**REVIEW PROTOCOL**

**Review title and timescale**

1 Review title

Give the working title of the review. This must be in English. Ideally it should state succinctly the interventions or exposures being reviewed and the associated health or social problem being addressed in the review.

Associations of children’s active school travel with perceptions of the physical environment and characteristics of the social environment: A systematic review

2 Original language title

For reviews in languages other than English, this field should be used to enter the title in the language of the review. This will be displayed together with the English language title.

N/A

3 Anticipated or actual start date Give the date when the systematic review commenced, or is expected to commence.

3 October 2016

4 Anticipated completion date Give the date by which the review is expected to be completed.

11 September 2017

5 Stage of review at time of this submission  Indicate the stage of progress of the review by ticking the relevant boxes.

|  |  |  |
| --- | --- | --- |
| **Review stage** | **Started** | **Completed** |
| Preliminary searches | Yes | Yes |
| Piloting of the study selection process | Yes | Yes |
| Formal screening of search results against eligibility criteria | Yes | Yes |
| Data extraction | Yes | Yes |
| Risk of bias (quality) assessment | Yes | Yes |
| Data analysis | Yes | Yes |

**Review team details**

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10 Organisational affiliation of the review

Auckland University of Technology, Auckland, New Zealand

11 Review team members and their organisational affiliations

|  |  |  |  |
| --- | --- | --- | --- |
| **Title** | **First name** | **Last name** | **Affiliation** |
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12 Funding sources/sponsors

This review was supported by the Health Research Council of New Zealand (grant number 14/436).

13 Conflicts of interest

List any conditions that could lead to actual or perceived undue influence on judgements concerning the main topic investigated in the review. Are there any actual or potential conflicts of interest?

No

14 Collaborators

Give the name, affiliation and role of any individuals or organisations who are working on the review but who are not listed as review team members.

N/A

**Review methods**

15 Review question(s) State the question(s) to be addressed / review objectives.

(1) To summarise associations of school travel mode in children aged 5-13 years with perceived physical environment attributes and sociological and sociodemographic characteristics.

(2) To assess the robustness of the evidence and synthesis in relation to quality of the studies included, and the consistency of these results.

16 Searches

Give details of the sources to be searched, and any restrictions (e.g. language or publication period). The full search strategy is not required, but may be supplied as a link or attachment.

We searched the following electronic bibliographic databases: Scopus, Web of Science, MEDLINE (EBSCO, Ovid and PubMed Interfaces), CINAHL (EBSCO Interface), SportDiscus (EBSCO Interface), PsycINFO (Ovid Interface), ERIC (Education Resources Information Center, Ovid and ProQuest Interfaces), TRID (Transportation Research International Documentation), and Cochrane Library. The search terms were identified from previous related reviews and the knowledge and expertise of the authors using four categories: (1) population, (2) travel mode, (3) physical environment, and (4) social environment.

The following search terms were used (e.g., Table 1): (1) ((child\* or (boy or girl) or (pupil or student)) and school) and (2) (((travel\* or transport\* or commut\*) and school) or (walk or (bike or biking) or (cycle or cycling) or (bicycle or bicycling) or scooter or (skate or skating or skateboard) or (car or automobile or motor or drive or driving or chauffeur)) and school) and (3) ("physical environment\*" or "built environment\*" or "neighbo\*rhood environment\*" or (urban and neighbo\*rhood) or "residential density" or "dwelling density" or "population density" or connectivity or "land use" or pedestrian or (bicyclist or cyclist) or (street or path or road or track or trail or pavement) or route or (facility or facilities or equipment or infrastructure) or safe\* or crime or traffic or (aesthetic or esthetic) or (park or "open space" or playground)) and (4) (social or culture or cultural).

This systematic review was limited to peer-reviewed articles, available in full-text, written in English, and published from January 2000 to July 2017. This time period was chosen, as most of the relevant literature was published during the last decade. Moreover, it is essential to study only the most recent literature as environments are constantly changing.

Table 1. Search terms (e.g., Scopus)

|  |  |
| --- | --- |
| 1 | TITLE-ABS((child\* or (boy or girl) or (pupil or student)) and school) |
| 2 | TITLE-ABS(((travel\* or transport\* or commut\*) and school) or (walk or (bike or biking) or (cycle or cycling) or (bicycle or bicycling) or scooter or (skate or skating or skateboard) or (car or automobile or motor or drive or driving or chauffeur) and school)) |
| 3 | TITLE-ABS("physical environment\*" or "built environment\*" or "neighbo\*rhood environment\*" or (urban and neighbo\*rhood) or "residential density" or "dwelling density" or "population density" or connectivity or "land use" or pedestrian or (bicyclist or cyclist) or (street or path or road or track or trail or pavement) or route or (facility or facilities or equipment or infrastructure) or safe\* or crime or traffic or (aesthetic or esthetic) or (park or "open space" or playground)) |
| 4 | TITLE-ABS(social or culture or cultural) |
| 5 | #1 AND #2 AND #3 AND #4 |
|  | TITLE-ABS((child\* or (boy or girl) or (pupil or student)) and school) AND (TITLE-ABS(((travel\* or transport\* or commut\*) and school) or (walk or (bike or biking) or (cycle or cycling) or (bicycle or bicycling) or scooter or (skate or skating or skateboard) or (car or automobile or motor or drive or driving or chauffeur) and school))) AND (TITLE-ABS("physical environment\*" or "built environment\*" or "neighbo\*rhood environment\*" or (urban and neighbo\*rhood) or "residential density" or "dwelling density" or "population density" or connectivity or "land use" or pedestrian or (bicyclist or cyclist) or (street or path or road or track or trail or pavement) or route or (facility or facilities or equipment or infrastructure) or safe\* or crime or traffic or (aesthetic or esthetic) or (park or "open space" or playground))) AND (TITLE-ABS(social or culture or cultural)) |
| 6 | Limit to Year of Publication [PUBYEAR > 1999] |
|  | TITLE-ABS((child\* or (boy or girl) or (pupil or student)) and school) AND (TITLE-ABS(((travel\* or transport\* or commut\*) and school) or (walk or (bike or biking) or (cycle or cycling) or (bicycle or bicycling) or scooter or (skate or skating or skateboard) or (car or automobile or motor or drive or driving or chauffeur) and school))) AND (TITLE-ABS("physical environment\*" or "built environment\*" or "neighbo\*rhood environment\*" or (urban and neighbo\*rhood) or "residential density" or "dwelling density" or "population density" or connectivity or "land use" or pedestrian or (bicyclist or cyclist) or (street or path or road or track or trail or pavement) or route or (facility or facilities or equipment or infrastructure) or safe\* or crime or traffic or (aesthetic or esthetic) or (park or "open space" or playground))) AND (TITLE-ABS(social or culture or cultural)) AND PUBYEAR > 1999 |
| 7 | Limit to Language [LANGUAGE(english)] |
|  | TITLE-ABS((child\* or (boy or girl) or (pupil or student)) and school) AND (TITLE-ABS(((travel\* or transport\* or commut\*) and school) or (walk or (bike or biking) or (cycle or cycling) or (bicycle or bicycling) or scooter or (skate or skating or skateboard) or (car or automobile or motor or drive or driving or chauffeur) and school))) AND (TITLE-ABS("physical environment\*" or "built environment\*" or "neighbo\*rhood environment\*" or (urban and neighbo\*rhood) or "residential density" or "dwelling density" or "population density" or connectivity or "land use" or pedestrian or (bicyclist or cyclist) or (street or path or road or track or trail or pavement) or route or (facility or facilities or equipment or infrastructure) or safe\* or crime or traffic or (aesthetic or esthetic) or (park or "open space" or playground))) AND (TITLE-ABS(social or culture or cultural)) AND PUBYEAR > 1999 AND LANGUAGE (english) |
| *(NOT AVAILABLE to limit to 'Full-text' and 'Peer-reviewed')* | |

17 URL to search strategy

Aside from current document, the published systematic review is available at https://www.sciencedirect.com/science/article/pii/S1353829217309371

18 Condition or domain being studied

Give a short description of the disease, condition or healthcare domain being studied. This could include health and wellbeing outcomes.

Active school travel in children.

19 Participants/population

Give summary criteria for the participants or populations being studied by the review. The preferred format includes details of both inclusion and exclusion criteria.

Participants were children aged 5-13 years at the commencement of the study and/or their parents/caregivers. Studies with mixed child age groups were included if over 50% of the participants were so defined and findings for the age group included in the review were reported separately. Studies were excluded if the study population involved other age groups that could not be separated; and children with medical conditions or physical or intellectual disabilities that could restrict active travel to school.

20 Intervention(s), exposure(s)

Give full and clear descriptions of the nature of the interventions or the exposures to be reviewed.

Inclusion criteria were:

* Objectively or subjectively measured modes of travel to/from school reported as a dependent variable.
* Subjectively measured (i.e., survey, scale) physical environment attributes AND objectively or subjectively measured social environment variables reported as independent variables.
* Associations of school travel mode with perceived physical environments AND social environments reported.

Exclusion criteria were:

* No objectively or subjectively measured modes of travel to/from school reported.
* Subjectively measured physical environment attributes OR/NOR objectively or subjectively measured social environment variables reported.
* Only objectively measured (e.g., geographic information systems (GIS)) physical environment attributes reported.
* No associations of school travel mode with perceived physical environments AND/OR social environments reported.

All composite and individual outcomes as reported in the included studies were considered. Outcomes measured at the individual (e.g., child, parent, household) and group (i.e., school, neighbourhood) levels were included. In this review, the physical environment was defined as natural (non-man-made physical features) and built (man-made physical attributes) environments in which children live and spend their time (e.g., neighbourhood, school, home) [[1-3](#_ENREF_1)]. Built environment referred to urban design, transportation systems, and recreation settings [[4-6](#_ENREF_4)]. The term ‘social environment’ was used to encompass sociological (e.g., social cohesion, social interaction, social support) and sociodemographic (e.g., socioeconomic status, ethnicity) characteristics. Test statistics and significance for associations between dependent and independent variables were included.

21 Comparator(s)/control

Where relevant, give details of the alternatives against which the main subject/topic of the review will be compared (e.g. another intervention or a non-exposed control group).

Passive school travel including cars and public transport.

22 Types of study to be included

Give details of the study designs to be included in the review. If there are no restrictions on the types of study design eligible for inclusion, this should be stated.

Descriptive and observational studies (i.e., cohort and prospective studies, case-control studies, case series, cross-sectional studies, longitudinal studies) were eligible for inclusion. Experimental studies (e.g., natural and quasi experiments) and interventions were excluded due to a variety of environmental and/or behavioural changes involved [[7-9](#_ENREF_7)], and the complexity of determining the true effect of each intervention. Qualitative studies (due to the different quality assessment criteria required [[10-12](#_ENREF_10)]); and other study designs (i.e., systematic reviews, expert opinions and conference proceedings) were also excluded.

23 Context

Give summary details of the setting and other relevant characteristics which help define the inclusion or exclusion criteria.

N/A

24 Primary outcome(s)

Give the most important outcomes.

All reported (i.e., statistically significant and non-significant) results of associations (i.e., odds ratios (OR) and regression coefficients (β)) of children’s school travel mode (i.e., dependent variable) with perceived physical environment, and sociological and sociodemographic characteristics (i.e., independent variables) were included.

25 Secondary outcomes

List any additional outcomes that will be addressed. If there are no secondary outcomes enter None.

None

26 Data extraction (selection and coding)

Give the procedure for selecting studies for the review and extracting data, including the number of researchers involved and how discrepancies will be resolved. List the data to be extracted.

A Cochrane Data Collection Form which was tailored to the requirements of this review (e.g., excluding intervention components) was used to extract and manage data (Table 2). An initial screening of titles and abstracts was undertaken by the first review author (EI), and 10% of the randomly selected titles and abstracts were also screened by a co-author (MS) [[13](#_ENREF_13), [14](#_ENREF_14)]. Full texts were obtained for all titles and abstracts that appeared to meet the inclusion criteria. Review authors (EI and MS) then independently screened the full text reports and assessed their eligibility for inclusion. Discrepancies between the review authors were resolved through discussion. The reasons for excluding studies were recorded. Neither of the review authors were blinded to the journal titles or to the study authors or institutions.

Using the modified Cochrane Data Collection Form, data for all the eligible studies were extracted only by the first review author (EI), and then checked by a research assistant to reduce bias and errors in data extraction. Data extracted included sociodemographic information, methodology, and all reported important outcomes related to school travel mode, perceived physical environments, and social environments.

Table 2. Data extraction form

|  |  |
| --- | --- |
| **General information** | Date form completed |
| Name/ID of person extracting data |
| Reference citation |
| Study author contact details |
| Publication type (e.g., full report, abstract, letter) |
| Notes |
| **Study eligibility** | Type of study |
| Participants |
| Types of comparison |
| Types of outcome measures |
| Include / exclude |
| Reason of exclusion |
| Notes |
| **Characteristics of included studies** |  |
| **Methods** | Design |
| Unit of allocation |
| Start date |
| End date |
| Duration of participation |
| Ethical approval needed / obtained for study |
| Name of study / project |
| Notes |
| **Participants** | Population description |
| Setting |
| Inclusion criteria |
| Exclusion criteria |
| Method of recruitment of participants |
| Informed consent obtained |
| Sample size |
| Clusters |
| Withdrawals and exclusions |
| Age |
| Sex |
| Race / ethnicity |
| Other relevant sociodemographics |
| Subgroups measure |
| Subgroups reported |
| Notes |
| **Outcomes** | Time points measured |
| Time points reported |
| Outcome definition(s) |
| Person measuring / reporting |
| Unit(s) of measurement |
| Scales: upper and lower limits |
| Spatial scales |
| Is outcome(s) / tool(s) validated? |
| Imputation of missing data |
| Power |
| Notes |
| **Risk of bias assessment** | Blinding methods |
| Response rate |
| Follow-up response rate |
| Notes |
| **Data and analysis** | Comparison |
| Outcome(s) |
| Subgroup |
| Time point(s) |
| No. participants |
| Results (adjusted or unadjusted) |
| No. missing participants |
| Reasons missing |
| Unit(s) of analysis |
| Statistical methods used and appropriateness of these (e.g. adjustment for correlation) |
| Notes |

27 Risk of bias (quality) assessment

State whether and how risk of bias will be assessed, how the quality of individual studies will be assessed, and whether and how this will influence the planned synthesis.

The strength of evidence, quality, and risk of bias for each included study were assessed at the study level using the quality assessment checklist of Pont et al. [[2](#_ENREF_2)]. Rating scales were retrieved from Effective Public Health Practice Project Quality Assessment Tool (EPHPP) [[15-18](#_ENREF_15)]. The grading system, comprising six components and a composite global rating. The six domains of bias and methodological quality are: description of the sample, sampling methods, study methodology, measurement, external validity of measurement tools, and bias from blinding and follow-up [[2](#_ENREF_2)]. The original quality assessment checklist of Pont et al. [[2](#_ENREF_2)] was modified to increase the suitability for evaluating studies included in this review, and to generate an overall appraisal of each study. Given the importance of assessment in confounders and analyses [[7](#_ENREF_7), [15-17](#_ENREF_15), [19](#_ENREF_19)], an additional domain of analyses (i.e., statistical methods, confounders, clustering and model fit) was included in the assessment, but reported separately from the overall rating of the other six domains. Two review authors (EI and EH) independently assessed the quality of each study included. Reviewers resolved disagreements by discussion, and an arbitrator (KW) adjudicated unresolved disagreements.

28 Strategy for data synthesis

Give the planned general approach to be used, for example whether the data to be used will be aggregate or at the level of individual participants, and whether a quantitative or narrative (descriptive) synthesis is planned. Where appropriate a brief outline of analytic approach should be given.

A systematic narrative synthesis was performed to summarise the characteristics (i.e., study location, study design, research project, participants, school travel mode, perceived physical environment attributes, and sociological and sociodemographic variables) and significant and non-significant findings (i.e., ORs and β) in the final statistical model of the included studies. In order to identify the direction of associations, findings were classified as positive (i.e., OR > 1, β > 0) or negative (i.e., OR < 1, β < 0). Reverse-coding of the original direction of associations (i.e., positive to negative or vice versa) was performed depending on the wording of the original question items (e.g., ‘too far’ versus ‘distance close enough’). Findings were collated separately by statistical significance (i.e., significant versus non-significant findings) and independent variables (i.e., perceived physical environment, and sociological and sociodemographic characteristics). Results from each independent variable were integrated into categories (Table 3).

Vote counting was applied for significant and non-significant findings separately to summarise the number of studies reporting positive and/or negative associations with school travel modes in each category (Table 3) [[20](#_ENREF_20), [21](#_ENREF_21)]. School travel modes were classified from individual studies as being concerned with active travel (i.e., walk, cycle) or passive travel (i.e., car, school bus, public transport). Studies were counted once per category (Table 3) by scoring either ‘1’ for positive or ‘-1’ for negative associations with active school travel. If the study reported more than one findings for the category and these findings were conflicted in direction (i.e., positive AND negative associations), the studies were scored as ‘0.5’ AND ‘-0.5’ for both directions.

The categories (Table 3) wherein three or more studies reported significant and non-significant findings were included in the synthesis of results. The consistency of positive or negative associations was examined in the categories with five or more studies reporting significant findings to sufficiently indicate consensus [[21](#_ENREF_21)] (i.e., the categories with < 5 studies were classified as ‘*none*’). ‘*Consistent associations*’ were defined as 76-100% (i.e., more than three quarters) of the significant results reporting the same direction within each category (c.f., 51-75%: ‘*inconsistent association’*).

Table 3. The categories of perceived physical environment attributes and social environment variables, and the direction of their associations with active school travel

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Direction** | |
| **Positive** | **Negative** |
| **Perceived physical environment:** | |  |  |
|  | Travel distance & time | Shorter distance / time | Longer distance / time |
|  | Walkability | More walkable | Less walkable |
|  | Land use mix - diversity | Presence of business or facilities | Absence of business or facilities |
|  | Land use mix - access | More accessible to services | Less accessible to services |
|  | Walking & cycling infrastructure | More infrastructure | Less infrastructure |
|  | Traffic & route safety | Safer (less traffic) | More dangerous (more traffic) |
|  | Neighbourhood safety | Safer | More dangerous |
|  | Personal safety | Safer | More dangerous |
|  | Aesthetics | More aesthetic | Less aesthetic |
| **Social environment:** | |  |  |
| *Sociological characteristics* | |  |  |
|  | Neighbourhood social capital / cohesion | Stronger social capital / cohesion | Weaker social capital / cohesion |
|  | Neighbourhood social interaction | More social interaction | Less social interaction |
|  | Social norms of active travel | Stronger social norms | Weaker social norms |
|  | Family & friends support / encouragement for active school travel | More support / encouragement | Less support / encouragement |
|  | Family/parents support / encouragement for active school travel | More support / encouragement | Less support / encouragement |
|  | Friends/other children support / encouragement for active school travel | More support / encouragement | Less support / encouragement |
|  | School support / encouragement for active school travel | More support / encouragement | Less support / encouragement |
| *Sociodemographic characteristics* | |  |  |
|  | Neighbourhood socioeconomic status | Higher socioeconomic status | Lower socioeconomic status |
|  | Household income | Higher income | Lower income |
|  | Household parent education | Higher education | Lower education |
|  | Household parental employment | Unemployed / Part-time | Employed / Full-time |
|  | Family structures | More adults (dual parent) / family members | Less adults (single parent) / family members |
|  | Number of children | More children / siblings | Less children / siblings |
|  | Car ownership/access | More cars | Less cars |
|  | Ethnicity/race | *Not specified* | *Not specified* |
|  | School bus | Availability of school bus | Unavailability of school bus |
|  | School administration | *Not specified* | *Not specified* |
|  | School level | Higher level (secondary) | Lower level (primary) |

29 Analysis of subgroups or subsets

Give any planned exploration of subgroups or subsets within the review. ‘None planned’ is a valid response if no subgroup analyses are planned.

None planned.

**Review general information**

30 Type and method of review

Systematic review, Child health, Public health (including social determinants of health)

31 Language

English

Will a summary/abstract be made available in English?

Yes

32 Country

New Zealand

33 Other registration details

N/A

34 Reference and/or URL for published protocol

Give the citation for the published protocol, if there is one. Give the link to the published protocol, if there is one. This may be to an external site or to a protocol deposited with CRD in pdf format. I give permission for this file to be made publicly available.

Aside from current document, the published protocol is available at https://www.sciencedirect.com/science/article/pii/S1353829217309371.

35 Dissemination plans

Give brief details of plans for communicating essential messages from the review to the appropriate audiences.

Publishing the review in a scientific, peer-reviewed, academic journal – *Health & Place* (doi:10.1016/j.healthplace.2018.09.009), and presenting it at scientific conferences.

36 Keywords

Give words or phrases that best describe the review.

Active school travel  
Perceived physical environment  
Travel distance and time  
Safety perceptions  
Social environment  
Neighbourhood social interaction  
Systematic review

37 Details of any existing review of the same topic by the same authors

Give details of earlier versions of the systematic review if an update of an existing review is being registered, including full bibliographic reference if possible.

N/A

38 Current review status

Review status should be updated when the review is completed and when it is published.

Completed and published in *Health & Place* (doi:10.1016/j.healthplace.2018.09.009).

39 Any additional information

Provide any further information the review team consider relevant to the registration of the review.

N/A

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