> <ul style="list-style-type: none"> <li>• Key characteristics of the people involved in the development and delivery of transport interventions which make them effective e.g. job roles, competencies</li> </ul>	<p>reporting any health outcomes will be noted in EPPI/the evidence tables and forwarded on to EMU for economic modelling and not for the purposes of this review.</p>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
<b>Review question 6</b>	Which interventions related to the design and accessibility of public open spaces are effective and cost-effective at encouraging and supporting physical activity in all population groups, including those less able to be physically active?	
Context and objectives	<p>To determine the effectiveness and cost effectiveness of interventions that focus on the design and accessibility of public open spaces (such as access by public transport, on foot, by bicycle and using other modes of physically active transport and through ensuring open spaces are managed maintained safe and welcoming to everyone), which may result in:</p> <ul style="list-style-type: none"> <li>• supporting and encouraging people to build physical activity into their daily lives</li> <li>• increasing opportunities for, and uptake of, formal or informal recreational activity</li> <li>• reducing sedentary time</li> <li>• increasing the opportunity for, and uptake of, active travel such as walking or cycling (including the use of adapted cycles)</li> </ul>	
Types of study to be included/excluded	<p>Inclusions:</p> <p>Comparative studies including:</p> <ul style="list-style-type: none"> <li>• Randomised or non-randomised controlled trials</li> <li>• Before and after studies</li> <li>• Cohort studies</li> </ul>	<ul style="list-style-type: none"> <li>• If there is a large number of includes for the question, evidence may be prioritised, where available, by study design (e.g.</li> </ul>

<sup>1</sup> Public open spaces in the built and natural environment include open urban spaces (such as the external areas of buildings and open 'grey' space e.g. urban squares and pedestrianised areas), green spaces (such as urban parks, open green areas, woods and forests, coastland and countryside, and paths and routes connecting them) and blue spaces (including the sea, lakes, rivers and canals).

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• Case-control studies</li> </ul> <p>Economic studies:</p> <ul style="list-style-type: none"> <li>• Economic evaluations</li> <li>• Cost-utility (cost per QALY)</li> <li>• Cost benefit (i.e. Net benefit)</li> <li>• Cost-effectiveness (Cost per unit of effect)</li> <li>• Cost minimisation</li> <li>• Cost-consequence</li> </ul>	<p>RCTs prioritised over observational studies) in consultation with PHAC. Where there is a lack of higher quality evidence for different population groups, in particular those who are less able to be physically active, a lower quality of evidence may be considered.</p> <ul style="list-style-type: none"> <li>• It is unlikely that cross-sectional and other surveys will be included in the review unless there is an absence of other evidence. This will be agreed with PHAC as appropriate.</li> <li>• Systematic reviews will only be used as a source for primary evidence.</li> <li>• Only full economic analyses will be</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
		included – papers reporting costs only will be excluded.
Participants/population	<p>Whole population (adults and children) with particular consideration of groups who are less able to be physically active including:</p> <ul style="list-style-type: none"> <li>• Older people</li> <li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li> </ul>	
Intervention(s)	<ul style="list-style-type: none"> <li>• Access to open spaces by public transport, on foot, by bicycle or using other forms of active transport (such as Connect2)</li> <li>• Connections between open spaces through traffic-free networks of footpaths, trails or cycle routes (such as green corridors)</li> <li>• Maintenance and management, conservation or landscaping of open spaces</li> <li>• Facilities in open spaces such as accessible toilets, shelter, signage, accessible parking</li> <li>• Safety of open spaces, for example through layout, lighting or security</li> <li>• Regeneration projects</li> <li>• Street and neighbourhood design</li> <li>• Named interventions that involve changes to the design and accessibility of public open spaces, such as Healthy Towns/Healthy New Towns, Age Friendly Cities, Urban 40 project, Olympic parks, Pocket Parks, Play Streets, Healthy Streets</li> </ul>	<p>The following interventions related to the design and accessibility of public open spaces will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical activity as part of managing chronic or other conditions.</li> <li>• Interventions that aim to change individual behaviour by providing and encouraging people to take up activities that take place in the built or natural environment</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
		<p>e.g. exercise classes, green gyms and organised walks.</p> <ul style="list-style-type: none"> <li>Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers the design, deliver and promotion of interventions within the environment rather than changes to the physical environment itself.</li> </ul>
Comparator(s)/control	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>Other intervention</li> <li>Status quo</li> </ul> <p>Time (before and after) or area (i.e. matched area a vs b)</p>	
Outcome(s)	<p>The outcomes that will be considered when assessing the impact on physical activity are:</p> <p>Primary outcomes:</p> <ul style="list-style-type: none"> <li>total physical activity (as measured by e.g. time/distance/number of steps/levels of activity/levels of recommended PA)</li> <li>total sedentary time (as measured by time)</li> </ul> <p>Domain-specific physical activity levels (active travel or physical activity in everyday life (such as measures of walking,</p>	<ul style="list-style-type: none"> <li>Included studies should have an indicator of physical activity reported.</li> <li>Included studies reporting any health outcomes will be noted in EPPI/the evidence tables and forwarded on to EMU for economic</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
	<p>cycling or active play)).</p> <ul style="list-style-type: none"> <li>• public transport use (as a proxy measure of physical activity)</li> </ul> <p>Intermediate outcomes:</p> <ul style="list-style-type: none"> <li>• changes to urban planning</li> <li>• changes to transport (such as changes in modal share)</li> <li>• changes to the infrastructure for both green and blue spaces</li> <li>• access to and use of natural environment including green and blue space</li> <li>• access to grey space</li> </ul>	<p>modelling and not for the purposes of this review.</p>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
<b>Review question 7</b>	<p>Does the effectiveness and cost effectiveness of interventions related to the design and accessibility of public open spaces vary for different population groups in terms of encouraging and supporting physical activity? In particular, does this vary for those groups who are less able to be physically active, and if so how?</p>	
Context and objectives	<p>To determine any variation in the effectiveness and cost effectiveness of interventions related to the design and accessibility of public open spaces, between different population groups, in particular for groups who are less able to be physically active.</p>	
Types of study to be included/excluded	Inclusions:	<ul style="list-style-type: none"> <li>• If there is a large number of includes for</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
	<p>Comparative studies including:</p> <ul style="list-style-type: none"> <li>• Randomised or non-randomised controlled trials</li> <li>• Before and after studies</li> <li>• Cohort studies</li> <li>• Case-control studies</li> </ul> <p>Economic studies:</p> <ul style="list-style-type: none"> <li>• Economic evaluations</li> <li>• Cost-utility (cost per QALY)</li> <li>• Cost benefit (i.e. Net benefit)</li> <li>• Cost-effectiveness (Cost per unit of effect)</li> <li>• Cost minimisation</li> <li>• Cost-consequence</li> </ul>	<p>the question, evidence may be prioritised, where available, by study design (e.g. RCTs prioritised over observational studies) in consultation with PHAC. Where there is a lack of higher quality evidence for different population groups, in particular those who are less able to be physically active, a lower quality of evidence may be considered.</p> <ul style="list-style-type: none"> <li>• It is unlikely that cross-sectional and other surveys will be included in the review unless there is an absence of other evidence. This will be agreed with PHAC as appropriate.</li> <li>• Systematic reviews will only be used as a</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
		<p>source for primary evidence.</p> <ul style="list-style-type: none"> <li>• Only full economic analyses will be included – papers reporting costs only will be excluded.</li> </ul>
Participants/population	<p>Whole population (adults and children) with particular consideration of groups who are less able to be physically active including:</p> <ul style="list-style-type: none"> <li>• Older people</li> <li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li> </ul>	
Intervention(s)	<ul style="list-style-type: none"> <li>• Access to open spaces by public transport, on foot, by bicycle or using other forms of active transport (such as Connect2)</li> <li>• Connections between open spaces through traffic-free networks of footpaths, trails or cycle routes (such as green corridors)</li> <li>• Maintenance and management, conservation or landscaping of open spaces</li> <li>• Facilities in open spaces such as accessible toilets, shelter, signage, accessible parking</li> <li>• Safety of open spaces, for example through layout, lighting or security</li> <li>• Regeneration projects</li> <li>• Street and neighbourhood design</li> <li>• Named interventions that involve changes to the design and accessibility of public open spaces, such as Healthy Towns/Healthy New Towns, Age Friendly Cities, Urban 40 project,</li> </ul>	<p>The following interventions related to the design and accessibility of public open spaces will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical activity as part of managing chronic or other conditions.</li> <li>• Interventions that aim to change individual behaviour by providing and encouraging</li> </ul>



Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
	Olympic parks, Pocket Parks, Play Streets, Healthy Streets	<p>people to take up activities that take place in the built or natural environment e.g. exercise classes, green gyms and organised walks.</p> <ul style="list-style-type: none"> <li>Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers the design, deliver and promotion of interventions within the environment rather than changes to the physical environment itself.</li> </ul>
Comparator(s)/control	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>Other intervention</li> <li>Status quo</li> </ul> <p>Time (before and after) or area (i.e. matched area a vs b)</p>	
Outcome(s)	<p>The following outcomes will be considered when assessing variation in factors such as age, disability, special needs:</p> <p>Primary outcomes:</p> <ul style="list-style-type: none"> <li>total physical activity (as measured by e.g. time/distance/number of steps/levels of activity/levels of recommended PA)</li> </ul>	<ul style="list-style-type: none"> <li>Included studies should have an indicator of physical activity reported.</li> <li>Included studies reporting any health outcomes will be</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• total sedentary time (as measured by time)</li> <li>• Domain-specific physical activity levels (active travel or physical activity in everyday life (such as measures of walking, cycling or active play)).</li> <li>• public transport use (as a proxy measure of physical activity) according to factors such as age disability special needs etc</li> </ul> <p>Secondary outcomes:</p> <ul style="list-style-type: none"> <li>• access to and use of natural environment including green and blue space and variation in this according to factors such as age, disability, special needs</li> <li>• access to grey space and variation in this according to factors such as age, disability, special needs</li> </ul>	<p>noted in EPPI/the evidence tables and forwarded on to EMU for economic modelling and not for the purposes of this review.</p>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
<b>Review question 8</b>	<p>Are there any adverse or unintended effects of interventions related to the design and accessibility of public open spaces in terms of (1) physical activity and (2) other aspects of health and wellbeing?</p> <p>a. Do these vary for different population groups, in particular those who are less able to be physically active?</p> <p>b. How can the effects of any unintended or adverse effects be minimised?</p>	

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
Context and objectives	To determine if interventions related to the design and accessibility of public open spaces have any adverse or unintended effects, in all groups and particularly in those groups that are less able to be physically active.	
Types of study to be included/excluded	<p>Inclusions:</p> <p>Comparative studies including:</p> <ul style="list-style-type: none"> <li>• Randomised or non-randomised controlled trials</li> <li>• Before and after studies</li> <li>• Cohort studies</li> <li>• Case-control studies</li> </ul> <p>Economic studies:</p> <ul style="list-style-type: none"> <li>• Economic evaluations</li> <li>• Cost-utility (cost per QALY)</li> <li>• Cost benefit (i.e. Net benefit)</li> <li>• Cost-effectiveness (Cost per unit of effect)</li> <li>• Cost minimisation</li> <li>• Cost-consequence</li> </ul> <p>Qualitative studies:</p> <ul style="list-style-type: none"> <li>• Focus groups</li> <li>• Interviews</li> </ul>	<ul style="list-style-type: none"> <li>• If there is a large number of includes for the question, effectiveness evidence may be prioritised, where available, by study design (e.g. RCTs prioritised over observational studies) in consultation with PHAC. Where there is a lack of higher quality evidence for different population groups, in particular those who are less able to be physically active, a lower quality of evidence may be considered.</li> <li>• It is unlikely that cross-sectional and other surveys will be included in the review</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
		<p>unless there is an absence of other evidence. This will be agreed with PHAC as appropriate.</p> <ul style="list-style-type: none"> <li>• Systematic reviews will only be used as a source for primary evidence.</li> <li>• Only full economic analyses will be included – papers reporting costs only will be excluded.</li> </ul> <p>Only qualitative studies from the UK which provide insight into the unintended consequences or adverse effects of specific interventions and how these vary by population group will be included. Studies will be limited to the UK (rather than EU/OECD countries as for effectiveness studies)</p>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
		<p>as the context (national legislation, local government structures and powers etc) will be particularly relevant here.</p> <p>Qualitative studies which are linked to interventions identified through reviews 1 and 2 may be prioritised if the volume of studies is high. This would be agreed with PHAC.</p>
Participants/population	<p>Whole population (adults and children) with particular consideration of groups who are less able to be physically active including:</p> <ul style="list-style-type: none"> <li>• Older people</li> <li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li> </ul>	
Intervention(s)	<ul style="list-style-type: none"> <li>• Access to open spaces by public transport, on foot, by bicycle or using other forms of active transport (such as Connect2)</li> <li>• Connections between open spaces through traffic-free networks of footpaths, trails or cycle routes (such as green corridors)</li> <li>• Maintenance and management, conservation or landscaping of open spaces</li> <li>• Facilities in open spaces such as accessible toilets, shelter, signage, accessible parking</li> </ul>	<p>The following interventions related to the design and accessibility of public open spaces will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• Safety of open spaces, for example through layout, lighting or security</li> <li>• Regeneration projects</li> <li>• Street and neighbourhood design</li> <li>• Named interventions that involve changes to the design and accessibility of public open spaces, such as Healthy Towns/Healthy New Towns, Age Friendly Cities, Urban 40 project, Olympic parks, Pocket Parks, Play Streets, Healthy Streets</li> </ul>	<p>activity as part of managing chronic or other conditions.</p> <ul style="list-style-type: none"> <li>• Interventions that aim to change individual behaviour by providing and encouraging people to take up activities that take place in the built or natural environment e.g. exercise classes, green gyms and organised walks.</li> <li>• Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers the design, deliver and promotion of interventions within the environment rather than changes to the physical environment itself.</li> </ul>
Comparator(s)/control	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>• Other intervention</li> <li>• Status quo</li> </ul> <p>Time (before and after) or area (i.e. matched area a vs b)</p>	

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
Outcome(s)	<p><u>From comparative studies</u></p> <p>Indicators of physical activity and variation in these according to factors such as age, disability, special needs:</p> <ul style="list-style-type: none"> <li>• decrease in total physical activity</li> <li>• increase in total sedentary time</li> <li>• decrease in domain-specific physical activity levels</li> <li>• decrease in public transport use (as a proxy measure of physical activity)</li> </ul> <p>Other aspects of health and wellbeing and variation in these according to factors such as age, disability, special needs, including:</p> <ul style="list-style-type: none"> <li>• Rates/numbers of accidents, or injuries or fatalities e.g. road traffic accidents, falls</li> </ul> <p><u>From qualitative studies</u></p> <p>Adverse/unintended effects of interventions in terms of:</p> <ul style="list-style-type: none"> <li>• Intentions to be physically active</li> <li>• Perceptions (such as barriers, stigma, safety, isolation, feeling of exclusion, lack of sense of belonging and connectedness, increased fear of crime)</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Included studies should have an indicator of physical activity reported.</li> <li>• Included studies reporting any health outcomes will be noted in EPPI/the evidence tables and forwarded on to EMU for economic modelling and not for the purposes of this review.</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
<b>Review question 9</b>	What factors relating to interventions which focus on the design and accessibility of public open spaces ensure that interventions are acceptable to all groups, including those less able to be physically active?	
Context and objectives	To identify any factors relating to the design and accessibility of public open spaces, that may facilitate the uptake of opportunities to be physically active or conversely prevent uptake of those opportunities. In particular to identify factors which may facilitate uptake by one group but in doing so create barriers for others.	
Types of study to be included/excluded	<p>Inclusions:</p> <p>Qualitative studies:</p> <ul style="list-style-type: none"> <li>• Focus groups</li> <li>• Interviews</li> </ul>	<p>Exclusions:</p> <ul style="list-style-type: none"> <li>• All quantitative studies</li> <li>• Systematic reviews will only be included as a source for primary evidence.</li> </ul> <p>Only qualitative studies from the UK which provide insight into the unintended consequences or adverse effects of specific interventions and how these vary by population group will be included. Studies will be limited to the UK (rather than EU/OECD countries as</p>



Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
		<p>for effectiveness studies) as the context (national legislation, local government structures and powers etc) will be particularly relevant here.</p> <p>Qualitative studies which are linked to interventions identified through reviews 1 and 2 may be prioritised if the volume of studies is high. This would be agreed with PHAC.</p>
Participants/population	<p>Whole population (adults and children) with particular consideration of groups who are less able to be physically active including:</p> <ul style="list-style-type: none"> <li>• Older people</li> <li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li> </ul>	
Intervention(s)	<ul style="list-style-type: none"> <li>• Access to open spaces by public transport, on foot, by bicycle or using other forms of active transport (such as Connect2)</li> <li>• Connections between open spaces through traffic-free networks of footpaths, trails or cycle routes (such as green corridors)</li> <li>• Maintenance and management, conservation or landscaping of open spaces</li> <li>• Facilities in open spaces such as accessible toilets, shelter, signage, accessible parking</li> </ul>	<p>The following interventions related to the design and accessibility of public open spaces will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical</li> </ul>

Topic 2	Design and accessibility of public open spaces <sup>1</sup> in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• Safety of open spaces, for example through layout, lighting or security</li> <li>• Regeneration projects</li> <li>• Street and neighbourhood design</li> <li>• Named interventions that involve changes to the design and accessibility of public open spaces, such as Healthy Towns/Healthy New Towns, Age Friendly Cities, Urban 40 project, Olympic parks, Pocket Parks, Play Streets, Healthy Streets</li> </ul>	<p>activity as part of managing chronic or other conditions.</p> <ul style="list-style-type: none"> <li>• Interventions that aim to change individual behaviour by providing and encouraging people to take up activities that take place in the built or natural environment e.g. exercise classes, green gyms and organised walks.</li> <li>• Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers the design, deliver and promotion of interventions within the environment rather than changes to the physical environment itself.</li> </ul>
Comparator(s)/control	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>• Other intervention</li> <li>• Status quo</li> <li>• Time (before and after) or area (i.e. matched area a vs b)</li> </ul>	

<b>Topic 2</b>	<b>Design and accessibility of public open spaces<sup>1</sup> in the built or natural environment</b>	
Component of protocol	Description	Additional comments
Outcome(s)	<ul style="list-style-type: none"> <li>• Intentions (e.g. to be physically active)</li> <li>• Perceptions (e.g. feelings of inclusion, increased sense of belonging and connectedness, increased sense of safety, reduced fear of crime)</li> <li>• Knowledge / Attitudes / beliefs (e.g. of interventions)</li> <li>• Acceptability of interventions</li> </ul>	

<b>Topic 1</b>	<b>Transport interventions in the built or natural environment</b>	
Component of protocol	Description	Additional comments
<b>Review question 10</b>	Who needs to be involved to ensure that interventions related to the design and accessibility of public open spaces are effective and cost-effective for everyone in encouraging and supporting them to be physically active, including those less able to be physically active?	
Context and objectives	To determine what the key characteristics of the people involved in the design and accessibility of public open spaces (e.g. job roles and competencies) are which affect an intervention's effectiveness and cost effectiveness.	
Types of study to be included/excluded	<p>Inclusions:</p> <p>Comparative studies including:</p> <ul style="list-style-type: none"> <li>• Randomised or non-randomised controlled trials</li> <li>• Before and after studies</li> <li>• Cohort studies</li> <li>• Case-control studies</li> </ul> <p>Economic studies:</p> <ul style="list-style-type: none"> <li>• Economic evaluations</li> </ul>	<ul style="list-style-type: none"> <li>• If there is a large number of includes for the question, effectiveness evidence may be prioritised, where available, by study design (e.g. RCTs prioritised over observational studies) in consultation with</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• Cost-utility (cost per QALY)</li> <li>• Cost benefit (i.e. Net benefit)</li> <li>• Cost-effectiveness (Cost per unit of effect)</li> <li>• Cost minimisation</li> <li>• Cost-consequence</li> </ul> <p>Qualitative studies:</p> <ul style="list-style-type: none"> <li>• Focus groups</li> <li>• Interviews</li> </ul>	<p>PHAC. Where there is a lack of higher quality evidence for different population groups, in particular those who are less able to be physically active, a lower quality of evidence may be considered.</p> <ul style="list-style-type: none"> <li>• It is unlikely that cross-sectional and other surveys will be included in the review unless there is an absence of other evidence. This will be agreed with PHAC as appropriate.</li> <li>• Systematic reviews will only be used as a source for primary evidence.</li> <li>• Only full economic analyses will be included – papers reporting costs only will be excluded.</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
		<p>Only qualitative studies from the UK which provide insight into the unintended consequences or adverse effects of specific interventions and how these vary by population group will be included. Studies will be limited to the UK (rather than EU/OECD countries as for effectiveness studies) as the context (national legislation, local government structures and powers etc) will be particularly relevant here.</p> <p>Qualitative studies which are linked to interventions identified through reviews 1 and 2 may be prioritised if the volume of studies is high. This would be agreed with PHAC.</p>
Participants/population	<p>Whole population (adults and children) with particular consideration of groups who are less able to be physically active including:</p> <ul style="list-style-type: none"> <li>• Older people</li> </ul>	

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<ul style="list-style-type: none"> <li>• People with disabilities including mental, physical, sensory and learning impairments which impact on their ability to be physically active</li> </ul>	
Intervention(s)	<ul style="list-style-type: none"> <li>• Access to open spaces by public transport, on foot, by bicycle or using other forms of active transport (such as Connect2)</li> <li>• Connections between open spaces through traffic-free networks of footpaths, trails or cycle routes (such as green corridors)</li> <li>• Maintenance and management, conservation or landscaping of open spaces</li> <li>• Facilities in open spaces such as accessible toilets, shelter, signage, accessible parking</li> <li>• Safety of open spaces, for example through layout, lighting or security</li> <li>• Regeneration projects</li> <li>• Street and neighbourhood design</li> <li>• Named interventions that involve changes to the design and accessibility of public open spaces, such as Healthy Towns/Healthy New Towns, Age Friendly Cities, Urban 40 project, Olympic parks, Pocket Parks, Play Streets, Healthy Streets</li> </ul>	<p>The following interventions will not be included:</p> <ul style="list-style-type: none"> <li>• Interventions to increase physical activity as part of managing chronic or other conditions.</li> <li>• Interventions that aim to change individual behaviour by providing and encouraging people to take up activities that take place in the built or natural environment e.g. exercise classes, green gyms and organised walks.</li> <li>• Interventions covered by <a href="#">PH41</a> (walking and cycling) which covers the design, deliver and promotion of interventions within the environment rather</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
		than changes to the physical environment itself.
Comparator(s)/control	<p>Comparators that will be considered are:</p> <ul style="list-style-type: none"> <li>• Other interventions</li> <li>• Status quo/do nothing/control</li> <li>• Time (before and after) or area (i.e. matched city a vs b) comparisons</li> </ul>	
Outcome(s)	<p>The outcomes that will be considered when assessing the impact on physical activity are:</p> <p>Primary outcomes:</p> <ul style="list-style-type: none"> <li>• total physical activity (as measured by e.g. time/distance/number of steps/levels of activity/levels of recommended PA)</li> <li>• total sedentary time (as measured by time)</li> <li>• Domain-specific physical activity levels (active travel or physical activity in everyday life (such as measures of walking, cycling or active play))</li> <li>• public transport use (as a proxy measure of physical activity)</li> </ul> <p>Secondary outcomes:</p> <ul style="list-style-type: none"> <li>• changes to urban planning</li> <li>• changes to transport (such as changes in modal share)</li> <li>• changes to the infrastructure for both green and blue spaces</li> <li>• access to and use of natural environment including green and blue space</li> <li>• access to grey space</li> </ul>	<ul style="list-style-type: none"> <li>• Included effectiveness studies should have an indicator of physical activity reported.</li> <li>• Included studies reporting any health outcomes will be noted in EPPI/the evidence tables and forwarded on to EMU for economic modelling and not for the purposes of this review.</li> </ul>

Topic 1	Transport interventions in the built or natural environment	
Component of protocol	Description	Additional comments
	<p>Qualitative outcomes:</p> <ul style="list-style-type: none"> <li>• Perceptions (e.g. of the key characteristics of the people involved in the development and delivery of transport interventions which make them effective)</li> <li>• Preferences (e.g. for the person delivering the intervention)</li> </ul> <p>Descriptive outcomes:</p> <ul style="list-style-type: none"> <li>• Key characteristics of the people involved in the design and accessibility of public open spaces which make them effective e.g. job roles, competencies</li> </ul>	



## Appendix 1 – Sources to be searched

A systematic search of relevant databases and websites (listed below) will be carried out to identify relevant studies.

### Databases

- Applied Social Science Index and Abstracts (ASSIA) via ProQuest
- Cochrane Central Register of Controlled Trials (CENTRAL) via Wiley
- Embase via Ovid
- Greenfile via EBSCO
- Health Management Information Consortium (HMIC) via Ovid
- MEDLINE via Ovid
- MEDLINE-in-Process via Ovid
- Social Policy and Practice (SPP) via Ovid
- Transport via Ovid
- Trials Register of Promoting Health Interventions (TRoPHI) via [EPPI Centre](#)

Additional sources to identify cost effectiveness literature:

- Benefit-Costs Results via [Washington State Institute for Public Policy](#)
- Health Technology Assessment database via Wiley
- EconLit via Ovid
- EconPapers via [RePEc](#)
- NHS Economics Evaluation Database (NHS EED) via Wiley - note this has not been updated since March 2015 but may still identify relevant evidence added up to that date

Additional sources to identify systematic reviews for reference harvesting:

- Cochrane Database of Systematic Reviews (CDSR) via Wiley
- Database of Abstracts of Reviews of Effects (DARE) via Wiley - note this has not been updated since March 2015 but may still identify relevant evidence added up to that date

Note: only the primary studies that are available on Web of Science will be extracted and added to the EndNote file if they are relevant to the review.

### **Website browsing**

- [Active Living Research](#)
- [Active Scotland](#)
- [Association for the Study of Obesity](#)
- [Association of Directors of Public Health](#)
- [Big Lottery Fund](#)
- [Centre for Active Design](#)
- [Chartered Institute of Environmental Health](#)
- [Chartered Institute of Logistics and Transport](#)
- [Children's Commissioner for England](#)
- [Cycling UK](#)
- [Department for Transport](#)
- [Design Council](#)
- [Environment Agency](#)
- [Faculty of Public Health](#)
- [Greenspace Scotland](#)
- [Healthy Transport](#)

- [Living Streets](#)
- [Local Government Association](#)
- [London Cycling Campaign](#)
- [London Play](#)
- [National Audit Office](#)
- [Natural England](#)
- [Natural Resources Wales](#)
- [NHS England](#)
- [Public Health Agency for Northern Ireland](#)
- [Public Health England](#)
- [Public Health Wales](#)
- [Ramblers](#)
- [Royal Society for Public Health](#)
- [Royal Town Planning Institute](#)
- [RNIB](#)
- [Scottish Government](#)
- [Scottish Natural Heritage](#)
- [Scottish Public Health Network](#)
- [Scottish Public Health Observatory](#)
- [Sport and Recreation Alliance](#)
- [Sport England](#)
- [Sustrans](#)
- [Town and Country Planning Association](#)

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- [Transport for Greater Manchester](#)
- [Transport for London](#)
- [Transport Research & Innovation Portal](#)
- [Transport Scotland](#)
- [TRL](#)
- [UK Active](#)
- [UK Health Forum](#)
- [Urban Transport Group](#)
- [Welsh Assembly Government](#)
- [Wheels for Wellbeing](#)

#### **Website searching**

- [NICE Evidence Search](#)
- [OpenGrey](#)
- A targeted Google.co.uk search using the site: command, focusing on results from UK sites and restricted to PDF or Word formats. A series of focussed searches will be preferred to using one broad search strategy. The first 100 results (or 10 pages) will be sifted on screen for each of the search strategies.

## Appendix 2 – search strategies

### Topic 1 - transport

Database(s): Ovid MEDLINE

#	Searches
1	Physical Fitness/
2	Recreation/
3	hobbies/
4	leisure activities/
5	Exercise/
6	exp running/
7	exp walking/
8	bicycling/
9	motor activity/  ((physical or leisure) adj1 (fit* or train* or activit* or endurance* or exercis*) adj3 (barrier* or hinder* or block* or obstacle* or restrict* or restrain* or obstruct* or inhibit* or impeded* or delay* or constrain* or hindrance or decreas* or reduc* or discourag* or prevent* or refus* or facilitat* or uptak* or taking up or take up or increas* or impact* or
10	effect* or improv* or enhanc* or encourag* or support* or promot* or optimiz* or optimis* or adher* or access* or motivat* or accept* or satisfaction or compliance or comply or complie* or availab* or provision or provid* or offer or incentiv* or start* or attend* or utiliz* or utilis* or sustain* or maintain* or disincentiv* or higher* or lower* or affect*)).ti,ab.
11	(outdoor* adj3 (activit* or pursuit* or experience* or adventure* or event*) adj3 (barrier* or hinder* or block* or obstacle* or restrict* or restrain* or obstruct* or inhibit* or impeded* or delay* or constrain* or hindrance or decreas* or reduc* or discourag* or prevent* or refus* or facilitat* or uptak* or taking up or take up or increas* or impact* or

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effect\* or improv\* or enhanc\* or encourag\* or support\* or promot\* or optimiz\* or optimis\* or adher\* or access\* or motivat\* or accept\* or satisfaction or compliance or comply or complie\* or availab\* or provision or provid\* or offer or incentiv\* or start\* or attend\* or utiliz\* or utilis\* or sustain\* or maintain\* or disincentiv\* or higher\* or lower\* or affect\*)).ti,ab.

12 ((bicycle\* or exercis\* or fitness or walking\* or running\* or exertion or jogging\* or bicycling\* or cycling or bike\*1 or biking or hobbies or hobby or rollerskat\* or roller blad\* or rollerblad\* or hike\* or hiking or rambling\* or rambler\* or strength training or resilience training) adj3 (barrier\* or hinder\* or block\* or obstacle\* or restrict\* or restrain\* or obstruct\* or inhibit\* or imped\* or delay\* or constrain\* or hindrance or decreas\* or reduc\* or discourag\* or prevent\* or refus\* or facilitat\* or uptak\* or taking up or take up or increas\* or impact\* or effect\* or improv\* or enhanc\* or encourag\* or support\* or promot\* or optimiz\* or optimis\* or adher\* or access\* or motivat\* or accept\* or satisfaction or compliance or comply or complie\* or availab\* or provision or provid\* or offer or incentiv\* or start\* or attend\* or utiliz\* or utilis\* or sustain\* or maintain\* or disincentiv\* or higher\* or lower\* or affect\*)).ti,ab.

13 ((active\* or multimodal\* or multi-modal\* or mixed or healthy or healthier or modal\* shift\*) adj3 (travel\* or trip\*1 or transport\* or commute\* or commuting)).ti,ab.

14 (active\* adj3 (living or lifestyle\* or ageing or aging or play\* or game\*)).ti,ab.

15 (physical activit\* adj3 (daily or everyday\* or incidental\* or intens\*)).ti,ab.

16 ((avoid\* or barrier\* or hinder\* or block\* or obstacle\* or restrict\* or restrain\* or obstruct\* or inhibit\* or imped\* or delay\* or constrain\* or hindrance or decreas\* or reduc\* or discourag\* or prevent\*) adj3 (sedentary or deskbound\* or desk bound\* or inactiv\*)).ti,ab.

17 or/1-16

18 Transportation/

19 exp Motor Vehicles/

20 exp Railroads/

21 Automobile Driving/

22 parking facilities/

23 ((cycle\* or cycling or bike or bicycl\* or cyclist\*) adj4 (route\* or lane\* or path\* or trail\* or infrastructure\* or network\* or corridor\* or facilit\* or storage\* or store\* or storing or rack\* or park\* or equipment\* or segregat\* or highway\* or superhighway\* or hire\* or hiring)).ti,ab.

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24 ((walk\* or pedestrian\*1) adj4 (route\* or lane\* or path\* or trail\* or infrastructure\* or network\* or corridor\*)).ti,ab.

25 (speed\* adj3 (hump\* or bump\* or limit\* or restrict\* or reduc\* or chicane\* or camera\* or mph or miles per hour or "m.p.h." or kph or "k.p.h." or kilometres per hour or kilometers per hour)).ti,ab.

26 ((limit\* or restrict\*) adj3 (mph or miles per hour or "m.p.h." or kph or "k.p.h." or kilometres per hour or kilometers per hour)).ti,ab.

27 ((automobile\* or autos or car or cars or motorcycle\* or motorbike\* or traffic or vehic\* or motoring) adj3 (restrict\* or restrain\* or inhibit\* or impeded\* or delay\* or constrain\* or decreas\* or reduc\* or discourag\* or prevent\* or disincentiv\*)).ti,ab.

28 ((car or cars) adj3 (use\* or usage\* or trip\* or journey\* or share\* or sharing or pool\* or club\*)).ti,ab.

29 ((driver\*1 or motorist\*) adj3 (behaviour\* or behavior\*)).ti,ab.

30 ((congestion or "rush hour" or tailback\* or "tail back\*" or road\*) adj3 (charge\* or charging or price or pricing or zone\* or toll or tolls or pay or payment\* or levy or levies or tax\* or tariff\* or duty or duties)).ti,ab.

31 ((road\* or street\* or highway\*) adj3 (safety or open or calm\* or closing or closure\* or restrict\* or limit\* or play\* or design\* or redesign\* or layout\* or placement\* or chicane\* or furniture\*)).ti,ab.

32 ((junction\* or intersection\* or roundabout\* or pavement\* or sidewalk\* or footpath\* or trail\* or kerb\* or paving\*) adj3 (safety or design\* or redesign\* or layout\* or placement\* or repair\* or disrepair\* or fix or fixing or maintenance\* or broke\* or dropped or dropping)).ti,ab.

33 ((road\* or street\* or highway\* or pedestrian\*1 or zebra or toucan or pelican or puffin or cone or tactile) adj3 crossing\*).ti,ab.

34 ((parking\* or car park\*) adj3 (restrict\* or restrain\* or inhibit\* or impeded\* or delay\* or constrain\* or decreas\* or reduc\* or discourag\* or prevent\* or disincentiv\* or workplace\* or ratio\* or density or densities or charge\* or charging or price or pricing or zone\* or toll or tolls or pay or payment\* or levy or levies or tax\* or control\*)).ti,ab.

35 ((shared or share or sharing or allocat\* or reallocat\* or segregat\* or demarc\* or tactile) adj3 (space\* or street\* or road\* or highway\* or route\* or walkway\* or pavement\* or footpath\* or path\* or lane\* or trail\* or surface\*)).ti,ab.

36 (railtrail\* or rail trail\* or busway\* or bus way or playstreet\* or play street\* or school street\* or schoolstreet\* or walkab\* or safe\* route\* or cycleway\* or cycle way\* or traffic calm\* or green corridor\* or pedestrianis\* or pedestrianiz\* or carpool\* or streetscap\* or LEZ or low emission\* zone\* or rideshar\*).ti,ab.

37 ((bus or buses) adj4 (route\* or lane\* or infrastructure\* or network\* or corridor\*)).ti,ab.

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38 ((public or community or affordable or rural or sustainable\* or green) adj3 (travel\* or transport\*)),ti,ab.

39 ((mechanised or mechanized or motor\*4 or personal or private) adj3 (travel\* or transport\* or vehicle\*) adj3 (restrict\* or restrain\* or inhibit\* or impeded\* or delay\* or constrain\* or decreas\* or reduc\* or discourag\* or prevent\* or disincentiv\*)),ti,ab.

((railway\* or light rail\* or railroad\* or bus or buses or tram or trams or tramway\* or train or trains or streetcar or subway\* or underground rail\* or non-auto or non-motor\*4) adj3 (increas\* or improv\* or enhanc\* or encourag\* or support\* or promot\* or optimiz\* or optimis\* or adher\* or access\* or availab\* or provision or provid\* or offer or incentiv\* or start\* or utiliz\* or utilis\* or sustain\* or maintain\*)),ti,ab.

41 (park adj2 ride\*).ti,ab.

42 or/18-41

43 17 and 42

44 (ciclovía\* or iconnect\* or connect2\* or guided bus\* or "cycling city" or "cycling cities" or "walking city" or "walking cities" or Bikeability or "Cycling Cities and Towns" or "cycling demonstrator town\*" or ipen or "International Physical activity and Environment Network" or open streets or dutch roundabout\* or bikeshar\*).ti,ab.

45 43 or 44

46 animals/ not humans/

47 45 not 46

48 limit 47 to (letter or historical article or comment or editorial or news)

49 47 not 48

50 limit 49 to english language

51 limit 50 to yr="2006-Current"

52 remove duplicates from 51



## Topic 2 - open spaces

Database(s): **Ovid MEDLINE(R)** 1946 to June Week 3 2016

Search Strategy:

### # Searches

1 Physical Fitness/

2 Dancing/

3 gardening/

4 Recreation/

5 hobbies/

6 leisure activities/

7 Exercise/

8 exp Exercise Movement Techniques/

9 exp Sports/

10 exp walking/

11 motor activity/

((physical or leisure) adj1 (fit\* or train\* or activit\* or endurance\* or exercis\*) adj3 (barrier\* or hinder\* or block\* or obstacle\* or restrict\* or restrain\* or obstruct\* or inhibit\* or impeded\* or delay\* or constrain\* or hindrance or decreas\* or reduc\* or discourag\* or prevent\* or refus\* or facilitat\* or uptak\* or taking up or take up or increas\* or impact\* or effect\* or improv\* or enhanc\* or encourag\* or support\* or promot\* or optimiz\* or optimis\* or adher\* or access\* or motivat\* or accept\* or satisfaction or compliance or comply or complie\* or availab\* or provision or provid\* or offer or incentiv\* or start\* or attend\* or utiliz\* or utilis\* or sustain\* or maintain\* or disincentiv\* or higher\* or lower\* or affect\*)).ti,ab.

(outdoor\* adj3 (activit\* or pursuit\* or experience\* or adventure\* or event\*) adj3 (barrier\* or hinder\* or block\* or obstacle\* or restrict\* or restrain\* or obstruct\* or inhibit\* or impeded\* or delay\* or constrain\* or hindrance or decreas\* or reduc\* or discourag\* or prevent\* or refus\* or facilitat\* or uptak\* or taking up or take up or increas\* or impact\* or

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effect\* or improv\* or enhanc\* or encourag\* or support\* or promot\* or optimiz\* or optimis\* or adher\* or access\* or motivat\* or accept\* or satisfaction or compliance or comply or complie\* or availab\* or provision or provid\* or offer or incentiv\* or start\* or attend\* or utiliz\* or utilis\* or sustain\* or maintain\* or disincentiv\* or higher\* or lower\* or affect\*)).ti,ab.

((bicycle\* or aqua\* or exercis\* or fitness or walking or running or sport\* or yoga or tai ji or tai chi or swim\* or exertion or jogging or bicycling or cycling or bike\*1 or biking or dancing or dance\* or gardening or hobbies or hobby or athletic\* or boxing or football\* or golf\* or gym\* or hockey or martial art\* or karate or judo or mountaineer\* or rugby or skating or soccer or ski\* or snowboard\* or snow board\* or volleyball or water ski\* or wakeboard\* or weight lift\* or wrestling or tennis or badminton or canoe\* or yacht\* or rowing or kayak\* or bodyboard\* or windsurf\* or sail\* or basketball\* or netball\* or cricket\* or baseball or lacrosse or rollerskat\* or roller skat\* or roller blad\* or roller blad\* or 14 hike\* or hiking or rambling\* or rambler\* or orienteering or climbing or abseil\* or aerobics or pilates or "keep fit" or circuits or strength training or resilience training) adj3 (barrier\* or hinder\* or block\* or obstacle\* or restrict\* or restrain\* or obstruct\* or inhibit\* or imped\* or delay\* or constrain\* or hindrance or decreas\* or reduc\* or discourag\* or prevent\* or refus\* or facilitat\* or uptak\* or taking up or take up or increas\* or impact\* or effect\* or improv\* or enhanc\* or encourag\* or support\* or promot\* or optimiz\* or optimis\* or adher\* or access\* or motivat\* or accept\* or satisfaction or compliance or comply or complie\* or availab\* or provision or provid\* or offer or incentiv\* or start\* or attend\* or utiliz\* or utilis\* or sustain\* or maintain\* or disincentiv\* or higher\* or lower\* or affect\*)).ti,ab.

15 ((active\* or multimodal\* or multi-modal\* or mixed or healthy or healthier or modal\* shift\*) adj3 (travel\* or trip\*1 or transport\* or commute\* or commuting)).ti,ab.

16 (active\* adj3 (living or lifestyle\* or ageing or aging or play\* or game\*)).ti,ab.

17 (physical activit\* adj3 (daily or everyday\* or incidental\* or intens\*)).ti,ab.

18 ((avoid\* or barrier\* or hinder\* or block\* or obstacle\* or restrict\* or restrain\* or obstruct\* or inhibit\* or imped\* or delay\* or constrain\* or hindrance or decreas\* or reduc\* or discourag\* or prevent\*) adj3 (sedentary or deskbound\* or desk bound\* or inactiv\*)).ti,ab.

19 or/1-18

20 Forests/

21 Wetlands/

22 exp fresh water/

23 wilderness/

24 trees/

PA draft evidence review protocol – for sign off

25 bathing beaches/

26 public facilities/

27 parks, recreational/

28 cities/

29 urban population/

30 urbanization/

31 or/20-30

32 Esthetics/

33 environment design/

34 "Environmental Restoration and Remediation"/

35 Conservation of Natural Resources/

36 "Architecture as Topic"/

37 Toilet facilities/

38 parking facilities/

39 "Play and playthings"/

40 health promotion/

41 exp social planning/

42 Health Impact Assessment/

43 exp Public Policy/

44 exp Policy Making/

45 or/32-44

PA draft evidence review protocol – for sign off

46 31 and 45

(natural environment\* or nature reserve\* or nature preserve\* or moors or moorland\* or heathland\* or rural or countryside\* or green\* or field\* or garden\*1 or allotment\* or outdoor\* or park or parks or parkland\* or wood or woods or woodland\* or forest\* or tree\* or wetland\* or river\* or lake\* or pond\* or canal\* or waterway\* or sea or seaside\* or 47 seashore\* or beach\* or coast\* or foreshore\* or piazza\* or plaza\* or square\* or public space\* or public realm\* or public land\* or common land\* or recreation\* space\* or recreation\* area\* or recreation\* ground\* or conservation\* or footpath\* or pedestrianis\* or pedestrianiz\* or piazza\* or pavement\* or sidewalk\* or footpath\* or streetscape\*).ti,ab.

48 ((urban\* or town\* or city\* or cities\* or neighbourhood or neighborhood\*) adj4 (environment\* or square\* or plaza\* or space\*)).ti,ab.

49 47 or 48

50 (impact adj4 assess\*).ti,ab.

51 ((local or regional\* or city or cities or county\* or council\* or neighbourhood\* or neighborhood\* or town\* or administration\*) adj3 (plan or plans or planning or policy or policies or recommendation\* or strategy or strategies or guidance\* or guideline\*)).ti,ab.

52 (planning adj4 (application\* or policy or policies or recommendation\* or strategy or strategies or guidance\* or guideline\*)).ti,ab.

53 ((cycle\* or cycling or bike\* or bicycl\* or cyclist\*) adj4 (route\* or lane\* or path\* or trail\* or infrastructure\* or network\* or corridor\* or facilit\* or storage\* or store\* or storing or rack\* or park\* or equipment\* or segregat\* or highway\* or superhighway\* or hire\* or hiring)).ti,ab.

54 ((pavement\* or sidewalk\* or footpath\* or trail\*) adj4 (safety or design\* or redesign\* or layout\* or placement\* or sign or signs or signpost\* or signage or wayfind\* or way find\*)).ti,ab.

55 ((walk\* or pedestrian\*1) adj4 (route\* or lane\* or path\* or trail\* or infrastructure\* or network\* or corridor\*)).ti,ab.

56 ((play\* adj4 (ground\* or area\* or facility or facilities or amenit\* or equipment\* or space\*)) or (playground\* or playspace\*)).ti,ab.

57 or/50-56

58 49 and 57

59 (eaprs or "environmental assessment of public recreation spaces" or soparc or "System for Observing Play and Recreation in Communities" or "healthy town\*" or "healthy new town\*" or "age friendly city\*" or "age friendly cities" or "urban 40" or "pocket park\*" or "play street\*" or "health\* street\*").ti,ab.

PA draft evidence review protocol – for sign off

60 (environment\* adj4 (campaign\* or interven\* or program\* or project\* or initiative\* or scheme\*)).ti,ab.

((pavement\* or sidewalk\* or sign or signs or signpost\* or signage or wayfind\* or way find\* or path\* or trail\* or footpath\* or age friendl\* or lighting or fencing or traffic\* or securit\* or securing or cycleway\* or cycle way\* or cycling\* or bicycling\* or transport\* or parking or car park\* or toilet\* or lavator\* or bathroom\* or washroom\* or shelter\* or bench or benches or seat or seats or seating or opening time\* or opening hour\*) adj4 (natural environment\* or nature reserve\* or nature preserve\* or moors or moorland\* or 61 heathland\* or rural or countryside\* or green\* or field\* or garden\*1 or allotment\* or outdoor\* or park or parks or parkland\* or wood or woods or woodland\* or forest\* or tree\* or wetland\* or river\* or lake\* or pond\* or canal\* or waterway\* or sea or seaside\* or seashore\* or beach\* or coast\* or foreshore\* or piazza\* or plaza\* or square\* or public space\* or public realm\* or public land\* or common land\* or recreation\* space\* or recreation\* area\* or recreation\* ground\*)).ti,ab.

((upgrad\* or promot\* or landscap\* or architect\* or renew\* or regenerat\* or conserv\* or preserv\* or redesign\* or structur\* or layout\* or facilit\* or feature\* or amenit\* or develop\* or design\* or land us\* or aesthetic\* or esthetic\* or access\* or connect\* or inclusiv\* or safety or renovat\* or refurb\* or management\* or improv\* or adapt\* or enhanc\* or optimiz\* or optimis\* or sustain\* or maintain\* or maintenance\* or beautify or beautifies or beautific\* or infrastructur\* or campaign\* or intervention\* or program\* or project\* or 62 initiative\* or scheme\*) adj4 (natural environment\* or nature reserve\* or nature preserve\* or moors or moorland\* or heathland\* or rural or countryside\* or green\* or field\* or garden\*1 or allotment\* or outdoor\* or park or parks or parkland\* or wood or woods or woodland\* or forest\* or tree\* or wetland\* or river\* or lake\* or pond\* or canal\* or waterway\* or sea or seaside\* or seashore\* or beach\* or coast\* or foreshore\* or piazza\* or plaza\* or square\* or public space\* or public realm\* or public land\* or common land\* or recreation\* space\* or recreation\* area\* or recreation\* ground\*)).ti,ab.

63 (or/58-62) or 46

64 19 and 63

65 animals/ not humans/

66 64 not 65

67 limit 66 to (letter or historical article or comment or editorial or news)

68 66 not 67

69 limit 68 to english language

70 limit 69 to yr="2006-Current"

71 remove duplicates from 70

### Appendix 3 – Post sign-off decisions/amendments

<b>Date</b>	<b>By Who</b>	<b>Decision / Amendment</b>
21 <sup>st</sup> July 2016	AC; KP; DOR; AM	Following a discussion, it was agreed that non-economic modelling studies would not be included at TiAb or full paper screening as these papers do not fit the study designs outlined in the protocols (they are more about building hypothesis and justifying intervention research).