INTERVENTIONS TO PREVENT UNINTENTIONAL INJURY IN CHILDREN ON THE ROAD

Report 2:

Barriers to, and facilitators of, the prevention of unintentional injury in children on the road.

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About the Peninsula Technology Assessment Group (PenTAG)

The Peninsula Technology Assessment Group is part of the Institute of Health Service Research at the Peninsula Medical School. PenTAG was established in 2000 and carries out independent Health Technology Assessments for the UK HTA Programme, systematic reviews and economic analyses for NICE (Technology Appraisal and Centre for Public Health Excellence) and systematic reviews as part of the Cochrane Collaboration Heart Group, as well as for other local and national decision-makers. The group is multi-disciplinary and draws on individuals' backgrounds in public health, health services research, computing and decision analysis, systematic reviewing, statistics and health economics. The Peninsula Medical School is a school within the Universities of Plymouth and Exeter. The Institute of Health Research is made up of discrete but methodologically related research groups, among which Health Technology Assessment is a strong and recurring theme. Projects to date include:

- Barriers to and facilitators for the effectiveness of multiple risk factor programmes aimed at reducing cardiovascular disease within a given population: a systematic review of qualitative research (2009).
- Population and community programmes addressing multiple risk factors to prevent cardiovascular disease: a qualitative study into how and why some programmes are more successful than others (2009)
- Barriers to and facilitators of conveying information to prevent first occurrence of skin cancer: a systematic review of qualitative research (2009)
- The Effectiveness and Cost-Effectiveness of Cochlear Implants for Severe to Profound Deafness in Children and Adults: A Systematic Review and Economic Model (2008)
- The Effectiveness and Cost-Effectiveness of Methods of Storing Donated Kidneys from deceased donors: A Systematic Review and Economic Model (2008)
- Bevacizumab, sorafenib tosylate, sunitinib and temsirolimus for renal cell carcinoma: A systematic review and economic model (2008)
- The Effectiveness and Cost-Effectiveness of Cinacalcet for Secondary Hyperparathyroidism in end stage renal disease patients on dialysis. Systematic Review And Economic Evaluation (2007)
- The effectiveness and cost-effectiveness of Carmustine Implants and Temozolomide for the treatment of newly-diagnosed High Grade Glioma**.** Systematic Review And Economic Evaluation (2007)
- The Effectiveness and Cost-Effectiveness of Cardiac Resynchronisation Therapy for Heart Failure. Systematic Review And Economic Evaluation (2007)
- Inhaled Corticosteroids and Long-Acting Beta2-Agonists for The Treatment of Chronic Asthma in Adults and Children Aged 12 Years and Over: a Systematic Review and Economic Analysis (2007)
- Inhaled Corticosteroids and Long-Acting Beta2-Agonists for The Treatment of Chronic Asthma an Children Under the Age of 12 Years: a Systematic Review and Economic Analysis (2007)
- The Cost-Effectiveness of testing for hepatitis C (HCV) in former injecting drug users. Systematic Review And Economic Evaluation. (2006)

- Do The Findings Of Case Series Studies Vary Significantly According To Methodological Characteristics?(2005)
- The Effectiveness And Cost-Effectiveness Of Pimecrolimus And Tacrolimus For Atopic Eczema - A Systematic Review And Economic Modelling (2005)
- The Effectiveness And Cost-effectiveness Of Dual Chamber Pacemakers Compared To Single Chamber Pacemakers For Bradycardia Due To Atrioventricular Block Or Sick Sinus Syndrome - Systematic Review And Economic Evaluation (2005)
- The Effectiveness and Cost-Effectiveness Of Surveillance Of Barrett's Oesophagus: Exploring The Uncertainty (2005)
- The Effectiveness And Cost-Effectiveness Of Microwave And Thermal Balloon Endometrial Ablation For Heavy Menstrual Bleeding - A Systematic Review And Economic Modelling (2004)
- Systematic Review Of Endoscopic Sinus Surgery For Nasal Polyps (2003)
- The Effectiveness And Cost-Effectiveness Of Imatinib For First Line Treatment Of Chronic Myeloid Leukaemia In Chronic Phase (2003)
- The Effectiveness And Cost-Effectiveness Of Imatinib (STI 571) In Chronic Myeloid Leukaemia - A Systematic Review (2002)
- Screening For Hepatitis C Among Injecting Drug Users And In Genitourinary Medicine (GUM) Clinics - Systematic Reviews Of Effectiveness, Modelling Study And National Survey Of Current Practice (2002)
- The Effectiveness And Cost-Effectiveness Of Imatinib (STI 571) In Chronic Myeloid Leukaemia - A Systematic Review (2002)
- Screening For Hepatitis C Among Injecting Drug Users And In Genitourinary Medicine (GUM) Clinics - Systematic Reviews Of Effectiveness, Modelling Study And National Survey Of Current Practice (2002)

Collaborations

Work for the NICE Centre for Public Heath Excellence is carried out in close collaboration with the West Midlands Health Technology Assessment Centre at the University of Birmingham although they were not directly involved with this review.

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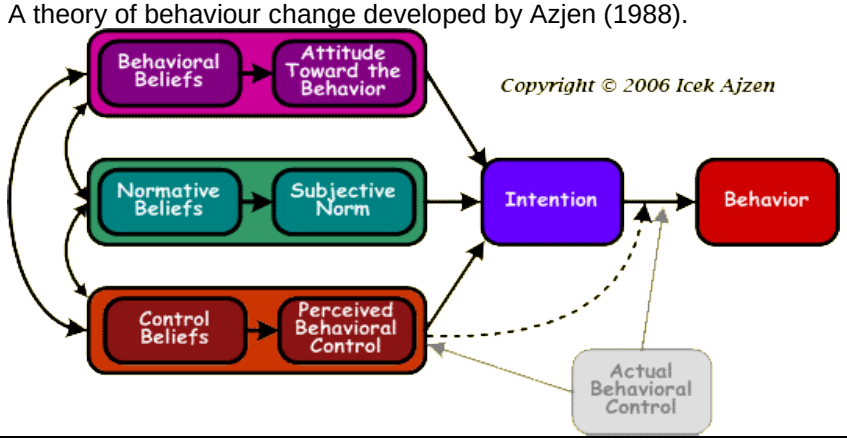
Declaration of authors' competing interests

No authors have competing interests.

List of abbreviations

BAME	Black, Asian, Minority Ethnic communities
PenTAG	Peninsula Technology Assessment Group
RSO	Road Safety Officer
WMHTAC	West Midlands Health Technology Assessment Centre

Glossary of terms

"Common" risk	Behaviour such as running across the road to get across safely, walking between parked cars or through traffic (Sawyer, 1998)
Content analysis	Content analysis is a research tool used to determine the presence of certain words or concepts within texts or sets of texts. Researchers may use quantitative or qualitative methods, to quantify and/or analyse the presence, meanings and relationships of such words and concepts, then make inferences about the messages within the texts, the writer(s), the audience, and even the culture and time of which these are a part.
Constant comparative method	A method of analysis and theory generation originally described by Glaser and Strauss (1967) in developing grounded theory. In the course of conducting research, initial coding and categories inform data collection and further analysis, which test and refine them and test provisional hypotheses for validity against other examples of the phenomenon under examination. Unhelpfully, the term is also often used generally, to describe an analytic process that does not lead to theory development.
"Extreme" risk	Behaviour such as playing games in the road (such as football or "chicken"), or holding onto buses on rollerskates or bike.
Grounded theory	The development of theory from qualitative research findings that explain how an aspect of the social world works (originally described by Glaser & Strauss, 1967 although the authors have since diverged in their views about its meaning and conduct). Key elements of grounded theory include constant comparison, simultaneous collection and analysis of data, simultaneous generation and testing of hypotheses, theoretical sampling. Throughout, the method places primary importance on the development of an analytic approach based upon the perspectives of research participants (i.e. one that is "grounded" in the data) rather than researchers' pre-defined concepts.
Lollipop people	A school crossing supervisor, usually operating before and after school who stops traffic temporarily, to allow children to safely cross the road.
Key informants	People purposively selected for interview for their specialist knowledge or insight into the questions, and community, of interest.
"Soft "quantification	The use of quantifying information, but not numbers, when describing qualitative findings, for example – "the vast majority of interviews…".
S2, S4	Scottish school grades – secondary school year 2 and year 4.
STATS19	Statistics collected by the police about road accidents. This includes assessment of the ethnicity of those involved, as assessed by the police. Categories are white-skinned European, Dark-skinned European, Afro-Caribbean, Asian, Oriental, Arab, Other.
Thematic analysis	Analysis of qualitative data into descriptive, thematic categories without further development into analytically useful concepts or interpretive explanations or theories.
Theory of planned behaviour	A theory of behaviour change developed by Azjen (1988). 

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1. Summary

1.1. Introduction

This is Report 2, in a series of three, related to design based interventions for the prevention of unintentional injury to children on the road, produced for the NICE CPHE Intervention Guidance process. It presents the findings of a systematic review of qualitative research about the barriers to, and facilitators of, the prevention of unintentional injury in children on the road. Report 1 contains a systematic review of the effectiveness and cost-effectiveness of interventions to prevent unintentional injuries in children on the road, and Report 3 reports on cost-effectiveness modelling of such interventions.

1.2. Aim

The aim of this review is to understand the elements that contribute to successful or unsuccessful road and traffic management strategies to reduce injury on the road. The following primary research question informed this evidence review:

- What are the important factors which either enhance or reduce the effectiveness of design based interventions, safe routes to schools and cycle/walking routes, or which help or hinder their implementation?

In order to address this question, two key types of outcomes were sought in the identified literature from the start, although it was understood that other important areas might emerge through the process of reviewing the evidence:

- The views and experiences of those planning and delivering injury prevention schemes (such as design based interventions, safe routes to schools and cycle/walking routes) which describe the barriers and facilitators to successful *implementation* of such schemes or how to overcome such barriers.
- The public's views and experiences – especially children and young people themselves or their parents – about how they use street spaces and view injury prevention schemes (design based interventions, safe routes to schools and cycle/walking routes) which might illuminate reasons why some schemes work better than others, barriers to effectiveness or how to overcome those barriers.

In particular, it was hoped that information about the second of these concerns may help to explain inequalities in childhood injury rates on the roads.

1.3. Methods

The review used published evidence identified through a search of electronic databases and websites using subject terms, together with reference list checks.

Study reports were included if they were written in English and related to reducing child injury on the roads using qualitative research methods. Each included study was quality appraised, and the findings, in the form of key themes, concepts and supporting quotations, were extracted. Details of each study were recorded in an evidence table for each study.

1.4. Findings

Ten studies were included in the review, eight of them from the UK. The quality of the study reporting was generally poor.

Evidence statement 1: Children and young people's knowledge and behaviour
1a. Three UK based studies discuss children's and young people's knowledge and behaviour about accidents (Lupton & Bayley, 2006 [-]; Sawyer, 1998 [-]; Steinbach et al 2007 [-]). 1b. While these three studies suggest that children and young people are well informed about what constitutes risky behaviour and how to avoid it (Lupton & Bayley, 2006; Sawyer, 1998; Steinbach et al 2007), two studies found this did not influence their actual behaviour, even if they had experienced a previous near miss or actual accident.
Evidence statement 2: Children and young people as the causes of accidents
2a. Five studies, four UK and one USA based, discuss risk-taking behaviour among children and young people as a potential cause of accidents (Christie et al, 2007 [+]; Frattaroli et al, 2006 [+]; Lupton & Bayley, 2006 [-]; Sawyer, 1998 [-]; Steinbach et al,

2007 [-]).

2b. Like adults, children and young people often engage in “common” risk behaviours, which are seen as part of everyday life, such as not always using crossings, crossing between parked cars or in traffic etc. (Sawyer, 1998)

2c. One UK study (Lupton & Bayley, 2006) reports that teenagers were more likely to take risks on the road than younger children (aged 8+).

2d. Three UK studies (Christie et al, 2007; Lupton & Bayley, 2006; Sawyer, 1998) suggest that a minority of children and young people engage in “extreme” risks – playing chicken in the road, holding onto the back of buses etc, and that boys are more likely to do this, and to encourage such behaviour in each other. Such behaviours are regarded in a similar way to thrill-seeking sports.

2e. Peer issues were seen as important in two UK studies (Lupton & Bayley; Sawyer 1998). This could be positive if it gave children and young people the confidence to use crossings safely and if some adopted a minder role, preventing risky behaviour in their friends. However it could also be negative where it encouraged “ritual showing off” and dares.

2f. Two UK studies report that drinking alcohol may increase risk taking among young people, whilst in adults, may encourage less supervision of their children (Christie et al, 2007; Sawyer, 1998).

2g. Three UK studies suggest that children and young people play in the street where there other suitable facilities are lacking or pricey, or where parks are seen as dangerous due to their use for drinking and drug-taking (Christie et al, 2007; Sawyer et al 1998; Steinbach et al, 2007).

Evidence statement 3: Drivers as the cause of accidents

3a. Five studies, three from the UK, one from the USA and one from New Zealand, discuss drivers as the cause of accidents (Christie et al, 2007 [+]; Frattaroli et al, 2006 [+]; Lupton & Bayley, 2006 [-]; Sawyer, 1998 [-]; Tranter & Pawson, 2001 [-]).

3b. Key identified responsibilities were identified as obeying speed and other traffic

laws, sopping for pedestrians, not driving recklessly and parking safely and legally, especially around schools and places children and young people play (Christie et al, 2007; Frattaroli et al, 2006; Lupton & Bayley, 2006; Sawyer, 1998; Tranter & Pawson, 2001).

3c. One study suggests that young people did not necessarily understand that it might be difficult for drivers to stop quickly (Sawyer 1998).

3d. One study found that younger children are worried that drivers might not see them waiting to cross the road because they are small and might be considered unimportant (Lupton & Bayley, 2006). These fears led to indecisiveness at crossings which children thought made drivers impatient – something they were very anxious to avoid.

Evidence statement 4: Structural causes of accidents

4a. Four studies (three UK, one USA) discuss structural causes of accidents, although these received less attention than child or driver causes (Christie et al, 2006 [+]; Frattaroli et al, 2006 [+]; Sawyer, 1998 [-]; Steinbach et al, 2007 [-]).

4b. One UK study suggests that older, narrow streets not designed for contemporary traffic volume, exacerbate traffic and parking problems (Christie et al, 2007).

4c. One UK study suggests that more signs are needed to alert drivers to areas where children and young people congregate play (Christie et al, 2007).

4d. One study among USA stakeholders highlights the volume of traffic, its speed and congestion, as well as poor walking areas which are inadequately defined or signed or in poor repair (Frattaroli et al, 2006).

4e. One UK study suggests there is a need for more central islands to help crossing (Steinbach et al, 2007).

4f. Two UK studies suggest that the placement of crossings need to be carefully considered to accommodate how people actually use the roads, taking into account "line of desire" (Sawyer, 1998; Steinbach et al, 2007).

4g. One UK study suggests that underpasses may not be considered safe to use

(Sawyer, 1998).

4h. One UK study reports that lollipop people are seen as for younger children and older children and young people did not want to use them (Sawyer, 1998).

Evidence statement 5: Attitudes to road safety – priorities and awareness

5a. Five studies, three from the UK, one from the USA and one from New Zealand, suggest that road safety for children and young people is given low priority by local communities (Baslington, 2008 [-]; Christie et al 2006 [+]; Frattaroli et al, 2006 [+]; Steinbach et al, 2007 [-];Tranter & Pawson, 2001 [-]).

5b. Five studies suggest that, particularly in urban areas, they may be competing safety related issues which are seen as more serious by children and young people, parents and other stakeholders, such as violence and crime, local neighbourhood concerns (including drug dealing, local rivalries or better facilities for young people), education and "stranger danger" (Baslington, 2008; Christie et al 2006; Frattaroli et al, 2006; Steinbach et al, 2007;Tranter & Pawson, 2001).

5c. One US study suggests that as a result, a more holistic approach to local safety and enhanced community environments might be more effective (Frattaroli et al, 2006).

5d. Two studies (one UK, one New Zealand) suggest there is an implicit cultural understanding car use as "good parenting", offering their children safety – the negative consequences of this are described as a "social trap", whereby road conditions become *less* safe generally, due to parental desire for their children to be *more* safe (Baslington, 2008; Tranter & Pawson, 2001).

5e. Two studies (one UK one USA) consider community engagement with plans for road safety interventions with either lack of structures, or lack of genuine consultation found in both cases (Green and Edwards, 2008 [+]; Frattaroli et al 2006 [+]). Unintended negative consequences, traffic speeding more after the replacement of a zebra crossing with traffic lights are reported.

5f. One study suggests that there is an inherent tension between meaningful community involvement in planning and an environment requiring interventions to be

"evidence based" (Green & Edwards, 2008).

5g. Three studies, one USA and two UK – the latter based on the same data-set, suggest that there is low political priority for road safety (Frattaroli et al, 2006 [+]; Green & Edwards, 2008 [+]; Steinbach et al, 2007 [-]). The UK studies qualify this as relating to the difficulties of differentially allocating resources to address inequalities in injury risk among some minority groups.

5h. Two UK studies (based on the same dataset) suggest that there is a lack of community awareness about differential road injury risk among children and young people from some ethnic minority groups (Green & Edwards, 2008; Steinbach et al, 2007).

5i. Two UK studies (based on the same dataset) suggest that there are difficulties about interpreting data on differential road injury risk among children and young people from some ethnic minority groups, due to the way it is collected and its relevance to actual communities and locations, making targeting inequalities difficult (Green & Edwards, 2008; Steinbach et al, 2007).

Evidence statement 6: Suggested solutions to child injury on the road

6a. Six studies, five UK and one USA, discuss possible solutions to preventing child injury on the road (Baslington, 2008; Christie et al, 2007 [+]; Frattaroli et al, 2006 [+]; Green & Edwards, 2008 [+]; Steinbach et al [-]).

6b. Suggested structural solutions to reduce injuries included broad remits such as greater investment in the causes of deprivation and improved education (Green & Edwards, 2008); more compulsory measures (Lupton & Bayley, 2006) and better enforcement of existing traffic regulations (Christie et al, 2007; Lupton & Bayley, 2006).

6c One UK study reports that children and young people sometimes misunderstood the purpose of street furniture – tending to assume that items such as railings and bollards were intended to enhance pedestrian safety, and being dismayed to see that they were not strong enough for this purpose (Lupton & Bayley, 2006).

6d. One UK study suggests restricted vehicular access to schools and "Park and

Stride" might address congestion at the school gates (Baslington, 2008).

6e. Two UK studies (based on the same dataset) suggest that road safety officers favour empiricist solutions to injury rates – for example using accident histories to prioritise bids for interventions (Green & Edwards, 2008; Steinbach et al 2007).

6f. Two UK studies suggest that there was pressure on interventions to be targeted, however lack of appropriate data might limit the effectiveness of this and lead to proxy targets being used – for example, geographical definitions of deprivation replacing possible cultural or community characteristics related to higher risk – or professional's relying on personal experience rather than data (Green & Edwards, 2008; Steinbach et al 2007).

6g. Young people and professionals were sensitive to the possibility that data about differential risk among some ethnic communities needed to e used sensitively to avoid victim blaming (Steinbach et al, 207).

Evidence statement 7: School Travel Plans

7a. One UK study explicitly discussed School Travel Plans and found that promotional material tended to focus on health benefits and empowerment rather than their safety aspects (Baslington, 2008 [-]).

7b. It may be difficult to recruit parent volunteers to assist with aspects of School Travel Plans, such as walking buses, due to competing priorities, including work. Some may feel it inappropriate for such schemes to rely on such free, usually female, labour (Baslington, 2008).

Evidence statement 8: Quiet Lanes

8a. Two UK studies assess Quiet Lanes (Kennedy et al, 2004 I & II, both [-]).

8b. While locals were aware of the scheme, visitors were not, and signs were thought too small and too uninformative to assist with this.

8c. It was felt that the Lanes were not safe for children to use as pedestrians or cyclists – conflict between vehicles and other road users was seen as inevitable, and exacerbated by heavy vehicles including buses using the Lanes, which did not have

speed limits.

8d. Better publicity and more informative signs were recommended, as were enhanced links with existing leisure and village routes.

2. Aims and Background

2.1. Objectives and Rationale

This is the second report produced by PenTAG for the CPHE at NICE about design based interventions aimed at preventing unintentional injury in children on the road. The Report 1, comprises reviews of the evidence for effectiveness and cost-effectiveness of such intervention while Report 3 contains the results of cost-effectiveness modelling of such interventions.

The aim of the project overall is to understand how to provide effective and cost-effective interventions to prevent unintentional injury in children on the road. This report systematically reviews and synthesises relevant qualitative research to inform this topic, in particular to understand what factors might facilitate, and mitigate against, the prevention of unintentional injury in children on the road.

2.2. Review Questions

The following primary research question informed this evidence review:

- What are the important factors which either enhance or reduce the effectiveness of design based interventions, safe routes to schools and cycle/walking routes, or which help or hinder their implementation?

In order to address this question, initially two key types of information were sought in the identified literature from the start, although it was understood that other important areas might emerge through the process of reviewing the evidence:

- The views and experiences of those planning and delivering injury prevention schemes (such as design based interventions, safe routes to schools and cycle/walking routes) which describe the barriers and facilitators to successful *implementation* of such schemes or how to overcome such barriers.
- The public's views and experiences – especially children and young people themselves or their parents – about how they use street spaces and view injury prevention schemes (design based interventions, safe routes to schools and cycle/walking routes) which might

illuminate reasons why some schemes work better than others, barriers to effectiveness or how to overcome those barriers.

In particular, it was hoped that information about the second of these concerns may help to explain inequalities in childhood injury rates on the roads.

3. Methods

3.1. Identification of evidence

While all reviews can pose challenges for finding research, the literature on road safety was discovered to contain additional challenges that shaped the searching methodology. We are not the first research team to have encountered such difficulties. Wentz et al, used word frequency analysis with hand searching as a gold standard in an attempt to devise search strategies that identified controlled evaluation studies of road safety interventions (Wentz et al. 2001). Despite being a team of experienced information professionals and researchers from the Cochrane Injuries Group using the indexed TRANSPORT database, they were unable to devise a strategy with acceptable sensitivity and specificity. We were also unable to access many potentially useful papers due to prohibitive cost, access difficulties (usually the British Library not buying certain reports), and being unable to source unpublished reports from their original funder or research organisation (n=48).

See Appendix 3 for full search methodology and database search strategies.

A single strategy was used to identify relevant primary research for the effectiveness, cost-effectiveness, and qualitative research reviews. A search of the electronic bibliographic databases: Transport Research Information Service (TRIS), Medline, Medline In Process, PsycINFO, Social Science Citation Index, Health Management Information Consortium (HMIC), Applied Social Science Index and Abstracts (ASSIA), ERIC, SafetyLit, the EPPI CENTRE databases; TRoPHI, DoPHER, and Bibliomap, and the databases of the Centre for Review and Dissemination; DARE, NHSEED, and HTA was undertaken. A follow up `targeted` search was done in TRIS and Medline of specific named programmes and additional traffic calming methods determined from the results of the original database searches.

Author suggestions, expert contacts, author citation, websites, and an extensive search of references lists of reports and reviews were also used as search methods.

3.1.1. Inclusion of relevant evidence

3.1.1.1. Inclusion criteria

Populations

Children and young people aged under 15.

Parents and carers of children and young people aged under 15.

Those who plan or implement road injury prevention schemes or design based road safety schemes.

Interventions

Local or regional interventions to reduce injuries in children and young people aged under 15 by road/street design or by modifying the road/street environment and highway design.

These will include the following either combined or delivered separately:

- traffic calming
- 20 mph zones
- home zones
- international examples such as 'woonerven' in the Netherlands: streets or a group of streets that have been redesigned to slow traffic and promote non-motorised traffic
- 'naked streets' (or 'psychological traffic calming') where road markings, lines, traffic lights, signs and curbs and so on are removed to create uncertainty in road users and encourage them to slow down
- 'quiet lanes' and other rural examples of traffic calming schemes
- signing related to speed limits
- walking and cycling networks
- 'Safe Routes to Schools'

Locations

Developed/OECD countries (See Appendix 4 for details)

Time period

1990 onwards.

Study design

Primary qualitative research involving the analysis of written or spoken evidence, regarding attitudes towards, or experiences of, the relevant interventions;

Qualitative surveys of attitudes towards, or experiences of the relevant interventions.

3.1.1.2. Exclusion criteria

Interventions

- National legislation or regulation, including in relation to blood alcohol concentration and other driver legislation.
- Enforcement of legislation, including speed limits, speed cameras, speed limiters (technology that prevents a vehicle being driven at certain speeds) alcohol testing, enforcing driver legislation and policing policies.
- Primary prevention to reduce the risk of collisions which use education of drivers, cyclists and pedestrians (including national and local media campaigns, leaflets and promotional activities), mandatory training, re-testing and post-offence training, visibility for vehicles and visibility for cyclists and pedestrians such as daytime lights and high visibility clothing, and those that aim to reduce risk through passive methods (such as anti-lock breaks or skid resistant surfaces).
- Secondary prevention measures that aim to reduce the severity of or occurrence of injury following collision (e.g. seat belt and safety seat use promotion, helmets)
- Tertiary prevention, including emergency services, treatment and rehabilitation.

Locations

Developing or non-OECD countries.

Study types

Research which does not involve the collection and analysis of qualitative data using established qualitative research methods. This included studies that were considered fatally flawed because they used an inappropriate study design for the research questions they wanted to be answered (for example, one paper was excluded

because it used focus group methodology to collect information that was essentially survey data – such as the types of traffic calming measures that parents liked. No primary data (quotes) were presented in this report, and findings were presented in the form of the number of focus groups that raised a particular issue (Defrancesco et al. 2003))

While systematic reviews were not included in the review, where they were identified, lists of included and excluded studies were scanned to identify potentially relevant studies, the title and abstract of which were screened online, with potentially relevant full text study reports screened online or as a hard copy, using the same checklists and procedures outlined below.

Language

Non-English language studies.

3.1.1.3. Screening

Studies identified through the searches were uploaded into RevPal, a bespoke access database specifically developed within PenTAG to aid screening of titles and abstracts and manage the review process. All titles and abstracts (where available) were screened by one of two reviewers independently (KA, RG). Where the first reviewer was uncertain, the opinion of a second reviewer (KA, RG or RA) was sought. A predefined checklist (see Appendix 5) was used to assess whether papers met the inclusion criteria. Where studies appeared to meet the inclusion criteria, full text copies were requested.

Full text study reports were checked for inclusion by one reviewer independently (KA or RG) and any uncertainties resolved by discussion. The checklist used is shown in Appendix 5. The content of study reports was assessed at the full text phase. We included study reports that did not directly relate to a particular design intervention or safe route to school, contrary to initial protocol. With the agreement of CPHE, this was done where it was thought that the opinions expressed would relate to any attempts to reduce accidental injury on the road in children and young people, for example, studies where the local culture of playing in and around roads was

discussed. Studies obtained but excluded at the full text stage, together with abstracts where available, are shown in Appendix 7.

The review protocol had allowed for iterative decisions about the type of material that would be used to inform the question of barriers and facilitators to be made in response to the information we located. In order to allow flexibility, and identify alternative sources of information if needed, we marked for retrieval potentially relevant quantitative studies when screening titles and abstracts, as well as qualitative studies (those, for example, that surveyed parental attitudes to road safety features). In the event, enough relevant qualitative research was identified so it was agreed with the team at NICE that we would not pursue this information at an interim meeting. A list of these quantitative studies, with abstracts where available, is also shown in Appendix 7.

3.2. Methods of analysis/synthesis

3.2.1. Quality assessment

All included studies were assessed for quality by one member of the team (RG) using the criteria shown in Appendix 6: this was used as an alternative to that in the NICE Methods Guidance document since, at the time, the methods guide was under review.

3.2.2. Data extraction

For each included study report, information about the methods and population studied was extracted into an evidence table. In addition, findings, in the form of key themes, concepts and metaphors, from the authors, and participants' quotes where appropriate, were extracted for each study report by one reviewer (RG) (see Appendix 8). At the extraction phase there was no attempt to separate out those themes that might be deemed directly relevant to the research questions and key outcomes, to avoid prematurely excluding details that might later be revealed as important.

In addition, general statements about possible applicability of the study findings to a UK setting were made based on the location and date of the studies that were conducted.

3.2.3. Data analysis and synthesis

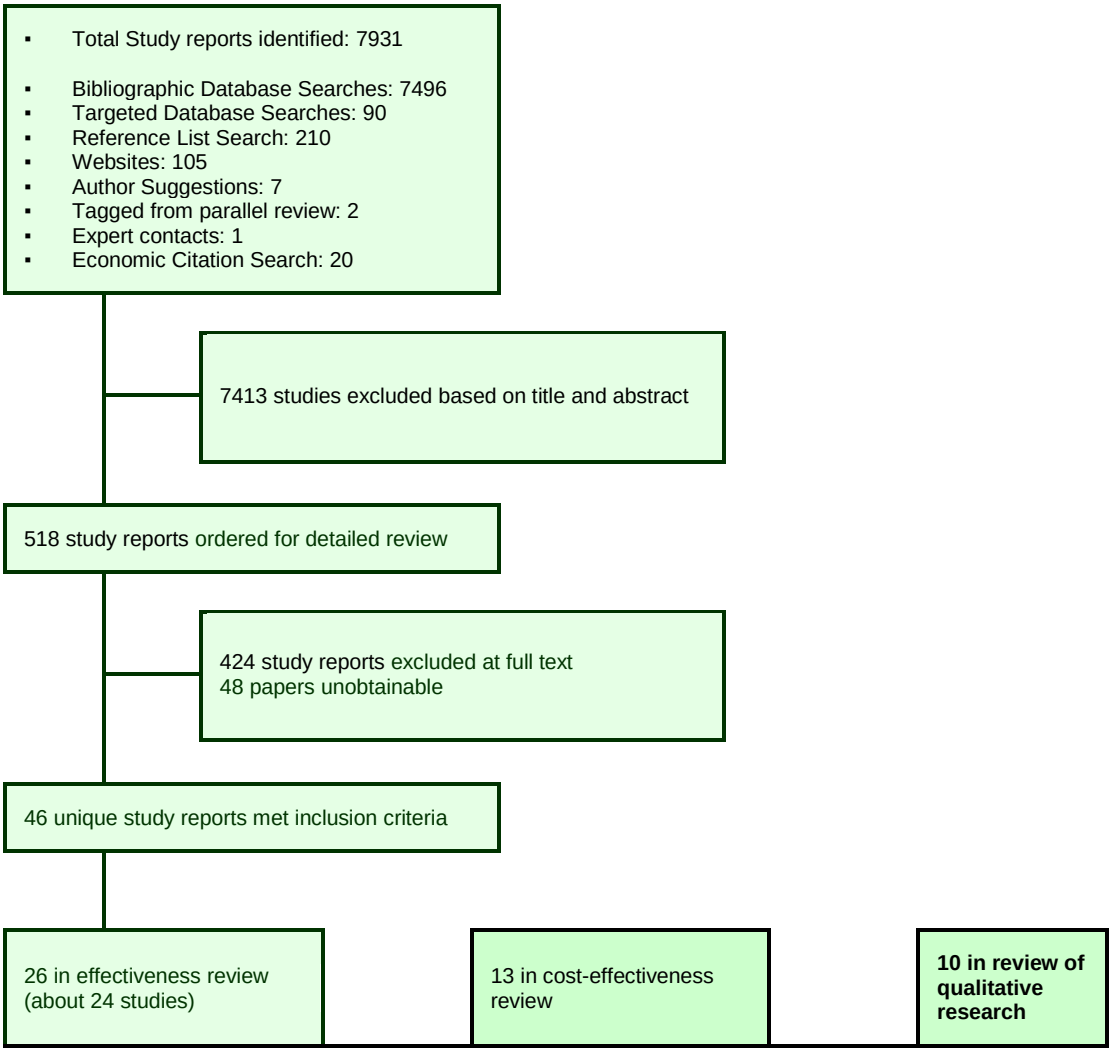
Extracted findings were read and re-read by one author (RG) in order to identify main themes and concepts from the included studies and develop a coding frame which was used to analyse the included studies.

Bringing together coded segments of text allowed findings to be synthesised across the studies. In doing so, the principle of translation was used, whereby study findings are understood in relation to each other (Noblit & Hare, 1988). Common or recurring findings across studies are examined to explore whether they are substantially referring to the same concepts (reciprocal translation), opposing concepts (refutational translation) or can be joined together to create a “line of argument” (Britten et al. 2002;Garside et al. 2008;Noblit & Hare 1988).

4. Summary of included studies

4.1. Identified studies

FIGURE 1 Review flowchart



Process of study identification is shown in **FIGURE 1**. Note that a single search strategy was used to inform the three reviews of effectiveness, cost-effectiveness and this review of qualitative research.

4.2. Included studies

4.2.1. Study characteristics

A total of 10 studies were included in the review, eight of which were from the UK (Baslington 2008;Christie et al. 2007;Green & Edwards 2008;Kennedy et al. 2004a;Kennedy et al. 2004b;Lupton & Bayley 2006;Sawyer 1998;Steinbach et al. 2007) and one each from New Zealand (Tranter & Pawson 2001) and the USA (Frattaroli et al. 2006). (See Table 1).

Most collected information by interview – either individual (Baslington, 2008; Frattaroli, 2006; Green & Edwards, 2008; Steinbach et al, 2007) or group (Christie et al 2007; Kennedy et al 2004 I; Kennedy et al 2004 II; Sawyer, 1998; Tranter & Pawson, 2001). Lupton & Bayley (2006) used interviews and observational techniques.

Studies were among children and young people (Lupton & Bayley, 2006; Steinbach et al, 2007; Tranter & Pawson, 2001); parents (Baslington, 2008; Christie et al, 2007; Sawyer, 1998; Steinbach et al, 2007); key professionals or stakeholders (Baslington, 2008; Frattaroli, 2006; Green & Edwards, 2008; Steinbach et al, 2007) or local adult residents (Kennedy et al 2004 I; Kennedy et al 2004 II). Some studies were conducted among more than one of these groups.

Throughout the findings we used the term “children” to refer to those aged 12 and younger and “young people” to refer to those older than this, although we have maintained the language used by respondents, and where the authors of the included studies have used different language to describe the study participants.

Most studies did not focus on any particular road safety initiative, but Baslington (2008) explored attitudes towards School Travel Plans, Christie *et al* (2007) looked at perceptions of risk in a local area where there was a Neighbourhood Road Safety Initiative, and two studies, both by Kennedy *et al* (2004 I; 2004 II) explored attitudes towards Quiet Lanes in Kent and Norfolk. None of the initiatives which had studies included in the effectiveness review (Report 1) had associated qualitative research. Information relating to barriers and facilitators included here is therefore more generic, rather than relating to those particular interventions.

Table 1 Summary of identified study reports

Author	Aim	Method	Population	Location	Relevant scheme/ intervention
Baslington, 2008	To raise and discuss important issues identified by the author during a literature review, documentary analysis and empirical evaluation of travel schemes in three schools. Qualitative data collected to investigate attitudes and awareness of School Travel Plans.	Interviews (also documentary analysis, and quantitative evaluation data)	Parents of children aged 9-11 Key informants	3 local authorities in the UK	School Travel Plans
Christie et al, 2007	To provide information about parents' perceptions of risks for children in the neighbour hood, how parents' feel about children's exposure to risk while playing out in the street and the accessibility of alternatives such as parks and clubs	Focus group discussions	Parents of children and young people aged 9-14,	NW England	Neighbourhood Road Safety Initiative
Frattaroli et al, 2006	To document local stakeholders' opinions concerning the cause of child pedestrian injuries and effective prevention strategies. To identify impediments to implementing environmental interventions to reduce pedestrian injuries To obtain stakeholders' perspectives about how best to address the identified impediments.	Interviews	Stakeholders - members of statutory and community organisations	USA	None specified

Author	Aim	Method	Population	Location	Relevant scheme/ intervention
Green & Edwards, 2008	To explore the tensions inherent in the targeting of evidence based interventions in communities at high risk, in order to address health inequalities, using road traffic injury as a case study.	Interviews (also documentary analysis of 32/33 London borough Road Safety Plans)	Key professionals in road safety	London, England	Road Safety Plans
Kennedy et al, 2004 (1)	To explore residents views and attitudes about local Quiet Lanes	Focus group discussions	Local residents	Kent, England	Quiet Lanes
Kennedy et al, 2004 (2)	To explore residents views and attitudes about local Quiet Lanes	Focus group discussions	Local residents	Norfolk, England	Quiet Lanes
Lupton & Bayley, 2006	To explore children's own perceptions of the road environment and what they believe would make the road a safer place for them.	Ethnographic observation Interviews	Children and young people aged 8-15	Greater London, England	None specified

Author	Aim	Method	Population	Location	Relevant scheme/ intervention
Sawyer, 1998	To explore roads user behaviour of young teenage pedestrians and peer pressure influences. To establish if there are any differences in attitudes and behaviour. To explore differences between perceptions of accidents and the reality. To establish how best to reach them with road safety messages and what does not work. To ascertain views on current a split screen road safety TV and cinema advertisement.	Focus group discussions	Young people aged 12-15	Edinburgh and East Lothian, Scotland	None specified
Steinbach et al, 2007	To use exiting data on borough professionals views, with additional interviews with key stakeholders, to describe the current context in which policies to address ethnicity are developed. To undertake qualitative pilot work to identify potential research questions in this area, and generate exploratory hypotheses for future studies. – to generate data on travel patterns, explore differences among ethnic groups, gather views on possible strategies for addressing inequalities.	Secondary analysis Interviews	Stakeholders Young people and parents	London, England	None specified

Author	Aim	Method	Population	Location	Relevant scheme/ intervention
Tranter & Pawson, 2001	To explore the variability in children's independent access to local environment and to relate this to the socio-spatial nature of those environments in NZ cities. To compare children's freedoms to explore local neighbourhood with that in other Australian, UK and German cities. To explore the role of social traps in impeding the creation of a more child-friendly city.	Group interviews Interviews (formal and informal) (Questionnaires)	Children aged 9-11 Parents and teachers	Christchurch, New Zealand	None specified

4.3. Study methods and quality appraisal

Details of the study methods and the results of the quality appraisal are shown in Table 2 and Table 3.

Overall, the reporting of study methods was poor, especially in relation to sampling, data collection and data analysis (see Table 3). Two studies failed to clearly articulate a research question (Kennedy et al, 2004 I; Kennedy et al, 2004 II). The theoretical perspective of the authors was clear in only two studies (Green & Edwards, 2008; Tranter & Pawson, 2001). In addition, few studies considered potential ethical issues. Issues of sampling, consent to participate and the running of the interviews may be of particular concern where children and young people are involved, and only one of the four studies which talked to children and young people discussed these issues (only Steinbach et al, 2007, while Lupton & Bayley, 2008; Sawyer, 1998 and Tranter & Pawson, 2001, did not).

These issues led to no studies being assigned a summary quality score of "++", only three studies "+" (Christie et al, 2007; Frattaroli et al, 2006; Green & Edwards, 2008) while the remainder received "–" (Baslington, 2008; Kennedy et al, 2004 (1); Kennedy et al, 2004 (2); Lupton & Bayley, 2006; Sawyer, 1998; Steinbach et al, 2007; Tranter & Pawson, 2001). Further details about reporting limitations can be found in the data extraction tables in Appendix 8.

We recognise that there are no universally accepted standards of methodological reporting for qualitative research, and that lack of description may not reflect lack of rigour in execution (Sandelowski & Barroso 2007). Further, the lack of detail about analytic methods may indicate that this is the accepted norm for these study types within road safety literature.

Table 2: Methodological details of included studies

Author & location	Theoretical approach	Sample	Type of sample	Analytic process
Baslington, 2008	None stated	22 parents (20 women, 2 men) (7 of whom attended school with School Travel Plans) 4 key informants (3 heads and a "walking bus" coordinator)	No description of sampling – convenience?	No description provided.
Christie et al, 2007	None stated	Parents of school children and young people aged 9-14 (living in 10 low socioeconomic areas participating in a Neighbourhood Road Safety Initiative)	Convenience	Content analysis using constant comparison method. Analytic framework developed on a sample of scripts.
Frattaroli et al, 2006	None stated, but Miles & Huberman (1994) and Strauss (1987) cited, although analysis reads like a content analysis rather than a grounded theory, including "soft" quantification of responses.	20 leaders of community based organisations (n=9), school administrators (n=3), city transport & planning officers (n=3), 2 law enforcement officers (n=2), city health dept. officer (n=1), people from local politicians offices'(n=2)	Convenience	Text segments coded individually by 2 authors about factors related to factors that impede or facilitate implementation. Coded segments then extracted form the transcript and 2 authors separately identified themes form the coded data. Differences resolved by a third.

Author & location	Theoretical approach	Sample	Type of sample	Analytic process
Green & Edwards, 2008	None stated The example of road accident prevention is used to explore the limitation of targeting as a method for addressing health inequalities.	35 key professional in 10 London boroughs: include engineers and road planners, Road Safety Officers, police and fire brigade, community representative (such as teachers, councillors and resident association members) Informal interviews also held with representatives from Transport for London and local residents.	Purposive	No description provided.
Kennedy et al, 2004 (1)	None stated	13 local residents (12 walkers and 1 cyclist) in 2 groups	Convenience	No description provided.
Kennedy et al, 2004 (2)	None stated	18 local residents (including 13 walkers, 4 horse riders and 1 cyclist) in 2 groups	Convenience	No description provided.
Lupton & Bayley, 2006	None stated Theory of planned behaviour used to relate children's and young people's opinions to possible behaviours	122 children and young people aged 8-15 years in six junior and six secondary schools (from rural and urban locales). Schools were chosen to provide a range of road crossing facilities and socio-economic backgrounds.	Schools selected for variation. No description of how children and young people were sampled.	Thematic analysis using Nudist.
Sawyer, 1998	None stated	63 young people aged 12-15 in 10 single sex focus groups (6 with girls, 4 with boys) aged 12-13 or 14-15. form 2 school in Edinburgh and 2 in East Lothian	No description of how young people were sampled.	No description provided.

Author & location	Theoretical approach	Sample	Type of sample	Analytic process
Steinbach et al, 2007	None stated	Reanalysis - 40 borough professionals and other stakeholders, plus 32 Road Safety Plans. New data – 7 stakeholders. 7 young people (age NR) and 3 parents from different ethnic groups.	Data set in Green and Edwards reanalysed Convenience sample of young people	Initial data set reanalysed looking particularly for information about how ethnicity and accidental injury was being addressed, data needed and challenges,. No description of analysis for new data
Tranter & Pawson, 2001	None stated. Authors believe that child friendly cities should guarantee the right to play – important for children's personal and social development and well being, and that of the community.	Children aged 9-11, parents, teachers in 4 Christchurch schools in groups of 8-10 in each of 4 schools. Interviews with principals in each school. Informal discussions with teachers and parents at the beginning and end of the school day. Questionnaires received from 436 children and 297 parents (response rate 68%).	Schools purposively samples. No description of how children were sampled.	No description provided

Table 3: Quality appraisal of included studies

	Overall score	Is the research question clear?	Perspective of author clear?	Perspective influenced the study design?	Is the study design appropriate?	Is the context adequately described?	Sample adequate to explore range of subjects/settings?	Sample drawn from appropriate population?	Data collection adequately described?	Data collection rigorously conducted?	Data analysis rigorously conducted?	Findings substantiated/limitations considered?	Claims to generalisibility follow from data?	Ethical issues addressed?
Baslington, 2008	-	Y	N	NA	Y	N	CT	Y	N	CT	CT	N	NA	N
Christie et al, 2007	+	Y	N	NA	Y	N	CT	CT	Y	Y	Y	Y	NA	Y
Frattaroli et al, 2006	+	Y	N	NA	Y	N	CT	Y	Y	Y	CT	N[1]	NA	N
Green & Edwards, 2008	+	Y	Y	Y	Y	Y	CT	Y	N	CT	CT	N[2]	NA	Y
Kennedy et al, 2004 (1)	-	N	N	NA	Y[3]	N	CT	CT	N	CT	CT	N	NA	N
Kennedy et al, 2004 (2)	-	N	N	NA	Y[4]	N	CT	CT	N	CT	CT	N	NA	N
Lupton & Bayley, 2006	-	Y	N	NA	Y	N	CT	CT	Y[5]	Y	CT	N	N	N
Sawyer, 1998	-	Y	N	NA	Y	N	CT	Y	N	CT	CT	N	NA	N
Steinbach et al, 2007	-	Y	N	NA	Y	N	CT	CT	N	CT	CT	N	NA	Y

[1] Few quotes provided and little reflection about author role. Some limitations are considered though.
[2] Limitations not discussed
[3] Largely, although some questions , such as knowledge of and use of the Quiet lanes seem more appropriate to a quantitative survey.
[4] Largely, although some questions , such as knowledge of and use of the Quiet lanes seem more appropriate to a quantitative survey.
[5] For the group interviews. No details about the video material are given, although some findings are briefly described.

	Overall score	Is the research question clear?	Perspective of author clear?	Perspective influenced the study design?	Is the study design appropriate?	Is the context adequately described?	Sample adequate to explore range of subjects/settings?	Sample drawn from appropriate population?	Data collection adequately described?	Data collection rigorously conducted?	Data analysis rigorously conducted?	Findings substantiated/limitations considered?	Claims to generalisibility follow from data?	Ethical issues addressed?
Tranter & Pawson, 2001	-	Y	Y	N	Y	N	CT	CT	N	CT	CT	N	NA	N

Key: Y = Yes N = No CT = Can't tell NA = Not applicable

5. Study findings

This section outlines the synthesised findings of the 10 included studies. We first consider information about children's and young people's knowledge about accidents and injury on the road and their behaviour, compared to this knowledge. We then describe understandings of the causes of accidents (related to children and young people, drivers and the structure/design of roads). The next section considers attitudes towards road safety, community and political, in terms of the priority and awareness of the issues. We then describe suggested solutions for preventing injury in children and young people on the roads. The final sections describe the very limited information identified about specific design solutions to road injury – School Travel Plans and Quiet Lanes.

5.1. Knowledge about accidents and injury on the road

Four UK studies, three among children and young people (Lupton & Bayley, 2006; Sawyer, 1998; Steinbach et al 2007) and one among key road safety professionals (Green & Edwards, 2008), discuss these different population's perceptions about accidents and injury on the road.

The young, Scottish people to whom Sawyer (1998) spoke (aged 12-15) correctly understood that urban areas were likely to be the most dangerous for their age group, with specific problems, such as walking on unlit roads at night and cars speeding around blind corners, identified as problematic in rural areas. Those from the more rural areas of East Lothian reported being more wary of traffic when visiting cities like Edinburgh, though urban children perceived the city centre as safer due to the greater number of pedestrian crossings. Rural and urban children correctly felt themselves to be most at risk when leaving, and after, school and recognised that inattentive behaviour contributes to road accidents in young people – in particular, what they described as "bolting" across the road without looking properly (Sawyer, 1998).

Steinbach et al (2007) reports that young people in their sample were knowledgeable about road safety advice, and could recount what they had been told.

Two UK studies explicitly explored how children and young people apportioned blame in the event of a child being injured on the road (Lupton & Bayley, 2006; Sawyer, 1998). Both found that children and young people blamed pedestrians as well as drivers. Children and young people were thought to be easily distracted, to rush and to act without thinking, in some cases this blame included children who were accompanied by an older child/ young person or a parent. Older children and young people were more likely to think that road layout could be a factor (Lupton & Bayley, 2006). Young people in the study by Sawyer (1998) also attributed blame to pedestrians, and were sympathetic to the driver if they perceived the pedestrian had dashed into the road.

Among key London road safety professionals interviewed by Green and Edwards (2008), there was a recognition of the link between deprivation and the risk of injury on the road, which most were considering how to address. A few reported that this was not important within their locality because needs were similar across the borough due to the population being mostly deprived or mostly affluent.

5.2. Knowledge and behaviour

Two UK based studies report that the behaviour of children and young people on the road contrasted with their knowledge (Sawyer, 1998 and Steinbach et al, 2007). Despite young people's accurate understanding of the types of behaviour that were risky among their peers, Sawyer (1998) and Steinbach et al (2007) note that this did not translate into safer behaviour as individuals, and they did not necessary recognise their own such actions as risky. Those involved in near misses, or minor incidents, might change their behaviour for only a short while. (Note that quotes provided by Sawyer record the Scottish secondary school year, the sex of the group, the location and whether the school is in an affluent, less affluent or mixed area):

> *- Well, I've nearly got hit but…my pal got run over by a car. He's been ran over twice!*
>
> *- Been run over twice? He's been run over more times than that.*
>
> *- Aye and he still runs about outside school. [Laughter] (S2 Boys quote, urban, mixed. Sawyer, 1998. PenTAG truncation)*

> *I was walking across this road right, and I had my boots on and I cannot run with my boots right, and this guy came along and I looked at him and he started driving faster, he ran over the heel of my boot. I was greetin'[f] and everything. I thought he was going to kill me. It was scary. (S4 Girls quote, urban, mixed. Sawyer, 1998.)*

The author suggests that there might be gender differences with boys recalling such incidents with laughter and bravado, while girls seemed more aware of the potential dangers.

Even more serious incidents did not appear to change behaviour:

> *- If you got knocked down it would put you off.*
>
> *- Nah, I've been knocked off my bike twice and it still doesnae put us off. (S4 boys quote, rural, less affluent. Sawyer, 1998).*

Other reported gender differences in attitude and behaviour are discussed below (Section 5.2.1.1).

One UK study reported on children's and young people's experience of road accidents, both directly (to themselves) or indirectly (to friends or family) - a minority (~10%) of those young people to whom Sawyer (1998) spoke had such experience. This did not, however, appear to change their behaviour:

> *I just think it isnae goin' to happen to me. (S2 boys quote. Urban, mixed. Sawyer, 1998.)*

Such perceived invulnerability may influence risk-taking behaviour, which is discussed below.

Evidence statement 1: Children and young people's knowledge and behaviour
1a. Three UK based studies discuss children's and young people's knowledge and behaviour about accidents (Lupton & Bayley, 2006 [-]; Sawyer, 1998 [-]; Steinbach et

[f] Crying

al 2007 [-]).

1b. While these three studies suggest that children and young people are well informed about what constitutes risky behaviour and how to avoid it (Lupton & Bayley, 2006; Sawyer, 1998; Steinbach et al 2007), two studies found this did not influence their actual behaviour, even if they had experienced a previous near miss or actual accident (Sawyer, 1998; Steinbach et al 2007).

5.3. The causes of accidents

Six of the study papers discuss the perceived causes of accidents (Baslington, 2008; Christie et al, 2007; Green & Edwards, 2008; Lupton & Bayley, 2006; Sawyer, 1998; Tranter & Pawson, 2001). These have been organised below under sub themes of children and young people as the cause of accidents, drivers as the cause of accidents and structural causes of accidents.

5.3.1. Children and young people as the cause of accidents

5.3.1.1. Risk taking

Five studies, four UK and one USA based, discuss risk-taking behaviour among children and young people as a potential cause of accidents (Christie et al, 2007; Frattaroli et al, 2006; Lupton & Bayley, 2006; Sawyer, 1998; Steinbach et al, 2007).

Sawyer (1998) categorises the types of risk that children and young people describe taking around the roads as “common” or “extreme”. Common risks included running across roads and crossing between parked or halted cars, which children and young people mostly defined as part of the routine of everyday life (Sawyer, 1998). The author notes that, like adults, most and young people participate in such “common” risk activities. “Extreme” risk taking is defined as more dangerous and more likely to result in injury – examples given by Sawyer are playing games in the road (such as football), playing “chicken” with traffic, or holding onto buses to get pulled behind whilst on roller-skates or a bicycle.

Members of US statutory and community organisations frequently suggested that children's and young people's behaviour contributed to their injury on the road: citing specific behaviour such as not using crossings, being careless, inattentive, lacking fear or being in a hurry (Frattaroli et al 2006). Children and young people in three UK studies also suggested that they were more likely to take risks when hurrying, for example, when they were in a rush to beat the chip shop queue at lunchtime or to catch a bus for school, or if the lights took too long to change (Lupton & Bayley, 2006; Sawyer 1998; Steinbach et al, 2007). It may be, we suggest, that crossings around schools, and routes to and from them, should adjust priorities timing in busy times before and after school hours when young people are most likely to be using them, in order to encourage young people to use them.

5.3.1.2. Changes with age

One study discussed children's perceived behaviour changes as they got older. Younger children (aged 8-9) thought that as they got taller, drivers would be more likely to see them and to stop for them at designated crossings (Lupton & Bayley, 2006, see also section 5.2.3.1). These children anticipated that they would remain sensible in their attitudes to the road, or become more knowledgeable and careful. However, in reality, older children and young people reported paying less attention to the Green Cross Code – despite being able to recall its advice – and to show more risk taking (Lupton & Bayley, 2006).

5.3.1.3. Explanations for risk taking

Children and young people speaking to Lupton & Bayley (2006) also reported incidents where they were distracted by play or conversation – where running after a ball, or chasing games led them into the road – which could also be defined as "common" risks. Older boys/ young men believed that running through small traffic gaps was a way of coping with difficult traffic, although they also reported misjudging the speed of oncoming traffic (Lupton & Bayley, 2006).

"Extreme" risks taken on the road were placed by young people in the same category as other thrill seeking sports such as doing skateboarding or snowboarding tricks, or bungee-jumping (Sawyer, 1998). Some enjoyed negotiating small gaps in the traffic

or causing drivers to stop. While most young people acknowledged the risk involved, there was a general feeling of invulnerability:

> *Lots of stuff is a risk but you never really notice the risk (S2 boy quote, rural, affluent. Sawyer et al, 1998).*

Participants in other studies, in this case parents, also described risk-taking that could be seen as "extreme":

> *They ride down the middle of the road on their bikes, pull out in front of the cars, and play chicken on the main road with their bikes. (Parent quote, Group 9. Christie et al, 2006)*

> *…young people especially when they hit their mid teens, have an arrogance about them…they challenge you by walking slowly and you might not have seen them and I think "If you want me to kill you fine, stand up against my car then" they are ridiculous, they play with you as drivers, it is really stupid (Parent quote, Group 4. Christie et al, 2006, edits in original)*

These quotes from adults support the children's and young people's descriptions of "extreme" risk taking, and the second quote also illustrates driver impatience with, and blame towards, the behaviour of some children and young people on the road. Children's and young people's experience of this behaviour is discussed in Section 5.2.3.1.

Peer issues

Two UK studies among children and young people suggested that there were important peer related factors that encourage greater risk-taking (Lupton & Bayley, 2006; Sawyer 1998). Being with their friends was seen as being distracting, and younger children might not notice the road when chasing others or playing football (Lupton & Bayley, 2006).

Lupton and Bayley also noted that younger children (aged 7-8) preferred to cross in groups because they felt more visible to drivers (see also Section 5.2.3.1), and also so that cars would remain stopped if the lights changed while they were still crossing. Steinbach et al (2007) note that children and young people would alter school routes

in order to travel to school with their friends, which may involve unnecessarily crossing additional roads.

Sawyer also found that boys and young men in groups engaged in "ritual showing off" (author quote), and both girls/ young women and boys/ young men might show off for those older than them, especially to older boys/ young men.

> *They dinnae want their pals to think they're a wee goodie two shoes crossing over by the green man and that. (S4 girl quote, urban, less affluent, Sawyer, 1998)*

> *You want to act tough and that, show off in front of the older people, especially the laddies. (S4 girl quote, urban, less affluent, Sawyer, 1998).*

> *- They [girls] try to impress them [boys].*
> *- And if you fancy one of the laddies, you'll have to do it. [laughter] (S2 girl quote, rural, less affluent, Sawyer, 1998).*

Older pupils recognised this was happening but attached more risk to younger children mirroring their behaviour than they did to their own behaviour.

However Lutpon and Bayley (2006) also noted that some children and young people adopted the role of "minder" (author quote), preventing their friends' risky behaviour.

Gender differences

Two UK studies, among children and young people, discuss possible gender differences in behaviour (Lupton & Bayley, 2006; Sawyer, 1998). There was little apparent difference between boys'/young men's and girls'/young women's reports of engaging "common" risk activities, although girls and young women reported more calculated risk behaviours while boys and young men might not even look before crossing.

> *-Aye we're senseless.*

> *-They [girls] burn across it but they wait a wee bit longer than what we do.*

-We just burn down the alley and straight across the road (S4 boy quote, rural, less affluent. Sawyer, 1998)

There was a perception that girls were more sensible and less irresponsible than boys. Although this was not really borne out by reports of "common" risk, "extreme" risk was far more commonly reported, often with pride, by boys.

My friend did that and he tripped on a drain and cut all his sides. [Group laughs loudly]

I done it once when I was going down [name] Road on the back of a bus and I fell off and skinned my nose. [Group laughs again] (S2 boy quote, urban, mixed. Sawyer, 1998)

It seems that such behaviour is expected and even encouraged among some peer groups. We suggest that this behaviour can be seen in the context of other teenage risk taking, experimentation and rebellion.

While both boys and girls are often together in groups, girls reported group indecision when a number of them were crossing the road, while boys preferred not to cross in groups, believing it likely that they might be encouraged to take dares in such situations (Lupton & Bayley, 2006). By contrast, Sawyer (1998) suggested that girls were more confident in groups, and felt safety in numbers around the roads.

We suggest that it may be possible to mitigate against injury in the cases of "common" risk through alerting drivers to locations where children and young people are likely to be playing or travelling to and from school, improved priorities at crossings, and slower speed limits. However, it is more difficult to see how active thrill seeking, in the form of "extreme" risk taking, could be addressed by road design modifications.

Alcohol

Two UK–based studies mentioned the potential risk of alcohol on injury on the road. Young people from less affluent areas, to whom Sawyer (1998) spoke, associated drinking alcohol, both on the part of the driver and the child or young person, with accidents.

Cos when you're drinking you dinnae care what you do. You've got more guts to do something when you're drunk. (S4 girl quote, urban, less affluent, Sawyer 1998.)

Sawyer suggests that, as much teenage drinking takes place on the streets, this puts them at greater risk of road injury.

Christie et al, 2006, also noted criticism of parents for not supervising their children, and in some cases this was blamed on their drinking.

Lack of facilities to play elsewhere

Three UK studies discussed children and young people playing in the street (Christie et al, 2006; Sawyer, 1998; Steinbach et al, 2007). Christie et al (2006) thought this happened because there was a lack of suitable facilities elsewhere, and this was echoed by children in Sawyer's study (1998) and local stakeholders in Steinbach et al's study (2007). Even if available in theory, some local parks were thought to be unsafe for children:

They just get vandalised, and full of teenagers drinking cider and whatever. (Parent quote, Group 8. Christie et al, 2006)

For druggies and boozers (Parent quote, Group 2. Christie et al, 2006)

I counted 20 syringes on the way round to the shop (Parent quote, Group 10. Christie et al, 2006)

In some poor boroughs, there isn't a lot of option and activities for young people. Most schools have got rid of their parks and sports centres, so many young people in deprived areas don't have any social activities to get on with, so most of them are just, if you like, hanging out on the road sides because they haven't literally got anything to do. (Community organisation participant quote. Steinbach et al, 2007. PenTAG truncation)

Organised activities were preferred by some parents, but their cost was prohibitive:

….No facilities for the children unless you get your hand in your pocket every single time. (Parent quote, Group 8. Christie et al, 2006)

Some parents condoned children playing in the streets as they liked the fact that they were close to home and were seen to enjoy it (Christie et al, 2006). We would suggest that that initiatives such as Home Zones could formalise this community space for children.

5.3.2. Responsibility for child pedestrians

Three studies, two in the UK and one in the USA, discuss younger children supervised by older ones or by adults (Christie et al, 2007; Frattaroli et al, 2006; Lupton & Bayley, 2006). Lupton and Bayley (2006) presented situations to their groups of children which involved an older child/ young person or parent accompanying a child pedestrian, where risks were taken or risky incidents occurred involving the youngest child. They were interested to understand where pedestrians attributed blame for such incidents, and found younger children (aged ~7/8) where likely to blame the child, often without recognising the responsibility of the older person. Boys in particular emphasised the difficulties they faced when looking after and controlling a younger child on the road.

In other studies there was criticism for the lack of responsibility of some parents who allowed young children to stay out late, playing on the streets:

> *…little kids, seven year olds, are still out at 10 o'clock…(Parents, Group 4 Christie et al, 2007,PenTAG truncation)*

Some children and young people were thought to be poorly brought up and supervised in relation to road safety (Frattaroli et al, 2006). In some cases this was blamed on a drinking culture among parents (Christie et al, 2007).

We found that, overall, there seems to be a lot of victim blaming among children, young people, adults and professionals, all of whom were likely to blame children's behaviour as contributing to their injury on the road. It seems taken for granted that children should adapt their behaviour to avoid collisions with cars, rather than there being a drive to adapt the environment and driver behaviour to prioritise children's and young people's safety.

Evidence statement 2: Children and young people as the causes of accidents

2a. Five studies, four UK and one USA based, discuss risk-taking behaviour among children and young people as a potential cause of accidents (Christie et al, 2007 [+]; Frattaroli et al, 2006 [+]; Lupton & Bayley, 2006 [-]; Sawyer, 1998 [-]; Steinbach et al, 2007 [-]).

2b. Like adults, children and young people often engage in "common" risk behaviours, which are seen as part of everyday life, such as not always using crossings, crossing between parked cars or in traffic etc. (Sawyer, 1998)

2c. One UK study (Lupton & Bayley, 2006) reports that older children/young people were more likely to take risks on the road than younger children (aged 8+).

2d. Three UK studies (Christie et al, 2007; Lupton & Bayley, 2006; Sawyer, 1998) suggest that a minority of children and young people engage in "extreme" risks – playing chicken in the road, holding onto the back of buses etc, and that boys are more likely to do this, and to encourage such behaviour in each other. Such behaviours are regarded in a similar way to thrill-seeking sports.

2e. Peer issues were seen as important in two UK studies (Lupton & Bayley; Sawyer 1998). This could be positive if it gave children the confidence to use crossings safely and if some adopted a minder role, preventing risky behaviour in their friends. However it could also be negative where it encouraged "ritual showing off" and dares.

2f. Two UK studies report that drinking alcohol may increase risk taking among young people, whilst in adults, may encourage less supervision of their children (Christie et al, 2007; Sawyer, 1998).

2g. Three UK studies suggest that children and young people play in the street where there other suitable facilities are lacking or pricey, or where parks are seen as dangerous due to their use for drinking and drug-taking (Christie et al, 2007; Sawyer et al 1998; Steinbach et al, 2007).

5.3.3. Drivers as the cause of accidents

5.3.3.1. Perceived responsibilities of drivers

Two studies, one UK one USA, in different populations discussed responsibility of drivers to other road users (Frattaroli et al, 2006; Sawyer, 1998). Community and statutory stakeholders identified the responsibility of drivers to obey speed and other traffic laws, and to stop for pedestrians to prevent childhood accidents (Frattaroli et al, 2006). Teenagers believed that cars *should* brake for crossing pedestrians and didn't understand that there might be difficulty in stopping suddenly (Sawyer, 1998).

One study outlines some of the concerns and worries about their interactions with drivers expressed by children and young people (aged 8-15; Lupton & Bayley, 2006). Children fear that drivers may not stop for them, especially if they are small and think they cannot be seen, or think that they might not be considered important enough to stop for. Because they are not always sure whether drivers are going to stop, children are not always decisive about whether to cross the road, and children felt that this hesitancy made drivers impatient. Some children believed that preventing driver impatience was more important than traffic calming, speed limits or cycle lanes. We would suggest that this shows how intimidated children can feel by driver anger. In addition, it suggests that children prefer clear demarcation of road priority – open road schemes which encourage sharing of spaces by cars, bicycles and pedestrian may be threatening to younger children who feel vulnerable, invisible and unimportant compared to adults in cars.

5.3.3.2. Reckless driving and speeding

Three UK studies describe children's/ young people's and parent's perceptions of reckless driving (Christie et al (2007; Lupton & Bayley 2006; Sawyer, 1998).

The young people to whom Sawyer (1998) spoke understood irresponsible driving – such as jumping lights and speeding – as a potential cause of accidents. Lupton & Bayley (2006) also reported that children and young people were forthright in their condemnation of drivers who failed to stop at crossings, although it is not clear whether they are talking about zebra crossings or failing to stop at traffic lights.

Car drivers and scooter or motorcycle riders, especially young people joyriding, were also a key concern for parents in the study by Christie et al (2007):

> *You are not even safe to walk on the paths now because of the bikes and scooters. (Parent quote. Christie et al 2007. group 6)*

Where there were few crossings, children and young people in the Lupton & Bayley (2006) study reported that the volume of traffic made for few crossing opportunities and it was difficult to judge a safe gap in the traffic when cars drove at speed (including "boy racers"). This was seen as a risk even on short journeys, such as between home and the corner shop. While younger children generally regarded drivers as cooperative and kind, their scepticism about driver behaviour increased with age (Lupton & Bayley, 2006).

5.3.3.3. Parking

Two studies, one UK and one New Zealand, described illegal parking, particularly near to schools or in streets where children and young people play, as potentially hazardous (Christie et al 2007; Tranter & Pawson, 2001).

> *….outside the school itself. We have problems with double parking and very careless parking on wet days. (Parent quote. Tranter & Pawson, 2001. PenTAG edit)*

> *Parents are concerned only with their own children. Once the they have picked up their children they drive fast and carelessly past other children. (Parent quote. Tranter & Pawson, 2001.)*

> *The streets are very narrow it really wasn't made for the amount of cars that are actually on it. You have got the cars that have to park on the pavement and obviously kids are trying to play and what have you and shoot out in-between the parked cars (Parent quote. Christie et al 2007. Group 2)*

Parental concern for their own children's safety, demonstrated by driving them to school, may in fact put other children at risk through the volume of traffic and parking choices (see also Section 5.3.1).

Evidence statement 3: Drivers as the cause of accidents
3a. Five studies, three from the UK, one from the USA and one from New Zealand, discuss drivers as the cause of accidents (Christie et al, 2007 [+]; Frattaroli et al, 2006 [+]; Lupton & Bayley, 2006 [-]; Sawyer, 1998 [-]; Tranter & Pawson, 2001 [-]). 3b. Key identified responsibilities were identified as obeying speed and other traffic laws, stopping for pedestrians, not driving recklessly and parking safely and legally, especially around schools and places children play (Christie et al, 2007; Frattaroli et al, 2006; Lupton & Bayley, 2006; Sawyer, 1998; Tranter & Pawson, 2001). 3c. One study suggests that young people did not necessarily understand that it might be difficult for drivers to stop quickly (Sawyer 1998). 3d. One study found that younger children are worried that drivers might not see them waiting to cross the road because they are small and might be considered unimportant. These fears led to indecisiveness at crossings which children thought made drivers impatient – something they were very anxious to avoid (Lupton & Bayley, 2006).

5.3.4. Structural causes of accidents

While children, parents and stakeholders highlight their own behaviours as increasing the risk of accidents on the road, there was much less discussion about possible structural influences on accidents. As noted above, Christie et al (2007) criticise double parking outside the school gates, but note that this is exacerbated by the narrow streets locally, not designed for contemporary volumes of traffic. In addition, there was a lack of signs to alert drivers to where children and young people congregate and play (Christie et al, 2007).

5.3.4.1. Road environment

Two studies among community and statutory stakeholders or road safety professionals (one UK, one USA) identified the road environment and traffic as a cause of injuries, but after child, parent or driver behaviour as causes (Frattaroli et al, 2006; Steinbach et al, 2007). They mentioned the volume of traffic, its speed and

congestion as well as poor walking areas which were inadequately defined or signed or in poor repair (Frattaroli et al, 2006).

Some London stakeholders also mentioned problems on the road environment itself, including the lack of central islands to help crossing (Steinbach et al, 2007). Children and young people in the study by Lupton and Bayley (2006) liked central islands that allowed them to negotiate the road in two stages (see Section 5.4.1).

Provision of crossings

Steinbach et al (2007) describe people, including children and young people, using what planners described as "lines of desire" – routes taken by pedestrians because they are the most obvious ways to navigate streets, but which may be less safe:

> *There are some, some obvious places where, if you looked at a map you might not think we don't need to put a crossing there, but when you are actually there it's very obvious that you need a crossing. (Young person. Steinbach et al, 2007. PenTAG truncation)*

This suggests that, to maximise appropriateness and usability, interventions need to be designed with an awareness of the natural flow of pedestrian behaviour, requiring observation and experience of the roads, not just map exercises.

Where safe crossings don't exist, there is little alternative but to take "common" risks with crossing, but Sawyer (1998) also found young teenagers were not bothered to walk extra distance to use a crossing, or to wait if the lights took too long to change. Lollipop people were seen as more effective, but as a resource for younger children.

Some girls preferred crossing the road, in the absence of designated crossings, to using underpasses, where there were "bams"[g] (participant quote, Sawyer, 1998).

[g] "Nutters"

Evidence statement 4: Structural causes of accidents
4a. Four studies (three UK, one USA) discuss structural causes of accidents, although these received less attention than child or driver causes (Christie et al, 2006 [+]; Frattaroli et al, 2006 [+]; Sawyer, 1998 [-]; Steinbach et al, 2007 [-]). 4b. One UK study suggests that older, narrow streets not designed for contemporary traffic volume, exacerbate traffic and parking problems (Christie et al, 2007). 4c. One UK study suggests that more signs are needed to alert drivers to areas where children and young people congregate and play (Christie et al, 2007). 4d. One study among USA stakeholders highlights the volume of traffic, its speed and congestion, as well as poor walking areas which are inadequately defined or signed or in poor repair (Frattaroli et al, 2006). 4e. One UK study suggests there is a need for more central islands to help crossing (Steinbach et al, 2007). 4f. Two UK studies suggest that the placement of crossings need to be carefully considered to accommodate how people actually use the roads, taking into account "line of desire" (Sawyer, 1998; Steinbach et al, 2007). 4g. One UK study suggests that underpasses may not be considered safe to use (Sawyer, 1998). 4h. One UK study reports that lollipop people are seen as for younger children and older children did not want to use them (Sawyer, 1998).

5.4. Attitudes to road safety

5.4.1. Low community priority for road safety

Five studies suggest that road safety for children is give low priority among communities (Baslington, 2008; Christie et al 2006; Frattaroli et al, 2006; Steinbach et

al, 2007;Tranter & Pawson, 2001) Two studies discuss low perceived prioritisation of child injuries on the road among local communities (Frattaroli et al, 2006 USA among stakeholders; Steinbach et al, 2007 UK among young people, parents and stakeholders). In some cases, injury was seen as an "inevitable" risk:

> *I would go as far as to say that in the past you'd see road casualties being just an acceptable hazard that people would seek to live with and I think that would go across all communities (Policy maker quote, Steinbach et al, 2007.)*

In urban areas especially, road safety also has to compete with other perceived risks and dangers which are given more weight by local communities, including parents, young people, and local agencies. Competing priorities, identified in five studies (three in the UK, one USA and one New Zealand) include violence and crime, local neighbourhood concerns, education and "stranger danger" (Baslington, 2008; Christie et al 2006; Frattaroli et al, 2006; Steinbach et al, 2007;Tranter & Pawson, 2001)

> *Given the violence and drug use in this city, and given the poor state of a number of schools in this city, I think very few people are going to see pedestrian safety as being the highest priority, or even second or third. (participant quote, Frattaroli et al, 2006)*

Steinbach et al (2007) reported that road safety was seen as low priority among stakeholders and young people in London compared to urban gun and knife crime.

Frattaroli et al (2006) report there were fears around the presence of drug dealers where children and young people walk, and that local poor education systems and devaluing of life in deprived areas negatively affected attitudes to safety of all kinds. It was suggested that a focus on road safety alone was too narrow, and that it should be addressed as part of a the totality of pedestrian security issues, including crime, violence and drug dealing. Christie et al (2007) also suggest that neighbourhood should be made more secure by a number of safety measures, including park wardens, fencing, better facilities for children and young people and street lighting, as well as more crossings.

Steinbach et al (2007) found that young people in London, even though they did not belong to gangs, still recognised local neighbourhood, school and postcode

allegiances crossing which engendered fear of being assaulted or mugged, whether walking or on the bus. As such, their understandings of "safe" routes, may centre on these concerns rather than traffic.

Also in the UK, Baslington (2008) found that parents might restrict children's and young people's independent mobility due to their fears of "stranger danger".

> *- They're starting to want to go on their own, but, again, because of the issue of safety, one of us has to supervise.*
>
> *Q: When you say "safety" are you thinking about road accidents in particular, or any other form of safety?*
>
> *- Possibly, the issue around strangers, abduction, they have to, if they went in the wood, say, they know they can only for a certain distance because I need to be able to see where they are. (Parent quote. Baslington et al 2008, PenTAG truncation)*

Tranter & Pawson (2001) also note that New Zealand parents may fear "molestation" more than traffic, especially for their daughters, leading them to use their cars more as a way of protecting their children. They also suggest that higher socio-economic groups may have a more protective culture surrounding their children. This leads to less freedom being given to their children, and greater parental involvement in their activities – in particular, driving their children more often.

Cars as "good parenting"

Two studies (in both the UK and New Zealand) suggest an implicit cultural understanding that parents driving their children around is understood as indicative "good parenting" (Baslington, 2008; Tranter & Pawson, 2001). Tranter & Pawson suggest this may be particularly so among parents from higher socio-economic groups. This may have negative knock on effects in terms of road safety, described by the authors as a "social trap"; causing what they want to avoid (see also Section 5.2.3.3). A head teacher noted congestion around the school due to parents desire to *see* their children safe right to the gate, and despite regular requests not to park so close (Baslington, 2008).

5.4.1.1. Communities as agents of change

Stakeholders from community organisations in Frattaroli et al's (2006) study in the USA suggested that community engagement and championing the prevention of child injury on the road was important, but criticised local government's failure to engage with communities. They also found their efforts to engage the city were tiring and hampered by local bureaucracy and the lack of any well defined process through which the city would consider such suggestions and address community concerns.

Green and Edwards (2008) also reported mixed results for community engagement in London: some real impacts were noted, for example building relationships between residents and parking control staff to address problem parking, while others were less inclusive:

> *The consultation was flawed – formulaic – asking "do you agree with safer routes to schools" which you can't disagree with – and then using that to claim that everyone agreed. They didn't hold meetings that got to the nub of the issue…[the Council] have used the consultation to do something they wanted to do anyway…there were zebra crossing with a traffic refuge in the middle and the traffic speeds were slow – cars would slow down when they could see people trying to cross. Now they've installed traffic lights, with a green man…the traffic speeds up, because drivers get frustrated waiting at the lights, and there's been rat running in all the local roads. (community partner quote, inner London. Green & Edwards, 2008)*

This insight also highlights possible unintended consequences of interventions, in this case, an apparently pedestrian focussed change in crossing design in fact increases driver speed.

The authors suggest that meaningful community involvement was particularly challenging in an environment where "evidence-based" interventions are prioritised while professionals feel they already know what schemes are most likely to prevent collisions. These mitigate against meaningful community engagement.

These findings highlight the need for communities to be given detailed plans about proposed interventions and to be fully consulted at all stages. In addition,

interventions and the processes that produce them, should be monitored and evaluated.

5.4.2. Low political priority for road safety

Two studies (among stakeholder members of statutory and community organisations in the USA and road safety professionals in the UK) suggest that there is low political will to address child injury on the road (Frattaroli et al, 2006; Green & Edwards, 2008). The US study suggests that city agencies prioritise moving traffic quickly, and resourcing this, at the expense of pedestrians, and further, that children's and young people's issues generally may be further disenfranchised because they have no voting powers (Frattaroli et al, 2006).

The point made by the UK study is more subtle, and relates to the political difficulty of allocating resources differentially in order to address inequalities in accident risk among some populations (Green & Edwards, 2008). This is discussed in more detail below.

5.4.2.1. Lack of knowledge about BAME priority

Both Green and Edwards (2008) and Steinbach et al (2007) use the same data set, and explicitly address the issue of inequalities in road injury among different ethnic groups. Steinbach et al (2007) were particularly interested in investigating attitudes towards apparent higher risk of road related injury among minority ethnic groups and found that, in general, there was little awareness of inequalities around road injury risk.

> *I was quite shocked to be told that it was an issue specific to the black community. (Community organiser, Steinbach et al, 2007)*

> *I wouldn't say that there was any major drive from the community around this, partially because I think the community was probably not aware that this was an issue, it was not aware that there was an inequality. (Policy maker, Steinbach et al, 2007)*

Although this latter quote suggests more awareness might mobilise communities around the issue of child road safety, this paper also suggests there are challenges identifying exactly which communities might be most at risk, given limitations in the data (especially that recorded by police as STATS19 data – which does not relate to any real community and, in addition, can only record perceived, visible ethnicity) and the large number and variety of different London communities.

The study by Green and Edwards (2008) among key road safety professionals in London explicitly addressed possible inequalities in road injury related to ethnicity. Given the difficulties on interpreting data relating to any specific communities, participants suggested that targeting was not an appropriate strategy, and instead suggested tailoring programmes might be more appropriate. This would involve designing programmes with understandings about local communities in mind.

> *There is a culture, for instance, about things like drink/drive within the Turkish community…so you know, that's an issue that needs to be raised with them. We can only do that from the inside. (Road Safety Officer quote, Inner London. Green & Edwards, 2008. Edit in original but PenTAG truncation.)*

The authors suggest that such strategies were not offered as ways of reducing the gradients in injury risk but rather as practical ways of taking deprivation into account through tailoring services to local community need. In addition, it offered ways of meeting obligations to involve communities in decision making.

Steinbach et al (2007) suggest that developing community links around road safety was relatively unproblematic for settled minority communities in London, many of whom already had their own routes for asking for particular services (an example is given of an Islamic school asking for help with road safety) but recently arrived or transient groups may not have such systems in place.

5.4.2.2. Accounting for ethnic inequalities: Cultural, Knowledge & Structural factors

Asked to try and account for apparent differences in injury rates among different ethnic groups, most stakeholders in the study by Steinbach et al (2007) were circumspect about attributing such differences to cultural differences, although there

was some evidence of "racist stereotyping" (author quote). Rather, some comments suggest that exposure to risk might be the result of transport choices linked to ethnically defined identities:

> *It is sometimes that people at the lower end of the economic spectrum sometimes think that actually things like cycling is indicative of your status. So basically it's people can't afford cars that actually will cycle….and as it happens, the black community, broadly speaking, is the poorest section of the community…I can recall even walking, for example, and having people from my community saying "why are you walking?" (Community organisation participant quote, Steinbach et al, 2007, edits in original)*

Young people in the same study were more likely to draw on cultural explanations for different rates of injury, although in general they were more likely to stress the similarity of behaviour, rather than differences, among peers.

Evidence statement 5: Attitudes to road safety – priorities and awareness
5a. Five studies, three from the UK, one from the USA and one from New Zealand, suggest that road safety for children and young people is given low priority by local communities (Baslington, 2008 [-]; Christie et al 2006 [+]; Frattaroli et al, 2006 [+]; Steinbach et al, 2007 [-];Tranter & Pawson, 2001 [-]). 5b. Five studies suggest that, particularly in urban areas, they may be competing safety related issues which are seen as more serious by children and young people, parents and other stakeholders, such as violence and crime, local neighbourhood concerns (including drug dealing, local rivalries or better facilities for children and young people), education and "stranger danger" (Baslington, 2008; Christie et al 2006; Frattaroli et al, 2006; Steinbach et al, 2007;Tranter & Pawson, 2001). 5c. One US study suggests that as a result, a more holistic approach to local safety and enhanced community environments might be more effective (Frattaroli et al, 2006). 5d. Two studies (one UK, one New Zealand) suggest there is an implicit cultural understanding of car use as "good parenting", offering their children safety – the negative consequences of this are described as a "social trap", whereby road

conditions become *less* safe generally, due to parental desire for their children to be *more* safe (Baslington, 2008; Tranter & Pawson, 2001).

5e. Two studies (one UK one USA) consider community engagement with plans for road safety interventions with either lack of structures, or lack of genuine consultation found in both cases (Green and Edwards, 2008 [+]; Frattaroli et al 2006 [+]). Unintended negative consequences, traffic speeding more after the replacement of a zebra crossing with traffic lights are reported.

5f. One study suggests that there is an inherent tension between meaningful community involvement in planning and an environment requiring interventions to be "evidence based" (Green & Edwards, 2008).

5g. Three studies, one USA and two UK – the latter based on the same data-set, suggest that there is low political priority for road safety (Frattaroli et al, 2006 [+]; Green & Edwards, 2008 [+]; Steinbach et al, 2007 [-]). The UK studies qualify this as relating to the difficulties of differentially allocating resources to address inequalities in injury risk among some minority groups.

5h. Two UK studies (based on the same dataset) suggest that there is a lack of community awareness about differential road injury risk among children and young people from some ethnic minority groups (Green & Edwards, 2008; Steinbach et al, 2007).

5i. Two UK studies (based on the same dataset) suggest that there are difficulties about interpreting data on differential road injury risk among children and young people from some ethnic minority groups, due to the way it is collected and its relevance to actual communities and locations, making targeting inequalities difficult (Green & Edwards, 2008; Steinbach et al, 2007).

5.5. Suggested solutions to injury on the road in children and young people

Four studies, three UK based and one USA, discuss possible solutions to preventing child injury on the road. Stakeholders in Frattaroli et al's study (2006) suggest education for parents and drivers and in schools, improved road environment and better enforcement of traffic laws. Christie et al (2007) also found that parents believed they should have a greater role in providing road safety advice to their children.

The road safety professionals on whom both Green & Edwards (2008) and Steinbach et al (2007) report, noted that few Road Safety Plans directly address issues of deprivation or inequalities. There were challenges in trying to address multiple policy obligations – reducing injury rates, addressing deprivation and involving local communities. The authors categorised efforts to meet these obligations as "structural", empiricist and targeting. These are described in the following sections.

5.5.1. Structural solutions

While those involved in delivering road safety interventions mentioned structural approaches to reduce risk inequalities, some community partners suggested investment in the causes of deprivation, rather than its effects, might be a better solution.

> *[If] you deliver more railings that keep pedestrians away, this runs exactly counter to what I would say needed to happen…..actually if they could see that education is going to have, you know, a longer term and more sustainable impact. (Community partner quote, inner London, Green & Edwards, 2008. PenTAG edit.)*

This was off-remit for most staff, whose priority was to achieve targets to reduce collisions.

Three other UK studies also proposed solutions that could be described as structural (Baslington, 2008; Christie et al, 2007; Lupton & Bayley, 2006). Parents felt that some local structural solutions were ineffectual:

…You put speed bumps up, but it doesn't stop them, they just fly over it. (Parent, Group 6, Christie et al, 2007)

They also thought that police should be more visible to enforce traffic regulations, rather than always being in their cars (Christie et al, 2007.) Children and young people in the study by Lupton and Bayley (2006) also preferred compulsory measures that led to drivers being punished if they were broken. They felt that warnings were ambiguous, and so not likely to be effective.

One UK study provided insights into children's and young people's attitudes towards specific items of street design (Lupton & Bayley, 2006). Children and young people believed that crossings with traffic lights were safer than those, like zebra crossings, without (as discussed above in relation to fears they were not visible to drivers). When they felt that lights weren't responsive to pedestrians however, they would cross between cars, especially where the traffic was congested and slow moving as it often was around school (taking "common" risks). Children and young people liked pictures they were shown of roads with a central refuge for crossing, allowing them to cross in two parts.

We suggest that these findings about preferred road features and expectations of legal obligations for drivers, suggest that children and young people prefer clarity about both their own, and drivers, rights and responsibilities on the road.

There was evidence of misunderstanding of the purpose of some street furniture. Children and young people thought that railings between the road and the pavement, designed to prevent unsafe crossing, were actually supposed to protect pedestrians from traffic. However, as it seemed to children and young people that railings were not strong enough for this purpose and so they were worried that were clearly likely to be ineffectual (Lupton & Bayley, 2006). Their interpretation of keep-left bollards at crossing islands was also as potentially protective, so that children and young people were "dismayed" (author quote) to see how easily they were knocked down (Lupton & Bayley, 2006). We suggest that these findings indicate that children and young people may feel very vulnerable around traffic and wish, even expect, to be protected from it.

Baslington (2008) noted schools with restricted vehicular access due to the physical design of local streets and suggests that "Park and Stride" might be an alternative for schools suffering congestion at the gates.

5.5.2. Empiricist solutions

Road safety officers in the study reported by Green and Edwards (2008) and Steinbach et al (2007) suggested that decisions about which schemes to implement and where, were data-led using, for example, the collision histories of particular streets to prioritise funding bids. In some cases this was the only criteria used, whilst others saw such approaches in themselves as likely to address deprivation – reasoning that, if deprived communities suffer high injury, then areas of high injury would be likely to be in deprived areas:

> *Clearly, if you target directly where the accidents are then you are targeting directly social deprivation issues. (Engineer quote, central London, Green & Edwards, 2008)*

Some had such a tight focus on road safety, that this might conflict with other transport or health goals, such as the road safety officer who would prefer to see no cycling due to its high injury risk.

Community organisations felt that, if it were to be on their agenda, the risk of road traffic injury should be addressed as part of a broader concern with community safety, which could include safe spaces to play and addressing threat of violence on the streets (Steinbach et al 2007).

5.5.3. Targeting

Green & Edwards (2008) found that targeting was employed among London road safety professionals explicitly in response to government pressure and incentives such as priority funding, so for example, schools in deprived areas were targeted first for interventions. This leads to geographic areas of deprivation being used as a proxy for populations at greatest risk in order to target resources, while inequalities may be related to cultural or community characteristics.

Road safety professionals noted that data about ethnic inequalities of risk were too crude to be useful, with available London level data not locally relevant given the unique and varied mix of settled and recently arrived communities across different boroughs, and local injury numbers too small to be accurately analysed (Steinbach et al, 2007). In addition, there is little understanding about *why* a link between ethnicity and injury risk might exist.

> *I can't see why a black child is more likely to be injured than a white one. We've got deprivation across the whole of the borough, the bus, the lorry, or whatever isn't going to take any notice, the driver isn't, the driver doesn't actually want to hit and collide with [a child] and so why should there be a differential? (Road Safety Officer quote, inner London, Green & Edwards, 2008)*

In the absence of such data, professionals had to rely on personal experience and observation:

> *It [ethnicity] isn't given in normal statistics…we really just don't know, the only way we can get it is by feel, when you're going to places…but you go to another area and it might be completely the opposite, so its quite difficult to establish. (Road Safety Officer quote, Steinbach et al 2007, edit in original)*

Both young people and professionals were sensitive to the possibility that such data needed to be used sensitively without victim blaming:

> *Why are you saying Black people? Why is it always us black kids that is the problem? (Young person quote)*

> *Some [practitioners] have said that "well, we don't want to look like we've stigmatised [some communities]. It's rubbish…but that's what their fear is. (Policy make quote, Steinbach et al 2007, edit in original.)*

Stakeholders in Frataroli et al's study (2006) also suggested that reliable data was needed in order to mobilise both community and local government efforts on pedestrian road injury.

5.5.4. Media

Stakeholders in the Frattaroli et al study (2006) suggested that those who had been the victims of road injury as pedestrians could play a key role in raising awareness as they expected their input to be compelling.

Evidence statement 6: Suggested solutions to child injury on the road
6a. Six studies, five UK and one USA, discuss possible solutions to preventing child injury on the road (Baslington, 2008; Christie et al, 2007 [+]; Frattaroli et al, 2006 [+]; Green & Edwards, 2008 [+]; Steinbach et al [-]).
6b. Suggested structural solutions to reduce injuries included broad remits such as greater investment in the causes of deprivation and improved education (Green & Edwards, 2008); more compulsory measures (Lupton & Bayley, 2006) and better enforcement of existing traffic regulations (Christie et al, 2007; Lupton & Bayley, 2006).
6c One UK study reports that children and young people sometimes misunderstood the purpose of street furniture – tending to assume that items such as railings and bollards were intended to enhance pedestrian safety, and being dismayed to see that they were not strong enough for this purpose (Lupton & Bayley, 2006).
6d. One UK study suggests restricted vehicular access to schools and “Park and Stride” might address congestion at the school gates (Baslington, 2008).
6e. Two UK studies (based on the same dataset) suggest that road safety officers favour empiricist solutions to injury rates – for example using accident histories to prioritise bids for interventions (Green & Edwards, 2008; Steinbach et al 2007).
6f. Two UK studies suggest that there was pressure on interventions to be targeted, however lack of appropriate data might limit the effectiveness of this and lead to proxy targets being used – for example, geographical definitions of deprivation replacing possible cultural or community characteristics related to higher risk – or professional’s relying on personal experience rather than data (Green & Edwards, 2008; Steinbach et al 2007).
6g. Young people and professionals were sensitive to the possibility that data about

differential risk among some ethnic communities needed to e used sensitively to avoid victim blaming (Steinbach et al, 207).

5.6. School travel plans

5.6.1. Methods of advertising School Travel Plans

One UK study explicitly discussed School Travel Plans. Baslington (2008) analysed advertising material promoting school travel plans and found that, of five designs, only one emphasised the safety aspects, with two focussing on health benefits, one about empowerment and road sense and one about enhancing social and local awareness.

5.6.2. Difficulties with walking buses

Despite their enthusiasm for the idea of "walking buses", some parents were unable to use them, for example where they needed to leave for work before the bus arrived (Baslington, 2008). The same author found that the buses did not operate from all relevant areas, leaving those in the neglected catchment area feeling "forgotten about."

Finding volunteers to escort the walking buses and operate as conductors on the actual bus was also sometime difficult (Baslington, 2008). In some areas, but not all, expenses or payment through grants or the council had been found. While some parents were happy to volunteer, others were unable due to other commitments, including work. One mother felt that travel initiatives inappropriately relied on free female labour, and used guilt to stop car use:

> *The language of John Prescott[h] is to make women feel guilty. (Parent quote, Baslington, 2008)*

Although walking buses were not included in the effectiveness review, these observations about relying on parents, especially mothers, to volunteer for safer travel initiatives, may well be relevant to other initiatives.

[h] Secretary of State for Environment, Transport and the Regions 1997-2002

Evidence statement 7: School Travel Plans
7a. One UK study explicitly discussed School Travel Plans and found that promotional material tended to focus on health benefits and empowerment rather than their safety aspects (Baslington, 2008 [-]). 7b. It may be difficult to recruit parent volunteers to assist with aspects of School Travel Plans, such as walking buses, due to competing priorities, including work. Some may feel it inappropriate for such schemes to rely on such free, usually female, labour (Baslington, 2008).

5.7. Quiet Lanes

Two studies assess the success of Quiet Lane schemes in Kent and Norfolk (Kennedy et al, 2004 I; Kennedy et al, 2004 II). The findings of both are structured around the same headings of: knowledge and use of the quiet lanes, signs, success and suggested improvement. These are briefly summarised below as there is little explicitly about children and young people in the findings, although the results can clearly relate to everyone's use.

5.7.1. Knowledge and Use

In both cases, residents had heard of the scheme but felt that visitors to the area were unlikely to know about it. Leaflets about the scheme in Kent were criticised for not explaining the concept of the quiet lanes fully, while in Norfolk, participants were aware of the schemes through a number of sources, including village hall exhibitions, leaflets and local newspaper coverage (Kennedy et al, 2004 I; Kennedy et al, 2004 II).

The main criticism about use in both areas was that visitors to the area - car drivers, quad bikes and HGVs – did not respect the quiet lanes. It was felt that buses should not be routed through the lanes. Most residents used them, although it was not always clear whether this had always been the case or if use had increased following the introduction of the scheme (Kennedy et al, 2004 I; Kennedy et al, 2004 II).

5.7.2. Signs

Signs in both areas were felt too small to be seen by drivers and lacked sufficient information about the meaning of the scheme (Kennedy et al, 2004 I; Kennedy et al, 2004 II). It was also considered inappropriate for the scheme not to be accompanied by speed limits.

5.7.3. Success

There were mixed reactions about the success of the Quiet Lanes. Residents in Norfolk suggested that it was not working because it was still considered unsafe for children and young people to use the lanes to walk or cycle. Conflict between motorists and non-motorists was seen as inevitable (Kennedy et al, 2004 I; Kennedy et al, 2004 II).

5.7.4. Improvements

Better publicity and more informative signs were suggested. It was also considered that the roads would only be safe for walkers if traffic was slowed, or footpaths were introduced. Better links to other areas where people walk, or into villages, so that the Lanes led somewhere and linked routes, were also suggested improvements (Kennedy et al, 2004 I; Kennedy et al, 2004 II).

Evidence statement 8: Quiet Lanes
8a. Two UK studies assess Quiet Lanes (Kennedy et al, 2004 I & II, both [-]). 8b. While locals were aware of the scheme, visitors were not, and signs were thought too small and too uninformative to assist with this. 8c. It was felt that the Lanes were not safe for children and young people to use as pedestrians or cyclists – conflict between vehicles and other road users was seen as inevitable, and exacerbated by heavy vehicles including buses using the Lanes, which did not have speed limits. 8d. Better publicity and more informative signs were recommended, as were

enhanced links with existing leisure and village routes.

6. Discussion

6.1. Findings

The following research question informed this evidence review:

- What are the important factors which either enhance or reduce the effectiveness of design-based interventions, safe routes to schools and cycle/walking routes, or which help or hinder their implementation?

In particular, it was hoped that information about the second of these concerns may help to explain inequalities in childhood injury rates on the roads.

We included a total of 10 qualitative research reports for this review, eight of which were from the UK. The studies were among children and young people, parents, key professionals or stakeholders and local adult residents (some studies were conducted among more than one of these groups). Seven of the included studies focussed on behaviours, attitudes and experiences of children, young people and parents about road safety. Four studies considered the views of key professionals or other stakeholders (note that some of these studies included more than one type of participant so these numbers sum to more than 10). We identified only three studies that were related to specific interventions, and those that were found (two about Quiet Lanes and one about School Travel Plans), were about interventions that were not included in Report 1 about the effectiveness and cost-effectiveness of design based interventions.

Although children and young people appeared well informed about the nature of accidents and injury among peers on the road and appropriate road-safety behaviours, this did not always translate into appropriate behaviours. Like adults, children and young people often engage in “common” risk behaviours, such as crossing between parked cars, stepping into the road or crossing between cars in slow moving traffic. They may be more likely to do this when in a hurry or when playing with, or distracted by, their friends. Peers may encourage risk taking, actively, or because of “ritual showing off” to each other, especially older boys.

The review also identified some “extreme” risk-taking behaviours, which clearly may contribute to injury on the road among children and young people. It is difficult to see, particularly in the context of road design intervention, how to successfully address such behaviour. There is a large literature about risk-taking generally, especially among young people, which may well have been pertinent, but which was beyond the scope of this review.

Few participants identified particular road engineering or design issues which they believed were likely to contribute to road accidents and injury, and these were generally less prominent in participant comments than those about children or drivers as the causes of accidents. Where design issues were mentioned, they related to the exacerbation of traffic problems where streets were narrow and not designed for contemporary traffic volumes; the need for more signs to indicate areas where children are likely to play; more central islands to allow roads to be crossed in two parts; better placement of crossings to accommodate pedestrian “lines of desire” and improved areas for walking with more lighting and better maintenance. Children and young people may not feel safe using underpasses, while lollipop people are generally regarded as only appropriate for younger children.

The findings suggest that children do feel vulnerable in traffic, for example, children were nervous about crossing the road without traffic lights as they felt they were too small to be visible, and they feared that their indecisiveness about crossing would irritate drivers; something they strongly wanted to avoid. There were also misunderstandings about various items of street furniture, such as railings and bollards, which children wrongly thought were supposed to be protective of pedestrians, again suggesting feelings of vulnerability around traffic. Such findings suggest that children may prefer clear demarcation of priority on the roads to help them feel safe. Schemes which encourage shared use of public spaces between cars and other users may not be well received by this group.

Although reckless driving was identified as a potential cause of accident, it was noticeable that there seemed to be much “victim blaming” reported in the included studies, among children and young people themselves, as well as parents, other adults, and stakeholders among the community and statutory agencies. Children and young people were repeatedly blamed for contributing to road accidents through being

inattentive, careless or engaging in risky behaviours. Even when shown an accident involving a child accompanied by an older person (older sibling or an adult) who was supposed to be responsible for them, one study found that children and young people blamed the child rather than the older person.

This issue of blame and stigma was also raised in relation to apparent differential risk of injury on the road in children from some ethnic minority groups. However, while there was some evidence of blame relating to perceived behavioural or cultural differences among specific groups, there was also more awareness that inequalities in risk need to be handled cautiously, in order to avoid just such victim blaming (Steinbach et al, 2007).

Two studies from London (based largely on the same data set) suggest that the available data about risk inequalities between different communities is difficult for road safety staff to use, due to the manner of reporting ethnicity, which does not relate to any real community; the fact that data is available only at the London-level, which is not relevant to local, unique population mixes; and the lack of small area data due to small absolute numbers of injury in small areas. This makes it difficult for those involved in the management of road safety locally to meaningfully target policies and resources at those most in need. Planners may instead use deprivation scores for areas as proxies to target interventions, although it is unclear how appropriate this is. In addition, community demand for relevant services may be hampered by low levels of awareness about differential risk, as well as lack of existing mechanisms for engagement for transient or newly arrived communities.

Although studies suggest that community engagement may be important in successfully designing and implementing local road-design interventions, it was found that road safety was often not seen as a priority among community members including children, young people and parents. Other competing safety issues, especially in urban areas, are very varied and may include crime, such as fear of attack and abduction (“stranger danger”), drug dealing, young people’s concerns about crossing neighbourhoods other than their own, better street lighting, better facilities for children and young people and the presence of park wardens. It may be that a more holistic approach is needed which addresses these linked safety concerns locally, rather than focussing on road design in isolation. It is also noted that parents may see driving

their children around as indicative of "good parenting" since it protects them from a range of possible dangers, but that this constitutes a "social trap", through contributing to excess traffic, and therefore risk, on the road. If neighbourhoods were felt to be safer across a range of concerns, it may be easier to limit parental car use.

Further, there were reports of lip-service being paid to community consultation, which didn't really attempt to empower community involvement. It was also noted that there may be inherent contradictions in the twin demands on planners both to prioritise those interventions which are evidence-based and to engage meaningfully with communities. This may be exacerbated by the need to prioritise measurable targets such as reducing the number of collisions.

6.2. Review limitations

The review and synthesis of research is necessarily an interpretive process and, due to time and other resource pressures on this project, this synthesis is primarily the work of one researcher (RG). Single author reviews of qualitative research may be particularly open to bias and, although input from other team members was obtained on the first draft (KA & RA), this remains a risk here as they were not involved in the full review and synthesis process. Lack of time has prevented further conceptualisation of the findings; in particular, the development of a theoretical framework to add greater explanatory power to the synthesis. Other interpretations of the findings would be possible, and perhaps likely with the use of such a conceptual framework.

We found study reporting generally to be poor - seven of the included studies were rated "-" on an overall quality rating. Quality appraisal for qualitative research, however, remains a vexed issue. There are no universally accepted indicators of quality in qualitative research and different traditions and expectations of research procedures and reports are seen within and between academic disciplines (Sandelowski & Barroso 2007;Sparkes 2001). Given this lack of consensus, there are also no agreed protocols between researchers, reviewers and editors about the necessary nature and level of methodological detail about a study that should be reported. The lack of detail about basic elements such as sampling and procedures for collecting and analysing data across a number of studies may suggest that these

are not expected in the transport and safety journals in which these studies are typically published. Limited journal word counts may also mean that details of data collection and analysis procedures are not reported in order to preserve space to report findings in greater detail. Although we rated many study reports as poor, it is often unclear whether deficiencies are in the reporting or the actual conduct of the research and it is anyway unclear what, if anything should be considered so serious as to render findings highly suspect or invalid. It is particularly challenging to provide a meaningful, single overarching quality "score" for a study. A further unknown is how any quality appraisal should influence either the conduct, or the use, of systematic reviews of qualitative research.

6.3. Further research

There were few studies which reported on attitudes towards and experiences of specific designs based road intervention to prevent injury in children and young people.

Given children's apparent preferences for clear demarcation of priority between traffic and other road users, careful consultation, piloting and evaluation may be needed for planned open road schemes.

Future synthesis could develop conceptual framework to aid synthesis and interpretation of the findings.

Appendix 1 Bibliography

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Appendix 2 Protocol

Review protocol

Clarification of scope

Populations
Groups that will be covered

Children and young people aged under 15

Parents and carers of children and young people aged under 15

Groups that will not be covered

Anyone aged 15 or older, except the parents or carers of children and young people aged under 15 (where they are the focus of research about their children, or where they are targeted as key agents to reduce unintentional injuries in their children).

Interventions /Activities that will be covered
Activities
Activities/measures that will be covered

NICE is developing a range of public health guidance to prevent unintentional injuries among children and young people aged under 15. This protocol relates to producing evidence about interventions which prevent such injuries in the road or street environment.

In parallel with this work, NICE will also be developing public health guidance (also developed using the intervention development process) to prevent unintentional injuries in the home and in other external environments. There will also be public health guidance (developed through the programme guidance process) focusing on the broader legislative/regulatory and related activities which aim to prevent unintentional injuries in children. The present guidance will complement these publications and will focus on:

- Local or regional interventions to reduce injuries in children aged under 15 by road/street design or by modifying the road/street environment and highway design. These will include the following either combined or delivered separately:
  - traffic calming

- 20 mph zones
- home zones
- international examples such as 'woonerven' in the Netherlands: streets or a group of streets that have been redesigned to slow traffic and promote non-motorised traffic
- 'naked streets' (or 'psychological traffic calming') where road markings, lines, traffic lights, signs and curbs and so on are removed to create uncertainty in road users and encourage them to slow down
- 'quiet lanes' and other rural examples of traffic calming schemes
- signing related to speed limits
- walking and cycling networks
- 'Safe Routes to Schools'

Activities/measures that will not be covered

a) National legislation or regulation, including in relation to blood alcohol concentration and other driver legislation.

b) Enforcement of legislation, including speed limits, speed cameras, speed limiters (technology that prevents a vehicle being driven at certain speeds) alcohol testing, enforcing driver legislation and policing policies.

c) Primary prevention to reduce the risk of collisions which use education of drivers, cyclists and pedestrians (including national and local media campaigns, leaflets and promotional activities), mandatory training, re-testing and post-offence training, visibility for vehicles and visibility for cyclists and pedestrians such as daytime lights and high visibility clothing, and those that aim to reduce risk through passive methods (such as anti-lock breaks or skid resistant surfaces).

d) Secondary prevention measures that aim to reduce the severity of or occurrence of injury following collision (e.g. seat belt and safety seat use promotion, helmets)

e) Tertiary prevention, including emergency services, treatment and rehabilitation.

Key questions and outcomes

Below are the overarching questions that will be addressed along with some of the outcomes that would be considered as evidence:

Question 1: What types of road design or modification to the road and street environment are effective and cost-effective in reducing road injuries among children and young people aged under 15?

Question 2: What are the barriers and facilitators to implementing environmental modifications and road/street designs relating to the reduction of road injuries?

Expected outcomes: Changes in injuries and deaths in children and young people aged under 15, including changes in injury severity, vehicle speeds, collisions, knowledge and attitudes and estimates of the cost of specific interventions relative to the outcomes achieved.

Steps will be taken to identify ineffective as well as effective interventions and approaches (e.g. through the review of grey literature).

Reports

Report 1 will include Reviews 1 (effectiveness) and 2 (cost-effectiveness). Report 2 will include Review 3 (barriers and facilitators) if it is to be included as a separate review. Report 3 will include an economic analysis of a selected type of intervention (if deemed feasible and useful).

Reviews

Aims, key review questions and key outcomes

Report 1: Systematic review of effectiveness and cost-effectiveness studies

a) Aim

To identify, critically appraise, summarise and synthesise evidence relating to the effectiveness (review 1) and cost-effectiveness (review 2) of the specified types of road and street design-based interventions aimed at reducing unintentional injuries in children.

b) Key review questions

Review 1 (effectiveness)

What is the effectiveness (in terms of reducing unintentional injury in children) of design-based interventions aimed at reducing motorised traffic speeds and/or encouraging more careful driving

What is the effectiveness (in terms of reducing unintentional injury in children) of safe routes to school initiatives and cycle/walking routes/networks

What are the important factors which either enhance or reduce the effectiveness of such design-based interventions, safe routes to schools and cycle routes, or which help or hinder their implementation?

Review 2 (cost-effectiveness)

What is the cost-effectiveness of such design-based interventions aimed at reducing speed, encouraging more careful driving, providing safe routes to schools and cycle routes?

What are the main causal relationships which seem to explain how the different combinations of resources (and levels of costs) of these interventions are related to intended outcomes?

c) Factors and outcomes

Any potential explanatory factors (eg cultural, social, economic, environmental and organisational determinants/correlates) regarding the characteristics of individuals, families/households, or the places where they live or travel which may be associated with unintentional injury in children and young people under 15 will be considered. A range of potential outcomes associated with unintentional childhood injury, as described in the scope, are listed below:

Primary outcomes:

- rates of unintentional injuries in children
- rates of hospital admissions and preventable child deaths related to unintentional injuries
- severity of unintentional injuries in children

Secondary outcomes:

- vehicle speeds
- collisions (number and degree of impact)

Plus (for Review 2):

- costs and/or resource use
- cost-benefit estimates
- cost-effectiveness ratios

Report 2: Systematic review of evidence about 'barriers and facilitators'

Production of a separate review of barriers and facilitators is conditional upon (a) the amount of studies identified for inclusion in the effectiveness and cost-effectiveness reviews (the "main reviews"); and (b) the number of studies eligible for inclusion in a "barriers and facilitators" review. If the production of a set of high quality reviews under each of these three headings is deemed unmanageable given the time and resources available, then a

separate review of barriers and facilitators will not be conducted. However, in order to still answer the "barriers and facilitators" review question – it is proposed that relevant observations from the 'Discussion' and 'Conclusion' sections of all the included effectiveness papers will be extracted as part of that review (e.g. where authors try to explain why their evaluated outcomes differed from others, or differed from what they expected).

a) Aim

To identify, critically appraise, summarise and synthesise qualitative and/or quantitative evidence relating to contextual or other factors which either enhance or reduce the effectiveness of such design-based interventions, safe routes to schools and cycle routes, or which help or hinder their implementation.

b) Key review questions

What are the important factors which either enhance or reduce the effectiveness of such design-based interventions, safe routes to schools and cycle routes, or which help or hinder their implementation?

Methods

1.1 Overview

An electronic search of relevant bibliographic databases, and also selected websites, will be conducted in order to identify relevant primary research (to be supplemented by communication with experts and/or organisations involved in the relevant research or transport policy areas).

1.2 Search process and methods

To review published literature, and relevant unpublished/grey literature, as far as time and other resources allow.

To include all relevant primary research that meet minimum quality criteria (see below). Searches will be conducted in the following databases:

From the "core databases":

- ASSIA (Applied Social Science Index and Abstracts)

- Database of Abstracts of Reviews of Effectiveness (DARE); NHS EED; HTA (all in the CRD database)
- EconLit
- HMIC (or Kings Fund catalogue and DH data)
- MEDLINE
- PsycINFO
- Social Science Citation Index

From the topic-specific databases:

- ERIC
- SafetyLit
- EPPI Centre databases
- The Campbell Collaboration
- Transport Research Information Service via the TRIS online free access at: http://ntlsearch.bts.gov/tris/index.do hosted by the National Transportation Library
- International Transport Research Documentation (ITRD) via STN desk connection pay as you use service hosted by STN international at: http://www.stn-international.de

Search terms – To be agreed separately, and appended to this protocol)

The websites of the various relevant organisations will also be searched for relevant publications; these will include the following:

UK Department for Transport (DfT)

Transport Research Laboratory (TRL)

Sustrans

Public Health Observatory website(s) for the South West (lead on Injuries; http://www.swpho.nhs.uk/) and South East (lead on Transport; http://www.sepho.org.uk/)

Nottingham School of the Built Environment

CAST (Staffordshire University)

UCL Centre for Transport Studies

University of Leeds Institute of Transport Studies

University of Westminster Transport Studies Group

And may include some of the following, should time and resources allow:

Ministries of Transport in selected countries (e.g. Netherlands) – where the website is available in English

Royal Town Planning Institute (www.rtpi.org.uk/)

Institute of Highway Incorporated Engineers (http://www.ihie.org.uk/)

Living Streets (http://www.livingstreets.org.uk/)

National Technical Information Service

Institution of Civil Engineers (www.icenet.org.uk)

Scottish Executive

Welsh Assembly Government

Expert contacts in the relevant policy/practice areas (e.g. highway engineering, urban design/town planning) as well as key researchers of these types of intervention will also be consulted

1.3 Study selection

Inclusion criteria (common to all reviews):

Studies published from 1990

Studies published in English language

Criteria specific to Review 1 (effectiveness):

Inclusion criteria:

Evaluations (prospective or retrospective) using comparative designs (randomized controlled trials, non-randomized controlled trials, before and after studies, or natural experiments)

Studies reporting the relevant injury outcomes in children (or in both adults and children but with the outcomes for children shown separately). This inclusion criteria will only be applied at full-text assessment stage. In other words, no papers will be excluded on the basis of age at the title and abstract screening stage. *For the purposes of judging paper inclusion, papers will be included if the relevant outcome information pertains to an age-grouping (e.g. 5 to 18 year-olds) where it is judged that the majority of people in that age-range are common with the intended age range for this NICE Guidance (i.e. children aged under 15 years)*

Exclusion criteria:

Empirical studies which only document schemes/interventions and related outcomes but without evidence regarding injury outcomes without the scheme/intervention (e.g. before its introduction, or in comparable towns or neighbourhoods).

Empirical studies which do not separately report injury-related outcomes for children or young people.

Criteria specific to Review 2 (cost-effectiveness):

Inclusion criteria:

Full economic evaluations of relevant types of intervention or scheme, and high quality costing studies conducted in the UK or countries of a similar level of economic development, patterns of transport use and urban environment.

Exclusion criteria:

Cost-of-illness studies, or other studies which do not involve assessing the cost and related benefits/effectiveness of particular interventions (or class of intervention).

Criteria specific to Review 3 (barriers & facilitators):

Inclusion criteria:

> Primary qualitative research involving the analysis of written or spoken speech/evidence, regarding attitudes towards, or experiences of, the relevant interventions; OR
>
> Quantitative or qualitative surveys of attitudes towards, or experiences of the relevant interventions.

Exclusion criteria:

> Research which does not involve the collection and analysis of qualitative data using established qualitative research methods.

Assessment for inclusion will be undertaken initially at title and/or abstract level (to identify potential papers/reports for inclusion) by a single reviewer (and a sample checked by a second reviewer), and then by examination of full papers.

1.4 Quality assessment and data extraction

All included studies will be quality assessed using the checklists in the *Methods for development of NICE public health guidance 2006* where these are appropriate (so if, for example, one is not available for a particular included study design we will seek a valid checklist from other sources such as CRD or CASP). Any departure from the methods manual will be discussed and agreed with the NICE CPHE Team. Data extraction and quality assessment will be conducted by a single reviewer, and checked by a second reviewer for a sample of studies, as agreed with the NICE CPHE team.

1.5 Data synthesis and presentation, including evidence statements

Data synthesis and presentation, including evidence statements will be conducted according to the procedures outlined in the *Methods for development of NICE public health guidance 2006*. Key choices in how to synthesise the included evidence, or in how to develop evidence statements, will be discussed with the relevant analysts at CPHE.

Report 3: Economic analysis of a selected type of intervention

(IF FEASIBLE AND USEFUL)

a) Aim

For a specific type/s of scheme/s/intervention/s, to assess the relationship between the amounts and combinations of resources and costs, and the levels of resulting benefits and/or effectiveness (related to avoiding unintentional injuries to, and death in, children).(ie. To look at the costs and benefits of all impacts of an intervention in relation to unintentional injuries including death in children.

b) Perspective

The analysis will adopt both a health and Personal Social Services perspective, and a broader public sector perspective in relation to costs (as in the NICE CPHE methods Guide, 2006). Injury-related health outcomes will be expressed in terms of QALYs or life-years gained/lost wherever possible. If good data are available, and where appropriate, impacts in terms of other outcomes, such as lost school days may also be part of a broader cost-consequence approach to analysis. Also, if sufficient good data are available, outcomes may be expressed in monetary terms and an assessment of whether benefits exceed costs made.

Protocol Reference

Wallace A, Croucher K, Quilagars D, & Baldwin S. 2004. Meeting the challenge: developing systematic reviewing in social policy. Policy and Politics 32: 4; 455-470.

Appendix 3 Search Strategy

Searches were performed to find relevant primary research using a comparative design, qualitative studies, and cost-effectiveness studies. Database protocol driven searching, targeted searching, author suggestions, expert input, citation searching, named website searches, and citations from a parallel review were utilised.

All searches were limited to those published in English since 1990 where possible.

Bibliographic Databases:

The following databases were searched between 29 Jan, 2009 and 17 February, 2009

- ASSIA (Applied Social Science Index and Abstracts) via CSA
- Database of Abstracts of Reviews of Effectiveness (DARE); NHS EED; HTA all via the Centre for Reviews and Dissemination database
- EconLit via EBSCO
- HMIC via Search 2.0
- Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1950 to Present
- PsycINFO 1806 to February Week 2 2009 via OVID online
- ISI Web of Knowledge Social Sciences Citation Index (SSCI)--1956-present
- ERIC via Dialog Datastar
- SafetyLit (online)
- EPPI Centre databases: TRoPHI, DoPHER, and Bibliomap (online)
- The Campbell Collaboration (online)
- Transport Research Information Service (TRIS) via TRIS online

Bibliographic Databases Search Strategy

The Medline search strategy example follows and was “translated” according to the appropriate thesaurus terms for each individual database. Where a database did not have a thesaurus or does not have a search facility to incorporate thesaurus searching, text words only were used. All searches where possible were limited to English language and from 1990-current.

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1950 to Present

Search Date: 29012009

1. safe route*.mp.
2. (walk* adj3 bus*).mp.
3. traffic club*.mp.
4. (woonerven or woonerf).mp.
5. 1 or 2 or 3 or 4
6. ((walk* or Pedestrian*) adj2 (network* or path* or route* or footpath or sidewalk or verge)).mp.
7. ((cycle* or bicycle or walk*) adj2 (track* or trail* or network* or route* or lane*)).mp.
8. ((safe* adj2 cycl*) or (safe* adj2 walk*)).mp.
9. cycle* path*.mp.
10. Bicycling/
11. Walking/
12. (cycl* or bicycl* or walk* or play* or travel*).mp.
13. 6 or 7 or 8 or 9 or 10 or 11 or 12
14. (injur* or accident* or death* or fatal* or collision or crash*).tw.
15. (road* or street* or highway* or traffic*).tw.
16. 14 and 15
17. 13 and 16
18. ((traffic or pedestrian or home) adj2 zone*).tw.
19. (20 mph or 20 mi per hr).mp. or 20mi/hr or 20m/hr or 20 miles per hour.mp. or 20 mi ph.mp.
20. 30km.mp.
21. ((30 km and (hour or hr)) or (30 kilo meter* and (hour or hr)) or ((30 kilometre or 30 kilometer) and (hour and hr))).mp.
22. ((street* or road* or lane*) and (quiet or naked)).ti,ab.
23. ((speed or road or street) and (humps or bumps or lumps)).ti,ab.
24. (sleeping adj policeman).ti,ab.
25. (central adj2 (refuge* or reservat*)).tw.
26. (hierarchy and (road* or street* or highway*)).tw.
27. ((road* or street* or highway or traffic) adj3 (design or environment* or manage* or layout or lay out)).tw.
28. (chicane* or speed cushion or rumble or jiggle bars).tw.
29. (cross* adj2 (pelican* or zebra or puffin or signal*)).tw.
30. (traffic adj2 calm*).tw.
31. (traffic adj4 (flow or restraint* or engineer* or security)).tw.
32. or/18-31
33. 32 and 14
34. (urban or suburb* or residential or (limited adj access) or pedestrian or neighbourhood).tw.
35. (sign* and (reduc* or restrict* or limit* or prevent*)).tw.
36. Accident Prevention/ and (reduc* or restrict* or limit* or prevent*).tw.
37. "Location Directories and Signs"/
38. Environment Design/
39. Accidents, Traffic/
40. ((speed* or volume*) and (reduc* or restrict* or limit* or prevent*)).tw.
41. or/34-40
42. 41 and 16
43. (reduc* or restrict* or limit* or prevent*).tw.
44. 42 and 43

45. (animals not humans).sh.
46. 5 or 17 or 33 or 44
47. 46 not 45
48. limit 47 to (english language and yr="1990 - 2009")

Targeted Bibliographic Database Searches

After screening the results from the protocol driven search strategy, a "targeted" search of specific named programmes and additional traffic calming terms was done in the bibliographic databases on the 31 March 2009:

- Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1950 to Present
- Transport Research Information Service (TRIS) via TRIS online

Below is the Medline strategy for the targeted search.

1 neighbourhood road safety initiative.tw.
2 leigh park*.tw.
3 play it safe.tw.
4 child pedestrian injury prevention project.tw.
5 CPIPP.tw.
6 streetwise kids club.tw.
7 streetwise kids club*.tw.
8 street-wise kids club.tw.
9 school travel plan.tw.
10 school travel plan*.tw.
11 school safety zones.tw.
12 feet first a step ahead.tw.
13 vision zero.tw.
14 LATM.tw.
15 danish bun*.tw.
16 dynamic striping.tw.
17 local area traffic management.tw.
18 dynamic road marking.tw.
19 SUNflower.ti.
20 injur*.tw.
21 20 and 19
22 verkehrsberuhigung.tw.
23 liveable street*.tw.
24 cut your garden hedge.tw.
25 SAFE WAY TO SCHOOL.tw.

26 free foot spaces.tw.

27 11 or 21 or 7 or 26 or 17 or 2 or 22 or 1 or 18 or 23 or 16 or 13 or 25 or 6 or 3 or 9 or 12 or 14 or 15 or 8 or 4 or 24 or 10 or 5

Websites:

The following organisation's websites were searched for relevant publications:

- UK Department for Transport (DfT) (http://www.dft.gov.uk/)
- Transport Research Laboratory (TRL) (http://www.trl.co.uk/)
- Public Health Observatory website for the South West (lead on Injuries; http://www.swpho.nhs.uk/)
- Public Health Observatory website for the South East (lead on Transport; http://www.sepho.org.uk/)
- Every Child Matters (http://www.dcsf.gov.uk/everychildmatters/)
- Institute of Highway Incorporated Engineers (http://www.ihie.org.uk/)
- Transport 2000 (http://www.transport2000.org/)
- Safe Routes to School (http://saferoutesinfo.org/)
- (http://depts.washington.edu/hiprc/practices/topic/pedestrians/environment.html)

Review of References

Due to the difficulties of finding primary research as described in the methods section. References lists of reports and reviews were searched in order to utilise the contacts and database access that other research groups may have had available.

Citation Searching

Citation searches were done in ISI Web of Knowledge Social Sciences Citation Index (SSCI) on key authors.

Author Suggestions

A limited number of authors were contacted specifically in reference to potential qualitative research.

Expert Contacts

Staff of Sustrans (UK) and the National Center for Safe Routes to School (USA) were contacted along with experts in the field of transport policy evaluation.

Parallel review

References from a parallel review for the CPHE programme on preventing unintentional injuries in children, “A systematic review of risk factors for unintentional injuries among children and young people aged under 15 years: Quantitative correlates review of unintentional injury in children”, considered potentially includable for this review were tagged at time of screening.

Appendix 4 OECD countries

Austria

Australia

Belgium

Canada

Czech republic

Denmark

Finland

France

Germany

Greece

Hungary

Iceland

Ireland

Italy

Japan

Korea

Luxembourg

Mexico

Netherlands

New Zealand

Norway

Poland

Portugal

Slovak republic

Spain

Sweden

Switzerland

Turkey

United Kingdom

United States

Source: http://www.oecd.org/

Appendix 5 Screening checklists

Checklist for title/abstract and full text screening

	Title/abstract criteria
1	Not addressing primary prevention of unintentional injuries on the road OR admissions to hospital or preventable deaths related to unintentional injuries on the road OR the costs associated with interventions to prevent such outcomes OR barriers & facilitators to such interventions.
2	Not a comparative design OR full economic evaluation OR high quality costing study OR primary qualitative research OR survey of attitudes/experiences
3	Intervention not related to road/street design OR road/street environment OR walking/cycling networks OR 'Safe Routes to School'
4	Not set in an OECD country
5	Published prior to 1990
6	Not in English
7	Duplicate
8	Maybe
9	Does not address one of our primary outcomes (e.g. only measures vehicle speeds, number or severity of collisions etc.)
A	Applicability fatally flawed (e.g. setting completely inappropriate)
B	Simulation modelling
C	Conference proceeding/abstract
RR	Review for refs [this must be applied in addition to an exclusion criteria]
	Further criteria at full text stage
1	Outcomes not reported separately for children under 15 years (or where the majority are under 15 years)
2	Not a comparative design OR economic evaluation OR high quality costing study OR findings do not relate to barriers and facilitators
3	Unobtainable
4	Not addressing primary prevention of unintentional injuries on the road OR admissions to hospital or preventable deaths related to unintentional injuries on the road OR the costs associated with interventions to prevent such outcomes OR barriers & facilitators to such interventions.

5	Intervention not related to road/street design OR road/street environment OR walking/cycling networks OR 'Safe Routes to School'
6	Does not address one of our primary outcomes (e.g. only measures vehicle speeds, number or severity of collisions etc.)
7	Applicability fatally flawed (e.g. setting completely inappropriate)
8	Conference proceeding/abstract
9	Published prior to 1990
A	Duplicate
B	Not in English
C	Not set in an OECD country

Greyed out cells contain information that was used to "tag" references for follow up as described. They were not were used as exclusion criteria

Appendix 6 Quality appraisal tool

All questions are answered yes, no, can't tell or not applicable.

1	Question	Is the research question clear?
2	Theoretical perspective	Is the theoretical or ideological perspective of the author (or funder) explicit? Has this influenced the study design, methods, or research findings?
3	Study design	Is the study design appropriate to answer the question?
4	Context	Is the context or setting adequately described?
5	Sampling	Is the sample adequate to explore the range of subjects and settings? Has it been drawn from an appropriate population?
6	Data collection	Was the data collection adequately described? Was it rigorously conducted to ensure confidence in the findings?
7	Data analysis	Was there evidence that the data analysis was rigorously conducted to ensure confidence in the findings?
8	Reflexivity	Are the findings substantiated by the data and has consideration been given to any limitations of the methods or data that may have affected the results?
9	Generalisability	Do any claims to generalisability follow logically and theoretically from the data?
10	Ethics	Have ethical issues been addressed and confidentiality respected?

Source: Wallace et al 2004(Wallace et al. 2004)

Appendix 7 Studies excluded at full text stage

Reference and abstract (where available)	Exclusion
Defrancesco, S., Gielen, A. C., Bishai, D., Mahoney, P., Ho, S., & Guyer, B. 2003, "Parents as advocates for child pedestrian injury prevention: what do they believe about the efficacy of prevention strategies and about how to create change?", *American Journal of Health Education*, vol. 34, pp. 48-53.	Not qual. methods
Ramos, P., Diez, E., Perez, K., Rodriguez-Martos, A., Brugal, M. T., & Villalbi, J. R. 2008, "Young people's perceptions of traffic injury risks, prevention and enforcement measures: a qualitative study", *Accident Analysis & Prevention*, vol. 40, no. 4, pp. 1313-1319. Abstract: The purpose of this qualitative study is to investigate young people's perceptions, in Barcelona, Spain, about the evolution, magnitude, causes and determinants of traffic crashes, to describe their opinions on road safety regulations, and to explore their suggestions and proposals. Interviews were conducted with 43 key informants and 12 focus groups involving 98 participants. Discussion guides were designed to get insight on perceptions of relevance and trends in road traffic injuries, determinants of these, regulations and enforcement, as well as to gather their own ideas for reducing traffic injuries. Young people are aware that traffic injuries are a relevant and increasingly serious problem. The main determinants identified are: driving under the influence of drugs and alcohol, fatigue, night driving, unsafe infrastructures, age of drivers and lack of public transport alternatives. Young people admit that fines, speed cameras and alcohol breath testing reduce risky driving. They prefer community work to fines. They have a poor image of public administrations in charge of prevention of traffic injuries. They demand information on traffic regulations and politicians' decisions, and a considerable increase in weekend and night time public transport. Effectiveness of interventions to reduce traffic injuries can be improved by taking the recipients' perceptions into account	Outcomes not relevant to children

Quantitative study designs – excluded at full text stage

Reference and abstract (where available)
2009, *Students' Perception of the Level of Traffic Safety Provided in School Areas*. Abstract: There is a need to provide a safe environment for vulnerable road users in the road network is essential when considering the land-use system and the transportation system in an area. This need is more important in the case of students due to the fact that they are not always in the position to easily realize the danger of the road traffic and therefore take the necessary precautionary measures. This paper presents the results of a research concerning high school students' perception of the level of traffic safety provided in school areas are presented. Students in high schools (first to third grade) participated in a questionnaire-based survey in the Municipalities of Kalamaria and Larissa, Greece. The perception of the traffic safety level in the vicinity of schools, the reasons for which students feel unsafe, their knowledge of the Highway Code, their participation in traffic education events, their opinion about the traffic calming measures and the transport modes used for the trips to and from schools are examined and presented in this paper.
Abdelghany, A. 2005, *Above-Ground Actuated Yellow Crosswalk Lights at Uncontrolled Pedestrian Crossings*, NTIS. Abstract: There has been a significant amount of studies that investigated a wide variety of measures, devices, and treatments that improve pedestrian safety at different locations (sidewalks, intersection crossing, and midblock crossing). These measures can be classified into three main categories: Physical separation, time separation; Warning; and Traffic Calming Measures. The focus of this study is limited to investigating the effectiveness of flashing lights in increasing pedestrian safety and reducing traffic accidents at uncontrolled pedestrian crossings. This study reviews the experimental research and test cases that investigate the effectiveness of the above-ground flashing beacons as a warning device at uncontrolled crosswalks. In particular, it investigate the usefulness of the above-ground flashing beacons in reducing traffic speeds at pedestrians crosswalks, increasing the percentage of motorists that are yielding to pedestrians, reducing conflicts between motorists and pedestrians, reducing accidents, and increasing pedestrians safety. This study also reviews the comparisons between the effectiveness of the above-ground flashing beacons and the in-pavement flashing lights as warning devices for motorists at uncontrolled crosswalks.
Balzani, M., Borgogni, A. E.-M. A., Balzani, M. b. i., & Borgogni, A. a. i. "The Body Goes to the City project: Research on safe routes to school and playgrounds in Ferrara. [References]", *Garcia Mira, Ricardo (Ed); Sabucedo Cameselle, Jose M (Ed); Romay Martinez, Jose (Ed)* no. 2003, p. Hogrefe. Abstract: (from the chapter) The research activity presented here is the fruit of a co-operation between an association (UISP Ferrara, The Body Goes to the City project), a faculty (the Faculty of Architecture of the University of Ferrara) and local authorities (La Citta bambina [Children's City] project). The common objective--to regain the possibility of children gaining autonomy with regards their personal mobility--has stimulated common strategies of intervention. These projects started from sociological research concerning liveability as well as safety, and have involved both school children and the whole neighbourhood, and were further developed in workshops in schools. Finally, the data collected in the studies and the workshops was adopted by town planners for the elaboration of the final project. The particularities of this research action are the common long-term intervention methodology, which--also thanks to the common training of operators with different professional backgrounds--allows the conservation of similar educational approaches and critical viewpoints; the adoption of the body as an analyser of the quality of

life; the particular attention that the planners pay to the perceptive and qualitative survey of the neighbourhood. The results of the sociological research, which has clearly revealed the children's lack of autonomy in their everyday movements, are in some ways similar to those obtained in other studies. However, they appear even more worrying considering that they have been gathered in Ferrara, a city considered one of the most liveable cities in Italy and a "city for cyclists" on the European level. The word that characterises the results of the study is "limit". We reckon that as the situation persists, it shall not only modify the autonomy of the children, who increasingly adopt their parents' models of behaviour and do not perceive the city as a place where they can live and play, but, in the long run, even their very desires are limited. (PsycINFO Database Record (c) 2008 APA, all rights reserved)
Bishai, D., Mahoney, P., Defrancesco, S., Guyer, B., & Carlson, G. A. 2003, "How willing are parents to improve pedestrian safety in their community?", *Journal of Epidemiology & Community Health*, vol. 57, no. 12, pp. 951-955. Abstract: STUDY OBJECTIVE: To determine how likely parents would be to contribute to strategies to reduce pedestrian injury risks and how much they valued such interventions. DESIGN: A single referendum willingness to pay survey. Each parent was randomised to respond to one of five requested contributions towards each of the following activities: constructing speed bumps, volunteering as a crossing guard, attending a neighbourhood meeting, or attending a safety workshop. SETTING: Community survey. PARTICIPANTS: A sample of 723 Baltimore parents from four neighbourhoods stratified by income and child pedestrian injury risk. Eligible parents had a child enrolled in one of four elementary schools in Baltimore City in May 2001. Main results: The more parents were asked to contribute, the less likely they were to do so. Parents were more likely to contribute in neighbourhoods with higher ratings of solidarity. The median willingness to pay money for speed bumps was conservatively estimated at $6.43. The median willingness to contribute time was 2.5 hours for attending workshops, 2.8 hours in community discussion groups, and 30 hours as a volunteer crossing guard. CONCLUSIONS: Parents place a high value on physical and social interventions to improve child pedestrian safety
Boarnet, M. G., Day, K., Anderson, C., McMillan, T., & Alfonzo, M. 2005, "California's Safe Routes to School program: impacts on walking, bicycling and pedestrian safety", *Journal of the American Planning Association*, vol. 71, no. 3, pp. 301-317.
BOWERS, S. P. 2001, "A Safer Routes to School Project incorporating the use of speed sensitive (vehicle actuated) signs", *HIGHWAYS & TRANSPORTATION.*, vol. 48, no. 5, pp. 9-13.
Brenda J.Wigmore, C. P. B. W. B. W. a. P. H. B. 2001, School journey safety :a comparative study of engineering devices 271.
Brennan, D. T. 1994, "Evaluation of residential traffic calming: a new multi-criteria approach", *Traffic Eng Control*, vol. 35, no. 1, pp. 19-24. Abstract: This paper examines the issue of the assessment and evaluation of traffic calming within residential areas. It is argued that, although the concept of traffic calming has been increasingly grasped and practical experiments and improvements are being implemented, comprehensive evaluation that identifies the success of projects has not been undertaken on an appropriate and systematic basis. The study puts forward a new evaluation approach which is based on the multi-objective nature of residential traffic calming. A case-study was selected and part of the new model applied. Although further research and modifications may be needed, the model has given the evaluator an enhanced and comprehensive evaluation framework that assesses both quantitative and qualitative data.
Centres for Disease Control and Prevention 2005, "Barriers to children walking to or from school - United States 2004", *Morbidity and Mortality Weekly Report*, vol. 54, no. 38, pp. 949-952.
Chua, C. S. & Fisher, A. J. 1991, "Performance measurements of local area traffic management: a case study", *Australian Road Research*, vol. 21, no. 2, pp. 16-34.

Cottrell, W. D., Kim, N., Martin, P. T., & Perrin, H. J., Jr. 2006, "Effectiveness of traffic management in Salt Lake City, Utah", *Journal of Safety Research*, vol. 37, no. 1, pp. 27-41. Abstract: PROBLEM: The effectiveness of speed humps, 14 ft (4.3 m) wide by 3.5 in (8.9 cm) high, and tables, 22 ft (6.7 m) wide, on 12 streets in Salt Lake City, Utah was investigated. Mean and 85th percentile spot speeds, speed limit compliance, motor-vehicle crashes, and resident opinions were considered. METHOD: Spot speeds were collected at 18 "between-hump" locations. Motor-vehicle crash data were obtained for "before" and "after" periods of equal duration. A total of 436 residents were surveyed; 184 responded. RESULTS: The mean and 85th percentile speeds decreased at 14 and 15 locations, respectively. The average reduction in the 85th percentile speed (3.4 mph or 5.4 km/h) was significant in flat and rolling terrain, but not on uphill or downhill segments. The number of sites with 50% speed limit compliance increased from 4 to 12. The number of motor-vehicle crashes decreased from 10 to 9; the change was not significant, but injury crashes decreased from five to one. Regarding the residents, 30% were positive, 25% were negative, and 45% offered suggestions, some of which were conflicting. DISCUSSION: Further study is needed on speed hump spacing and speed tables in hilly terrain. Example results should be shared with residents to inform their decision-making. SUMMARY: At least 78% of the sites experienced a decrease in the mean or 85th percentile speed, or an increase in speed limit compliance. IMPACT ON INDUSTRY: These findings should be useful to agencies that are planning or implementing traffic calming projects, and to analysts
Dischinger, P. C., Ryb, G. E., Ho, S. M., & Braver, E. R. 2006, "Injury patterns and severity among hospitalized motorcyclists: a comparison of younger and older riders", *Annual Proceedings/Association for the Advancement of Automotive Medicine*, vol. 50, pp. 237-249. Abstract: In recent years there has been a significant increase in mortality among motorcyclists, especially older riders (40+ years). However, few studies have compared the nature and severity of injuries sustained by older vs. younger cyclists. The purpose of this analysis was to determine differences, if any, in injury patterns to older vs. younger motorcyclists and to explore rider, vehicle, and environmental factors associated with these differences. Older riders were found to have a significantly higher incidence of thoracic injury, especially multiple thoracic injuries, and specifically multiple rib fractures. Older motorcyclists were also more likely to ride larger motorcycles, and were more involved in collisions involving overturning or striking highway structures. Large engine sizes were associated with increased risk of head and thoracic injuries, but not abdominal injuries. The magnitude of increased risks related to 1000+ cc engine size was higher among older motorcyclists than younger motorcyclists
Geoplan Town Planning 1990, *Neighbourhood Road Safety and Amenity: A look at barriers to the implementation of local area traffic management schemes and strategies to overcome these*, Geoplan Town Planning, CR 98; HS-041 330. Abstract: This project had two aims: to provide an information base on attitudes and other barriers to the implementation of speed control and Local Area Traffic Management (LATM) schemes in Western Sydney which the Office of Road Safety and other authorities can use in promoting such schemes; and to disseminate information on relevant research relating to speed control and LATM schemes to elected local representatives within Western Sydney and to technical staff. The following objectives directed the study: to identify the present experience of councils in Western Sydney with speed control devices and LATM schemes; to identify political, technical, attitudinal and resource problems councils are faced with in implementing speed control and LATM schemes; and to develop strategies targeted at overcoming these particular problems of implementation. Five main barriers to effective implementation of LATM in Western Sydney were identified: Poor Planning Methods; Narrow View of LATM; Lack of Educative Materials; Lack of Local Government Area-Wide LATM Strategies; and Impact of Outside Interests. Twenty recommendations are made for overcoming these barriers.

Hass-Klau, C. 1992, *Civilized Streets: A Guide to Traffic Calming* Environment and Transport Planning, Brighton.
Johansson, C., Garder, P., & Leden, L. 2003, "Toward vision zero at zebra crossings: case study of traffic safety and mobility for children and the elderly, Malmo, Sweden", *Transportation Research Record*, vol. 1828, pp. 67-74. Abstract: The Swedish Vision Zero's goal is to eliminate all fatalities and incapacitating traffic injuries. One step toward Vision Zero is through traffic calming. Code changes are also part of this effort. The Swedish Code concerning car drivers' responsibility to give way to pedestrians was strengthened in 2000. A study was done to evaluate the short-term effects of the change in the code, as well as of the reconstruction of urban intersections to eliminate overtaking and speeding over 30 km/h. The focus of the evaluation was on children and elderly people, as pedestrians and cyclists. Between 1995 and 1999, an average of 7 pedestrians were killed and about 60 seriously injured at unsignalized zebra crossings. In 2001, those numbers were 8 and 70, respectively, despite the fact that some crosswalks were eliminated in connection with the change of the code. The conclusion is that the change of code has not improved safety. Field studies in Malmo in regard to behavior, speed, and conflicts, as well as analysis of crash data, show that the code change has increased mobility for cyclists, whereas motor vehicle speeds did not change significantly. The reconstruction increased mobility further and, at least based on indirect measures, improved safety. Also, safe traffic behavior, expressed as one's looking sideways, increased somewhat at the reconstructed intersections, but stopping at the curb before crossing the street decreased. Children and the elderly did not benefit more than people in other age groups
Jones, P. & Childs, R. 1999, *Home Zones - a step towards Europe* 1999/09. Abstract: Home Zones is the UK term for a residential area in which pedestrians, cyclists and motofised traffic all have equal status. Vulnerable road users are able to use all of the road space, and are not confined to footways at the side of a vehicular carriage Home Zones is the UK term for a residential area in which pedestrians, cyclists and motofised traffic all have equal status. Vulnerable road users are able to use all of the road space, and are not confined to footways at the side of a vehicular carriageway. Indeed, one of the key features of Home Zones is that the traditional demarcation between footway and carriageway is not normally present, as this arrangement tends to reinforce the perception of car drivers that they have the fight to pass through the area unhindered. Speed management is also a key requirement, with target speeds of well below 20mph. Street furniture, defined areas of car parking and soft landscaping are all used to break up the shared surface, making the vehicle path tortuous, whilst enhancing the streetscape. The concept of Home Zones was developed in continental Europe, initially in the Netherlands, where the term 'Woonerf' is used (literally 'living yard'). Home Zones are also common throughout Denmark, Germany and Austria. A key feature of continental Home Zones is that all road users have equal status by law. Traffic signs defining the beginning and end of Home Zones are erected, within which a responsibility is placed upon drivers to avoid conflict with pedestrians and cyclists. The benefits claimed for Home Zones go well beyond transport-related issues such as speed and accident reduction, into 'quality of life' considerations. Without fear from traffic, residents are said to be able to use the public realm to interact socially, developing a stronger sense of community. These effects are particularly important for children, who are than able to meet and play safely in public areas. This is in contrast to many residential areas, where fear of traffic leads parents to deny children the fight to play outside.
Mackie, A. & Wells, P. 2003, *Gloucester Safer City: Final report*, TRL, TRL589
Mota, J., Almeida, M., Santos, P., & Ribeiro, J. 2005, "Perceived neighborhood environments and physical activity in adolescents",

Preventive Medicine, vol. 41, no. 5-6, pp. 834-936.
Scottish Executive 1999, *The community impact of traffic calming schemes*, Central Research Unit, Scottish Executive, Edinburgh
Sisiopiku, V. P. & Akin, D. 2003, *Pedestrian behaviours at and perceptions towards various pedestrian facilities: an examination based on oberservation and survey data*, Transportation Research Part F (6).
Taylor, S. B. & HALLIDAY, M. E. 1997, *Pedestrians' and cyclists' attitudes to Toucan Crossings*, TRANSPORT RESEARCH LABORATORY, TRL Report 277. Abstract: This study was carried out by the Transport Research Laboratory on behalf of the Driver Information and Traffic Management Division of the Department of Transport as part of a research programme into Toucan Crossings. The research examines the public acceptability and understanding of prototype nearside signal aspects and call cancel facilities at Toucan Crossing sites in Warwick and Cambridge. The report presents the findings of 237 interviews carried out on the roadside with pedestrians and cyclists, to assess their understanding of the Toucan's function, the ease of use of the crossing, the acceptability of the prototype units and also feelings of safety whilst crossing the road. The results suggest that the prototype Toucans function well with most pedestrians and cyclists satisfied with their operation and appearance. (A)
Timperio, A., Crawford, D., Telford, A., & Salmon, J. 2004, "Perceptions of the local neighborhood and walking and cycling among children", *Preventive Medicine*, vol. 38, no. 1, pp. 39-47.

Appendix 8 Extraction tables

Study details	Research parameters	Population and sample selection	Mthods of analysis	Notes
Authors: **Christie, Ward, Kimberlee, Towner & Sleney** **Year:** **2007** **Citation:** **Understanding high traffic injury risks for children in low socioeconomic areas: a qualitative study of parents' views. *Injury Prevention* 2007;13:394-397** **Quality score:** **+**	**What was/were the research questions:** To provide information about parents' perceptions of risks for children in the neighbour hood, how parents' feel about children's exposure to risk while playing out in the street and the accessibility of alternatives such as parks and clubs. This information was needed to inform intervention development for the Neighbourhood Road Safety Initiative (NRSI) and assist in identifying intervention partners. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** Content analysis (re Krippendorf, 2004) **How were the data collected:** **What method (s):** Focus group discussions **By whom:**	**What population were the sample recruited from:** Parents of school children aged 9-14 living in 10 low socioeconomic areas participating in the NRSI. **How were they recruited:** Through residents' associations, liaison with schools, regeneration and community based initiatives. £15 cash incentive. Recruitment was planned among all 15 NRSI areas but resource limitations and difficulties with "gatekeepers" meant only 10 were included. **How many participants were recruited:** 86 (~8/ group) 90% female One group exclusively among Sikh and Muslim women	**Brief description of method and process of analysis:** Topic guide used. FGDs taped and transcribed. Transcripts read and re-read. Content analysis identified emergent themes. Coding frame developed through reading of the first 4 transcripts which classified the data into themes. Constant comparison made between data to classify subsequent data under existing codes. Data examined by second coder to ensure consistency. Themes then examined to explore relationships between them.	**Limitations identified by author:** Voluntary, self selected nature of sample means that some families are missed. **Limitations identified by review team**: No details of the local area or population are given, and few characteristics of the participants making judgments about the appropriateness of the sample difficult. Implications of not including people from 5/15 NRSI areas are unknown. Content analysis normally requires greater detail of the population to be provided. **Evidence gaps and/or recommendations for future research:** NR **Ethical considerations:** Information sheets and consent forms provided.

Study details	Research parameters	Population and sample selection	Mthods of analysis	Notes
	"trained facilitators" **What setting(s):** Low socioeconomic areas participating in NRSI in NW England **When:** NR	**Were there specific exclusion criteria:** NR **Were there specific inclusion criteria:** Parents of school children aged 9-14 living in low socioeconomic areas participating in the NRSI.		Consent for tape recording explicitly sought. Cash incentive paid but modest. **Source of funding:** Dept for Transport

Key themes relevant to this review:

Hazards caused by drivers and riders

Behaviour of drivers and riders was a key concern for parents related to their children's safety.

Young people were seen to recklessly "joyride" around estates on a variety of vehicles:

You are not even safe to walk on the paths now because of the bikes and scooters (group 6)

Illegal parking, especially near schools, also posed a risk.

This was thought to be due to the age of the road layout:

The streets are very narrow really wasn't made for the amount of cars that are actually on it. You have got the cars that have to park on the pavement and obviously kids are trying to play and what have you and shoot out in-between the parked cars (Group 2)

Speed and volume of traffic was also seen as a risk, especially on journeys between home and the shops.

….there is a corner shop and these, we call boy racers, they do 40 to 50mph you can hear them wheel spinning the lot and you have got kids running in and out of the shop…(Group 2) my edits

Study details	Research parameters	Population and sample selection	Mthods of analysis	Notes

This speaker said that speed humps had been requested.

Drivers were thought not to know where children play due to a lack of signs.

Insufficient parental responsibility

Young children were seen to be left out late, and in the care of older children for long periods of time.

…little kids, seven year olds, are still out at 10 o'clock…(Group 4) My edit

In some cases this was blamed on parents' preference for drinking over supervising their children.

Risk taking by children

They ride down the middle of the road on their bikes, pull out in front of the cars, and play chicken on the main road with their bikes. (Group 9)

…young people especially when they hit their mid teens, have an arrogance about them…they challenge you by walking slowly and you might not have seen them and I think "If you want e to kill you fine, stand up against my car then" they are ridiculous, they play with you as drivers, it is really stupid (Group 4) edits in original

Lack of activities and facilities

Parents felt that children played in the street because there was little else for them to do and they enjoyed it. Parents did not like them playing in the streets thought they liked them being close to home. Organised activities and clubs were preferred, but expensive.

Nothing at all for the kids to do actually but play in the park or on the street corners or causing a bit of a nuisance. No facilities for the children unless you get your hand in your pocket every single time. (Group 8)

Mixed views were seen about local provision of play facilities – some felt nothing was on offer whilst others felt there were activities that they just did not hear about. Parks were seen as inaccessible and sometimes unsafe:

They just get vandalised, and full of teenagers drinking cider and whatever. (Group8)

For druggies and boozers (group 2)

Study details	Research parameters	Population and sample selection	Mthods of analysis	Notes

I counted 20 syringes on the way round to the shop (Group 10)

Parents views on solutions

Parents felt that streets could be improved by engineering and enforcement, although traffic claming measures received mixed reactions.

…You put speed bumps up, but it doesn't stop them, they just fly over it. (Group 6)

Police were felt to spend too much time in their cars rather than integrating with the community and should have a greater enforcement role.

There was a general feeling that the neighbourhood, including parks, needed to be more secure through improved wardens, fencing, facilities, better crossings and lighting.

After school activities should be accessible, publicised and cheap, especially for older children. Parents and children should be involved in their planning.

Parents should be more involved in providing road safety advice for their children.

It was thought that more crossings, better, more comprehensive cycle paths and street lighting would encourage children to walk and cycle more. Some concern about bike theft was found.

Conclusion

Children play in local streets because:

- **They like playing with friends near home.**
- **There are few alternative safe, secure, well maintained spaces.**
- **They are excluded from leisure activities due to cost.**
- **There is insufficient parental responsibility.**

Key risks are:

- **Illegal riding and driving around on estates and pavements.**
- **The speed and volume of traffic**

Study details	Research parameters	Population and sample selection	Mthods of analysis	Notes
• **Illegal parking** • **Drivers poorly informed about where children play.** • **Children's risk taking behaviour** **Raised awareness of the dangers needs to be coupled with consistent law enforcement.**				

Study details	Research parameters	Population and sample selection	Mthods of analysis	Notes
Authors: Frattaroli, Defrancesco, Gielen, Bishai, Guyer **Year:** **2006** **Citation:** **Local stakeholders' perspectives on Improving the Urban Environment to Reduce Child pedestrian Injury; Implementing Effective Public Health Interventions at the local**	**What was/were the research questions:** Purpose of research to: 1. Document local stakeholders' opinions concerning the cause of child pedestrian injuries and effective prevention strategies. 2. Identify impediments to implementing environmental interventions to reduce pedestrian injuries 3. Obtain stakeholders' perspectives about how best to address the identified ipediments. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** None stated. Texts by Miles & Huberman (1994),	**What population were the sample recruited from:** Key informants with an interest in community and/or child issues. All those contacted agreed to participate. **How were they recruited:** Initial interview with 15 people known to the research team through participation on a child injury advisory board or by reputation as local leaders with an interest in child or community issues. These suggested an additional 5 relevant people. **How many participants were recruited:**	**Brief description of method and process of analysis:** Structured interviews were used, including open ended questions about the causes of child pedestrian injury, viable interventions, impediments and facilitators to implementing environmental injury prevention strategies, and how to address the identified impediments. Interviews were tape recorded and transcribed. Descriptions of injury caused and solutions were tabulated. 2 authors individually identified and coded text segments about factors that impede or facilitate successful implementation. Coded segments were then extracted from the transcribed text and 2 authors separately identified themes from the coded data. These were compared and discrepancies were found to relate to naming of themes or the breadth of themes, rather than being substantive. Differences were resolved by discussion with a third member of the research team.	**Limitations identified by author:** No designed to have population level generalisibility. May not include all those who fit the inclusion criteria, so important perspectives may be missing – particularly parents and parent groups. **Limitations identified by review team**: No justification for the convenience sample provided – although they note that some perspectives may be missing. Compounded by a lack of reflection on the stance of the authors. Few quotes are provided to support findings.

Study details	Research parameters	Population and sample selection	Mthods of analysis	Notes
level. ***J of Public Health Policy*; 27: 376-388** **Quality score:** **+**	Strauss (1987) and Boyatzis (1998) cited. **How were the data collected:** **What method (s):** Structured key informant interviews. **By whom:** One author. **What setting(s):** USA - "at times and places convenient for the informants." **When:** NR	20 (9 leaders of community based organisations, 3 school administrators, 3 city transport & planning officers, 2 law enforcement officers, 1 city health dept. officer, 2 people from local politicians offices') **Were there specific exclusion criteria:** NR **Were there specific inclusion criteria:** No – convenience sample, with additional snowballing.		Despite the references, this reads like a thematic survey, including some soft quantification of responses. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** John Hopkins Center for Injury Research and Policy Center for Disease control and prevention National Center for Injury prevention

Key themes (with illustrative quotes if available) relevant to this review:

Child pedestrian injury: perceptions of the problem and suggested solutions.

Children's behaviour was frequently cited as a cause of pedestrian injury – playing in the street, not crossing at a crosswalk, being careless, inattentive, fearless or in a hurry.

Also mentioned were parent behaviours – upbringing and supervision; and drivers' behaviours – speeding, breaking traffic laws, not stopping for pedestrians.

Second most common category was street/traffic environment – traffic volume, speed, congestion; and poor walking areas – inadequately defined, ineffective use of signals, & sidewalks in poor repair.

Also social disarray – drug dealers where children walk, poor education systems, devaluing of life that affects attitudes to safety.

Study details	Research parameters	Population and sample selection	Mthods of analysis	Notes

Approaches to reduce injury – education (for parents and drivers, schools and parents to train children), environment (traffic calming, improved traffic signals & signage, more crossways and walkways) & law enforcement (enforcing speed limits, ticketing violations, perhaps new laws).

Factors influencing implementation

3 themes identified:

Perceptions of child pedestrian injury

Political will and govt. resources

Communities as potential change agents

Perceptions of child pedestrian injury

Low level of citizen awareness about the problem of child pedestrian injury. Communities tend to blame the child, the parent or the driver rather than unsafe environment.

Not prioritised in community due to size and scope of competing issues:

> ***Given the violence and drug use in this city, and given the poor state of a number of schools in this city, I think very few people are going to see pedestrian safety as being the highest priority, or even second or third.***

Several viewed child pedestrian safety as being too narrow an issue, perhaps broader in appeal if reframed to combine with more general pedestrian *security* issues – including crime, violence and drug dealing.

Political will and govt. resources

City agencies described as lacking political will – evidenced by lack of resources. City's emphasis on moving drivers quickly (at the expense of pedestrians.) Absence of interest in creating pedestrian friendly environments. City representatives reactive, at best, about child pedestrian safety. Children's issues generally given low priority:

> ***….Because with children, there's no immediate gratification from them, They don't vote; there's no give back. (my edit)***

Communities as potential change agents

Study details	Research parameters	Population and sample selection	Mthods of analysis	Notes

Community-based interviewees lamented the city govt.'s failure to engage community members on the change process.

> ***…It's easier to empower the police or to make policies that allocate resources than it is to work with thousands of citizens…and yet it is, I think, the most powerful source of change and transformation that we have. (first edit mine, 2nd in original)***

Community-based interviewees noted that their efforts to engage the city on other topics were tiring, and hampered by local bureaucracy.

They proposed that the city should establish a well defined process for considering community suggestions and addressing their concerns.

They believed that pedestrian injury victims could be key partners to raise awareness and provide the energy and passion needed to advance environmental concerns impacting on injury on the road.

Reliable and credible data about pedestrian road injury was needed to mobilise community members and to convince govt. officials to invest in PH measures. Academic institutions were seen as partners in gathering & interpreting evidence.

Community efforts should set clear goals and engage with city officials. Efforts to secure funds are key.

Community's ability to organise the public and work with local govt. were seen as effective forces to address identified impediments. There was less support for initiatives initiated within the government.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Authors: **Green & Edwards** **Year:** **2008** **Citation:** **The limitations of targeting to address inequalities in health: a case study of road traffic. *Critical Public Health*; 18 (2): 175-187** **Quality score:** **+**	**What was/were the research questions:** To explore the tensions inherent in the targeting of evidence based interventions in communities at high risk, in order to address health inequalities, using road traffic injury as a case study. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** No references to analytic method supplied. The study uses road traffic accident prevention as a case study to investigate the limitations of targeting to address health inequalities. The premise is that UK health policy has recently been framed by three, somewhat contradictory, drivers which derive from the logic of the "third way". First, is the drive to design and implement policy that addresses health outcomes of inequality, which, despite some recognition that the *causes* of these may be economic, prioritise ameliorating the *effects* of	**What population were the sample recruited from:** Key professionals in 10 London boroughs purposively sampled to include inner and outer London boroughs. Interviewees purposively to include engineers and road planners responsible for managing and delivering local traffic schemes (engineers); managing and delivering educational, training and publicity interventions (Road Safety Officers, RSOs); key statutory partner organisations such as police and fire brigade (statutory partners); and community representative such as teachers, councillors and resident association members (community partners). Informal interviews also held with representatives from Transport for London and local residents. **How were they recruited:**	**Brief description of method and process of analysis:** None provided	**Limitations identified by author:** None **Limitations identified by review team**: No details about how potential participants were identified, selected or approached. No details about how the interviews were conducted. No details about how the "informal" interviews differed from the others in terms of access, questioning, analysis or write up, or how it was decided whether individuals were interviewed "informally". No details about analysis strategy. **Evidence gaps and/or recommendations for future research:** NR

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
	inequality. Second, is the obligation to be accountable and transparent through prioritising "evidence-based" policy and establishing targets to monitor progress. The third driver, derives from the weaknesses exposed in the neo-liberal marginalisation of the social fabric, with a requirement to rebuild social fabric through community involvement where possible. Injury prevention is policy is taken as an illustrative case study of the challenges of "addressing inequality" through relatively downstream mechanisms and explore how those responsible for implementing an delivering these policies discuss them. **How were the data collected:** **What method (s):** Review of Road Safety Plans from 32/33 London boroughs. Interviews with "key professionals" **By whom:** NR	NR **How many participants were recruited:** 35 **Were there specific exclusion criteria:** NR **Were there specific inclusion criteria:** NR		**Source of funding:** Ethics committee approval sought from University ethics committee.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
	What setting(s): London **When:** NR			

Key themes (with illustrative quotes if available) relevant to this review:

The salience of deprivation or inequalities for road safety professionals

Although addressing deprivation is an obligation, the main priority for road safety plans is to address the national and regional casualty reduction targets, but also attempting to integrate transport safety with crime reduction, community involvement, sustainability, commercial development & health ("joined up" government). Few Road Safety Plans addresses deprivation or inequalities directly.

In interviews, most professionals were aware of the link between deprivation and the risk of injury and most were considering how their work addressed this. A few reported it was not important at a local level because needs were similar across the borough (where the population was mostly affluent, or almost all deprived).

The challenges of trying to address multiple policy obligations of reducing injury rates, addressing deprivation and involving local communities were pressing. Strategies to address this were categorised by the authors are Structural, empiricists and targeting.

Professionals strategies for addressing deprivation

Those involved in delivering road safety interventions mentioned structural ways of addressing the problem, but a few community partners noted that investing in causes of deprivation rather than its effects might be more successful:

> ***[If] you deliver more railings that keep pedestrians away, this runs exactly counter to what I would say needed to happen…..actually if they could see that education is going to have, you know, a longer term and more sustainable impact. (Community partner, inner London) My edit***

However, these were off remit for local staff, for most RSOs, the priority was to achieve <u>targets</u> by reducing collision, especially among vulnerable road users like pedestrians and cyclists.

This was addressed through an empiricist approach by most – decisions about which schemes to implement and how to prioritise were data-led, for example using collision histories of particular streets to prioritise when bidding for funds. For some this was the only issue they took into consideration, for other, this empiricist approach was seen *in itself* to be addressing deprivation (using the logic that if the deprived were most likely to be injured then addressing areas of high injury would be

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

likely to be in deprived areas):

Clearly, if you target directly where the accidents are then you are targeting directly social deprivation issues. (Engineer, central London)

Some RSOs also claimed an empiricist approach, focusing tightly on injury reduction, even where they may conflict with other transport or health goals:

As a road safety officer I don't; want to see anybody cycle, I consider it dangerous but…the cyclist lobby believe that the more cyclists you get on the road you get to a point where…it's actually safer because you expect to see cyclists everywhere…but as road safety people we deal in raw, crude data, and if the cycle accidents go up then we get upset. (edits in text, but selected from fuller quote by me)

Empiricist approaches could also be used to take deprivation explicitly into account by allocating resources differentially to areas with higher deprivation scores.

At least as the years go by we will be asking ourselves questions as to why investments are not going adequately into deprived areas (engineer, outer London. My selection from provided quote)

The final approach was targeting, for some, explicitly in response to government pressure:

We had to identify areas which were socially deprived and use the schools within those areas. And we did identify twelve schools, which we started off with, because we felt, well, this was government pressure really to say we'll treat those schools first, and that's what we did. (RSO Outer London)

Government incentives for targeting deprived communities included priority funding for schemes such as Kerbcraft.

Putting strategies into practice

Strategies to address deprivation were used pragmatically, with multiple influences on decisions.

….I don't think there any one thing that sort of leads policy, it all, it all sort of feeds in really and truly. (engineers, Inner London – my selection from loner quote)

For RSOs, use of targeting was tempered by what they perceived as lack of credibility for differential needs across population groups, based on the observation that, since risk behaviours were similar, educational needs were universal.

It was also limited by the political difficulty of allocating resources differentially.

Difficulties of targeting particular communities is illustrated through the issue of ethnicity. There are no good local data that any ethnic groups is more at risk of injury, but regional data suggested decreases in injury rates among Black and Afro-Caribbean groups were less than for others (and not wholly accounted for by deprivation differences). This information was difficult to use – thought to lack credibility, and it was difficult to understand why certain groups might be at greater risk than others for

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

injury.

> ***I can't see why a black child is more likely to be injured than a white one. We've got deprivation across the whole of the borough, the bus, the lorry, or whatever isn't going to take any notice, the driver isn't, the driver doesn't actually want to hit and collide with [a child] and so why should there be a differential? (RSO inner London)***

Also, as each London borough contains a unique mix of communities, data was not necessarily informative at a local level. Further, categories used to collect data (such as "Afro-Caribbean residents") were collected by police at the accident site and didn't related to any "real" community, making it difficult to target. Local professionals drew on local knowledge:

> ***For example, the sorts of things that we found out was that Greek boys tend to have more "cycle" sorts of accidents, because they've got the bikes and are showing off, Asian women at that time seemed to have more incidents on buses because less of them drove…and from the ones that you can identify as pure refugee sort of people there was a general lack of understanding, and grasping what the dangers were. (RSO Inner London)***

Even where higher rates on injury are known about, there is inadequate knowledge about probable causes, leading to speculation to explain higher risk profiles – "*hunches*". In one case, this related to different cultural behavioural norms:

> ***You know, in some cultures younger children, children are allowed to look after children, whereas in other cultures, perhaps parents more look after children. (RSO inner London)***

Notable that these explanations were offered tentatively, with many "ums" and "ers", and many explicitly said they were speculative.

Involving the community

Instead of targeting (especially where links were uncertain as describe above) "tailoring" was more productive – with programmes designed with local communities in mind.

> ***There is a culture, for instance, about things like drink/drive within the Turkish community…so you know, that's an issue that needs to be raised with them. We can only do that from the inside/ (RSO Inner London. Edit in original but selection from a longer quote)***

Such accounts were not offered as ways of reducing gradients in injury risk, but were seen as practical ways of taking deprivation into account by tailoring services to local community needs. Tailoring was also seen as a way of meeting obligations to involve communities in decision making, such as for recent School Travel Plans.

> ***Since the inception of the school travel plan I think it's a bit more coordinated. It's not just the traffic engineers going out and saying "well let's have a look where we can spend our money now." It's actually sort of engaging with the public, engaging with schools, finding out exactly what they want [and if] that's either not possible or not viable and that's when we may be able to put in a school crossing patrol, perhaps just extra signage, things like that. (Engineer, inner London)***

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

This involvement was seen as a way of ensuring all sectors of the community can participate and was one way of "taking deprivation into account". Some reported real impact in terms of building up good relationship between, for example, parking control staff and residents to address problem parking. In other areas, consultation was reported as less inclusive

> ***The consultation was flawed – formulaic – asking "do you agree with safer routes to schools" which you can't disagree with – and then using that to claim that everyone agreed. They didn't hold meetings that got to the nub of the issue…[the Council] have used the consultation to do something they wanted to do anyway…there were zebra crossing with a traffic refuge in the middle and the traffic speeds were slow – cars would slow down when they could see people trying to cross. Now they've installed traffic lights, with a green man…the traffic speeds up, because drivers get frustrated waiting at the lights, and there's been rat running in all the local roads. (community partner, inner London)***

Meaningful community involvement was challenging, especially in an environment where utilising evidence base interventions is prioritised and professional feel they already know what schemes are most likely to prevent collisions.

Discussion points

Setting targets fro injury reduction may involve "gaming" to priories targets that will achieve this, even at the cost of other, potentially socially desirable goals.

A major challenge is the lack of evidence base about what works to reduce injury gradients. Professionals may assume that targeting high risk communities will reduce injury rate more quickly in those communities, but this is based on three large assumptions:

1) that we know what works (speed reduction works but little evidence about effectiveness of educational interventions.)

2) that it is possible to identify high risk communities (Statistical aggregates of high risk groups may not reflect actual communities, especially in diverse, local London boroughs)

3) that it is possible to deliver effective strategies (understandings about links between social characteristics and injury are weak, so there is a danger of designing programmes based on misunderstandings of attitudes or behaviour).

(more stuff on deprivation not extracted)

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Authors: **Lupton & Bayley** **Year:** **2006** **Citation:** **Children's views on the road environment and safety. Transport 159: 9-14** **Quality score:** **-**	**What was/were the research questions:** To explore children's own perceptions of the road environment and what they believe would make the road a safer place for them. (part of a larger study including video recordings and survey data). **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** No references to analytic method supplied. The study used the theory of planned behaviour to help relate children's opinions to possible past or future behaviour. Theory of planned behaviour identifies three types of belief that can predict behaviour: a) Attitudes towards the behaviour: perceived benefits or disadvantages of the behaviour b) Perceived behavioural control: the ease or difficulty of carrying out the behaviour	**What population were the sample recruited from:** Children aged 8-15 years in six junior and six secondary schools (from rural and urban locales). Schools were chosen to provide a range of road crossing facilities and socio-economic backgrounds. **How were they recruited:** NR **How many participants were recruited:** 122 in 24 single sex groups **Were there specific exclusion criteria:** NR **Were there specific inclusion criteria:** NR	**Brief description of method and process of analysis:** Interview guide was constructed based on a pilot. Non-evaluative probing used to foster disclosure, vignettes about children in specific situations on the road (based on information from the pilot) were used to stimulate discussion. Photographs of the immediate vicinity around the school were also used to engage discussion about safety features. In addition, children were shown photos of less familiar pedestrian and cycle facilities form the Danish Road Directorate. Interviews were tape recorded and transcribed verbatim. Thematic analysis was undertaken. Initial impressions were collated for each group after familiarisation with the transcripts. Themes, originating from the children or the researchers, and relationships between them were noted. Analysis was assisted by QSR Nudist v4.	**Limitations identified by author:** NR **Limitations identified by review team**: No description of how children were accessed, recruited or what, if any, kind of consent process was gone through with the children or their parents. No primary data are presented. Although some information from the video is reported, there are not details of how this information was collected or analysed. No reflexive discussion. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:**

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
	c) Subjective norm: the social pressures to carry out the behaviour or not. These dimensions were explored with the children when discussion particular children. **How were the data collected:** **What method (s):** Ethnographic study (filming daily arriving and leaving school) complemented by group interviews. **By whom:** NR **What setting(s):** 12 schools in Hertfordshire and North Greater London. **When:** NR			EPSRC/DTLR Future integrated transport programme. **Ethics** If important local safety issues were raised, these were discussed with teachers or road safety officers. No details about access to the schools or children are reported. No mentioned of consent or ethics committee approval made.

Key themes (with illustrative quotes if available) relevant to this review:

Reported accidents and risky incidents

Of 122 children, 5 had been injured in a road accident as a pedestrian or cyclists, and 11 accidents were described relating to a close relative or friend.

The majority of children had experience of situations on the road where they believed themselves to be at risk of injury.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Many incident s were described where children were distracted by play or conversation (such as running after a ball, or playing chasing games) -younger children often acknowledged that they were too focussed on their own activity. **Older boys recounted misjudging the speed of oncoming traffic, or the intention of the driver. They believed that they were better able to deal with difficult traffic conditions by crossing more quickly through small gaps between traffic – this behaviour was seen by boys with bikes on the video outside secondary schools.** **Other incidents were described where an older child or adult accompanied a child pedestrian. Younger children tended to blame the person who had broken perceived road safety rules, and often did not recognise that other people involved might also have responsibility. 3 incidents were described where parents accompanied a child – where a child ran out of his pram into the road and was hit by a car, a group of 8-year old boys blamed the child as he should not have attempted to cross the road if he did not know safe crossing procedures. In 2 other incidents, a child crossed into the path of oncoming traffic (one near miss, one accident) due to hesitating when parent crossed. Blame was attributed to the child for not focussing on the parents actions but none as attached to the parents.** **Secondary school children had a clearer view of who was to blame – attaching blame to the parent accompanying a small child. However, one group of 11 year olds divided blame between the driver, parent and child – and concluded that it depended on the age of the child.** **In cases where a child had crossed the road without looking, blame was attached to the child, but some thought that the driver should share some responsibility.** **8 accidents or near missed were described involving a child with an older sibling. In 2 cases where the younger child was given incorrect instructions to cross, they older child was held to blame. In 1 case where the younger child had slipped out of the older one's hand and run into the road, the younger child was blamed. These boys emphasised the difficulties they faced looking after younger children on the road.** **Generally, blame was divided between children and drivers. Children were thought less likely to think before they acted, to rush more, and to be distracted easily, especially by friends. Older children recognised that road layout might be a factor – for example one group of girls felt that a crossing too close to a roundabout was difficult because you could not always perceive the intentions of the drivers who may fail to indicate.** **Drivers** **Careless or reckless drivers were seen as the main source of danger on the road – often young male drivers, speeding drivers and those using mobile phones.** **Children were forthright in their condemnation of drivers who broke the rules at pedestrian crossings, such as failing to stop and blamed the driver.** **They believed that drivers might not be relied upon to stop at designated crossing because children were considered unimportant, or were too small to see.** **Younger children were often uncertain about drivers intention to stop, and found their hesitancy caused some to be impatient.**				

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Generally, high volume of traffic meant that few crossing opportunities were perceived, and high speed made it difficult to judge a safe gap in the traffic. **Many drivers were seen as cooperative, and complied with speed limits, and were described as good or kind. Children's scepticism about drivers increased with age.** **Risky behaviour** **Reflecting on their won behaviour, children felt liable to be more distracted, and at risk, when with other children.** **Junior school children appreciated the risks of playing near a road, but running after other children could distract them. They reported listening as well as looking for cars – drivers may need to remind them of their presence by sounding the horn. Football was doubly risky because cars might swerve to avoid the ball, and children may want to retrieve it without paying attention to the traffic.** **Junior and secondary pupils felt they were at risk when with other children – either taking more risks or paying less attention. One group of girls reported group indecision when crossing. Boys preferred not to cross in a group – believing that some might encourage taking dares.** **Generally it was considered that being in a hurry contributed to risky behaviour. A few enjoyed the sense of risk – negotiating small gaps in the traffic or causing drivers to stop.** **Some individuals adopted the role of "minder" – to prevent friend's risky behaviour.** **However, many children preferred to cross in a group – as seen on the video – as they felt more visible (when aged 7+), and at a crossing, if the lights changes while they were still crossing, cars were more likely to stop.** **Perceptions of change with age** **Those aged 8-9 anticipated remaining sensible, or increasing knowledgeable and careful.** **By aged 10, children believed their skills & knowledge had plateaued, although roads might be seen as becoming more dangerous, especially with increasing independence. Boys might participate in dares, but generally felt more confident.** **Some at 11 felt their learning had broadened and girls might think they took less risks.** **Many secondary school pupils started to elaborate on factors other than their behaviour that might affect safety. By aged 14, they felt increased danger due to more powerful cars, and one thought that as such risks increased, taking risks might be unavoidable. They were less conscious of the Green Cross Cide and more likely to tailor their decision to traffic conditions.**				

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
2 14-year old girls observed that they behaved automatically in familiar areas but were more cautious in areas that were not familiar. **Some felt that as they became taller, drivers were more likely to see them.** **Engineering measures** **Many believed preventing impatience in drivers was more important than traffic claming, speed limits or separate cycle lanes.** **Children preferred mandatory measures, and punishment for errant driver behaviour. Warning measure were thought ambiguous and so ineffective.** **Most believed lights were safer than zebra crossings – but complained that lights weren't responsive to pedestrians, and that pedestrian congestion near school encouraged them to cross among slow moving vehicles.** **Many focussed on the protective elements of road side furniture – for example (wrongly) perceiving a railing as a crash barrier that was ineffective for that purpose, and saying it prevented them crossing where they wanted to (its real purpose).** **Keep left bollards were also seen as potentially protective, and they were dismayed to see how easily these were knocked down.** **Shown some Danish road initiatives, children liked central refuges, allowing crossing in 2 parts to occur.**				

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes
Authors: Sawyer, B. **Year:** **1998** **Citation:** **The young teenage and road safety: a qualitative study.** **The Scottish Office. Edinburgh** **Quality score:** **-**	**What was/were the research questions:** To explore roads user behaviour of young teenage pedestrians and peer pressure influences. To establish if there are any differences in attitudes and behaviour. To explore differences between perceptions of accidents and the reality. To establish how best to reach them with road safety messages and what does not work. To ascertain views on current a split screen road safety TV and cinema advertisement. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** NR **How were the data collected:** **What method (s):**	**What population were the sample recruited from:** School children aged 12-15 in 2 Edinburgh and 2 East Lothian schools **How were they recruited:** NR **How many participants were recruited:** 63 young people aged 12-15 in 10 single sex focus groups (6 with girls, 4 with boys) aged 12-13 or 14-15. **Were there specific exclusion criteria:** NR **Were there specific inclusion criteria:** NR	**Brief description of method and process of analysis:** All groups were tape recorded and transcribed.	**Limitations identified by author:** NR **Limitations identified by review team**: No details of recruitment or selection process given. No discussion of ethics approval or consent among children, school or parents. Nothing written about the process of analysis. Limited theoretical grasp; for example, the author does not have any explanation for the fact that knowledge ≠ adoption of correct behaviours. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** The Scottish Office

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes
	Focus group discussions **By whom:** NR **What setting(s):** 4 schools in Scotland in affluent and less affluent areas. **When:** NR			

Key themes (with illustrative quotes if available) relevant to this review:

Common risk defined by authors as – running to get across the road, crossing between parked cars or queuing traffic, while extreme risk is defined as playing games in the road, playing chicken or holding onto the back of vehicles while roller-blading ("cantering").

Young teenagers and road user behaviour

Most teenagers (like adults) regularly participate in common risk behaviours, which are not always seen as risks, rather part of everyday life, often undertaken subconsciously.

You dinnae really think about it until you've crossed over. (S2, boys, urban less affluent)

It might be considered risky in retrospect in the event of a near miss.

Extreme risk was placed in the context of other dangerous, thrill seeking sports – tricks on skateboards, snowboarding bungee jumping etc. Sports are seen as involving risk taking that is exhilarating. Similar attitudes are seen to risks on the roads.

You never think it's going to happen to you.

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes

Most young people acknowledge that they are taking a risk, but don't think that it will resulting an accident.

Lots of stuff is a risk but you never really notice the risk.

The game of "chicken" was one of the most dangerous behaviours, particularly popular among boys, but girls also take part.

Boys and girls: are they different?

Little difference in common risky activities, although girls seemed generally to make calculated judgements about when it was safe to cross, while boys may not even look.

Aye we're senseless.

They [girls] burn across it but they wait a wee bit longer than what we do.

We just burn down the alley and straight across the road (S4 boys, rural, less affluent)

There was a perception, not borne out by the research, that girls are much more sensible ("brainier. They've got more sense and they'll use the lights" than "irresponsible" boys). Boys spoke of bolting into the road, for example while playing football, while girls talked about dangers of parked cars and not being able to see round them.

Extreme risk was far more common in boys than girls. Mostly reported with pride:

My friend did that and he tripped on a drain and cut all his sides [Group laughs loudly]

I done it once when I was going down [name][Road on the back of a bus and I fell off and skinned my nose [Group laughs again] (S2, urban, mixed]

Changes with age

Most agreed that they knew how to use roads safely but that they became more careless pedestrians as they got older.

Conversely, some girls thought their road user behaviour, especially high risk behaviour such as playing in the road, improved with age.

The groups suggested that few older boys still participated in high risk activities, though most had in the past. Most felt they were less sensible than in the past – out

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes

more and "more daft" in terms of "common" risk behaviours. S4 & S2 pupils reflected that they were more independent from adults now than at primary school. Adult presence still affected their behaviour and they were aware that their parents were concerned about road behaviour.

Despite undertaking "common risk" behaviours, many felt that they were not at risk, because they were able to use their discretion wisely:

Well I live on a main road and you get used to it, you know exactly how far a car can be away from you to get across safely and you learn to judge it exactly. (S4 girls, affluent, rural. My truncation)

There was some evidence that "extreme risk" behaviours decreased with age, reflecting a general move away from "playing" to more adult leisure activities. Some would never have contemplated "chicken" wile others found it hard to say why they had taken part at younger ages (often at primary-secondary transition).

Explaining risk taking

Despite describing activities as leading to accidents (running, crossing between cars etc) as they engaged in, most did not consider their behaviour as risky – merely acting out the routine of daily life.

Time issues

Being in a rush, traffic lights taking too long to change and wanting to beat the rush at the chippie at lunchtime were commonly provided reasons.

Peer issues

Peer preference (rather than "pressure") explained some behaviours, boys engaged in ritual showing off. Girls might also show off for older teenagers, especially boys.

They dinnae want their pals to think they're a wee goodie two shoes crossing over by the green man and that. (S4 girls. Urban, Less affluent)

You want to act tough and that, show off in front of the older people, especially the laddies. (S4 girls, urban, less affluent).

They [girls] try to impress them [boys].

And if you fancy one of the laddies, you'll have to do it. [laughter] (S2 girls, rural, less affluent).

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes

Girls thought boys behaved less responsibly when in groups, and that there was a temptation to prove themselves to older people, especially when going up to secondary school.

I think cause they're at High school they need to show off as well.

They just try and copy what the older people are doing. (S4 girls, urban mixed)

Older pupils recognise that this is happening, but don't attach the same risk to their own behaviour as that adopted by younger people's mirroring.

Girls had more confidence about risky behaviour when in groups than on their own (safety in numbers).

Boys described a number of reasons for risky behaviour:

Cos its good.

For a laugh.

You get a lift.

They think they're hard.

The adrenaline rush.

Nah, ya just dinnae think about it. (S4 boys, rural, less affluent)

Provision of crossings

Where safe crossings don't exists, common risk behaviours are inevitable, as the only way to get across the road. Even where they do exist, children may not be bothered to walk the extra distance to use them.

Some girls preferred to risk crossing rather than using an underpass where there were "bams". Safe crossings weren't used anyway as they were perceived as taking too long to change.

Loads of people do use the lights but half the time you cannae be bothered waiting and you just want to get over to the other side if you are in a hurry or something.

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes

(S2 girls, urban, less affluent)

Lollipop ladies were seen as more effective than a crossing, and she reported inappropriate behaviour. But older children saw her as a resource for younger children.

Extreme risks might be seen as unavoidable – for example where there was nowhere else to play other than the road.

Responsibility of the car driver

Many felt as cars could break, they should, and often did for crossing pedestrians. There was a lack of understanding about driver difficulty in stopping if they ran in front of the cars. Some were disrespectful of drivers who they thought should have stopped to let them cross.

Young teenagers and pedestrian accidents: perceptions and reality.

Teenagers are knowledgeable about how, when and where accidents occur and identified behaviours that commonly lead to accidents. However, despite this, they sometimes adopted such behaviours and, while recognising a collective risk to people "our age", believed it wouldn't happen to them.

Road accident experiences

Many had been involved in an accident themselves or knew of others who had been seriously injured but few felt this had changed their behaviour.

I just think it isnae goin' to happen to me. (S2 boy. Urban, mixed)

Many were involved in minor accidents for which attitudes differed by sex. Boys recalled with a sense of bravery and pride, girls with humour but more awareness of potential danger.

Well, I've nearly got hit but…my pal got run over by a car. He's been ran over twice!

Been run over twice? He's been run over more times than that.

Aye and he still runs about outside school.

[Laughter] (S2 Boys, urban, missed my truncation)

I was walking across this road right, and I had my boots on and I cannot run with my boots right, and this guy came along and I looked at him and he started driving

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes

faster, he ran over the heel of my boot. I was greetin' and everything. I thought he was going to kill me. It was scary. (S4 Girls, urban mixed)

Behaviour might be changed very temporarily, but memories fade quickly.

Even when (fatal) accidents had been heard of or witnessed, risky road behaviour was not changed.

Asked what would change behaviour, common answer was "*if it happened to me"* but this was not borne out. Boys showed machismo.

If you got knocked down it would put you off.

Nah, I've been knocked off my bike twice and it still doesnae put us off. (S4 boys, rural, less affluent).

Where do most accidents happen?

Pupils correctly felt that busy urban areas presented greatest risk of being involved in an accident. Specific rural road problems such as walking on unlit roads at night, cars speeding around blind corners and farm machinery, were also noted. They correctly recognised that this was not likely to be found on motorways.

Children from East Lothian reported being more wary of traffic when they visited Edinburgh, in part due to their reaction to the increased volume of traffic and number of buses.

Urban children might find the city centre safer, due to perception of more crossings. (Another study shows that most 12-15 year olds in accidents occur on unclassified 2 lanes road such as residential streets, but that 12-15 year olds are more likely to be involved in accidents on busier roads such as A roads.)

Children were aware that after school was a particularly dangerous time.

Corners and junctions, as well as parked cars, reduced visibility and were seen as dangerous, although teens reported crossing here rather than walking to a safer location. In fact, research suggests that most accidents occur at T- or staggered junctions or no junctions.

When do most accidents occur

Research suggests leaving school and early evening are most risky, with slight rises at lunchtime and in the morning on the way to school. Young people's perceptions of these risky times were accurate.

Young people from less affluent areas associated accidents with drinking, both on the part of the driver and the young person. Other irresponsible driving – jumping

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes

lights and speeding was - also seen as a problem.

How do most accidents happen

Research suggests that a range of dangerous and inattentive behaviour (p.31) contributes to accidents in young people, and most participants recognised this – especially "bolting" across the road. Authors suggest that young people engage in activities that they recognise as causes of accidents but don't associate their behaviour with such as risk when asked to think about it.

Alcohol and teenage pedestrians

Recent research reported that in 1/5 pedestrian fatalities aged 15-19 in Birmingham, the pedestrian was over the legal driving limit. Authors opine that as most teenage drinking takes place on the streets, this puts them at greater risk of a RTA.

Cos when you're drinking you dinnae care what you do. You've got more guts to do something when you're drunk. (S4 girls, urban, less affluent.)

Alcohol might influence the behaviour of those normally sensible in their road use, authors suggest this may be particularly so for girls.

You do look when you are sober, you do look. I mean you might not take along hard look at the road but when you are drunk you just kind of like to hell with it. (S4 girls, rural, affluent)

Who is most at risk?

Boys attributed greater risk to their behaviour, especially playing with friends or football.

They recognised that young teenagers – their peers - were the groups most at risk, thought the authors suggest this is in contradiction to their attitude that they take risks because they can, and its not really dangerous. They recognise that as a group, they are acting irresponsibly.

Who is to blame?

Most, even those involved in accidents themselves, believed that pedestrians were to blame ("very perceptive" – author quote) research is quoted showing that <19yr old casualties were the pedestrian's fault 89% of the time (p.36).

Despite feeling that cars may be driving too fast, most were sympathetic to the driver.

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes

I don't think it's fair though. If a car is going at the normal speed limit and the pedestrian runs out he is going to get done for it whether he did it or not. (S4 girl, urban, mixed)

Road safety education: experiences and perceptions

Experiences of road safety

All had primary school instruction (from police or road safety instructors and teachers), but few encountered any at secondary school. Less conventional approaches, such as going out of school to practice crossing, or placing a balloon on the kerb to illustrate the dangers of standing too close, were discussed more enthusiastically and in greater detail than class talks.

Nearly all recalled road safety videos shown at school or on TV (p. 39 – details of these not extracted).

The strongest recall was about real life footage of a boy being run over outside a school – girls were especially deeply affected by this, with the boys affecting "a public façade of amusement" (author quote)

All the lassies were like "oh no" but all the ladies were laughing their heads off.

But I don't think they would if they were by themselves (S4 girls, urban, mixed)

All seemed to easily recall advice given about road safety.

Perceptions of road safety education

In general traditional methods of teaching road safety were seen as boring and repetitive, and preferred more active engagement. Although all had listened and absorbed the road safety message, few felt it had affected their long term behaviour.

Overriding theme is that young teenagers consider road safety education to be an issue for "kids" even though they rarely put their own knowledge into practice. They did not believe that needed to be taught any more about road safety.

It would be quite boring because road safety is not usually very interesting. We have done it so much before. Like in primary school and things (S2 boys, rural, mixed)

Despite their knowledge, they continue wit risky behaviour.

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes

Road safety education for young teenagers: the way forward

Challenges are:

- Young teenagers consider road safety education as for "kids"

- They know basic road safety but fail to put it into practice.

Repeating known messages is interpreted as "preaching" and "treating them as children," in addition this age group tend to disassociate themselves from both younger children, but also adults:

When you were younger your mum told you to do things and you done them but know you are teenagers you just say och…. (S4 boys, rural, less affluent)

Straight teaching delivery was also felt inappropriate. A different "messenger" (author term) was felt appropriate – for example an accident victim or member of their family. Interactive approaches, role playing were suggested methods of making sessions more interesting and memorable.

Media based approaches

It was felt that adverts aimed at young teenagers should be should be different to those aimed at primary school children. Most felt that shock tactics were appropriate, though there were doubts whether this would impact on their behaviour long term. Footage of a young boy being hit by a car outside school had impacted on young people and was the type of thing thought to be effective for their age group.

They seem to have very different perceptions to adults about what constitutes a serious injury, this may be the result of the fact that cuts and bruises and even broken bones are part of an active childhood.

Researcher: if you were in an accident and your legs were broken, would it make you think about the way you use the roads?

- ***If it were more serious, like really serious.***

This lack of concern may help explain why young people take unnecessary risks when using the roads.

Others felt that the impact of adverts would be increased if the consequences of RTAs on young people's lives, and their family and friends, were shown. Examples of such from a drink-driving campaigns were described.

Study details	Research parameters	Population and sample selection	Outcomes and methods of analysis	Notes
(RG note – details from the final section which assesses a specific advert have not been extracted – not relevant to this review)				

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Authors: **Baslington** **Year:** **2008** **Citation:** **School travel plans: Overcoming barriers to implementation** **Transport Reviews. 2008; 28 (2): 239-258** **Quality score:** **-**	**What was/were the research questions:** To raise and discuss important issues identified by the author during a literature review, documentary analysis and empirical evaluation of travel schemes in three schools. Effectiveness data collected about travel mode behaviour between pupils involved/ not involved in an STP – including survey and travel diaries. Qualitative analysis of the content of STP promotional literature. Qualitative data collected to investigate attitudes and awareness of STPs. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** NR although a critique of rationalist models of behaviour is offered. **How were the data collected:** **What method (s):**	**What population were the sample recruited from:** Head teachers and parents. Six study school initially but low response from parents meant that they had to distribute to a further 7 schools. **How were they recruited:** Year 5/6 pupils took home a letter to parents requesting interviews. **How many participants were recruited:** 22 parents (20 women, 2 men) (7 attended school with STPs) 4 key informants (3 heads and a walking bud coordinator) **Were there specific exclusion criteria:** NR	**Brief description of method and process of analysis:** The overall study was comparative, with three primary/junior schools with a school travel plan compared to three without. A literature review explored relevant existing literature. A school travel survey was undertaken (n=208) A qualitative analysis of content was undertaken on the STP promotional literature (posters, information leaflets, slides booklets etc) produced by the DfT and the DfES including Transport 2000 Trust. For the interviews, parents were asked if they had heard of STPs, if not they were given a description. They were asked if there were any advantages or disadvantages, for their child, themselves and the school.	**Limitations identified by author:** For the survey data, the author notes that many journeys use more than one method and methods are required to ensure that this is captured. **Limitations identified by review team**: There are few details given about the different sources of information that inform this report – especially methodological details about the qualitative portion of the research. The response rate was very low – 22 parents from 13 schools. The authors maintain they were a cross section by age, car ownership, travel behaviour. Claims made about findings from the interviews may not be supported by quotes. As the paper reports integrated findings from the literature review, the interviews and in some parts the content analysis, it is not always easy to see which bits

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
	Interviews **By whom:** NR **What setting(s):** NR - UK **When:** NR	**Were there specific inclusion criteria:** NRR		of evidence have come form which source. It is also unconventionally structured – with findings reported in the discussion section. Having said that, it tells a coherent and interesting story about B&F for safe STPs. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** NR – part of the author's PhD work.

Key themes (with illustrative quotes if available) relevant to this review:

Several problems became apparent: the recruitment of volunteers and the social, geographical or financial restriction imposed on schools. These difficulties are a potential barrier to the implementation, extensiveness and longevity of School travel plans (STPs)

(Literature review – brief summary findings extracted here) headers are: Car reduction value of school travel initiatives; Other benefits of school travel initatives; social geogrphaical and financial restrictions on some schools. suggests that resources were committed to STPs when few systematic reviews were available, and that studies of yellow buses, walking buses and other schemes show wide variation between schools. Success of US Yellow Bus schemes depends on locality, attributes of buses, careful routing of services and the relationship with the school. Other possible challenges include – the number of parents who drop their children off en route to somewhere else. Children remain restricted rather than controls being imposed on traffic. Modal shifts towards alternative ways of travelling to school may be seen, but it is not possible to attribute such changes to STPs rather than other contributory factors. Other problems related to methods and analysis are also noted.

Schools with travel plans tend to form in affluent districts – where childhood pedestrian injury rates are lowest. In the UK, written STPs may take some time to be operative.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

Analysis of content in school travel plan promotional literature

Theoretical underpinning of the governmental promotional literature

Promotional government literature revolves around health, safety empowerment and social aspects of STPs – approaches which draw on health promotion messages underpinned by health psychology's theoretical models (such as the theory of planned behaviour, TPB). These are based on the assumption that individuals think rationally about their health, and "weigh up" costs and benefits of behaviours. The literature review suggests that parents are not always rational about their behaviour – in particular, safety fears may prevent them from allowing children to walk or cycle. In addition, some parents worried about children sitting in wet clothes if it rained. Protective instincts may override potential benefits such as time saving and fuel economy noted for parents.

Poster	Central explicit message
Vicious circle	Safety aspect
Reducing congestion and pollution	Health aspect
Improving children's health and fitness	Health aspect
Encouraging confidence, independence	Empowerment aspect and road sense
More time to talk and learn about your area	Social/ learning aspect

In addition, slide presentations for parents suggest a practical benefit for parents – avoiding spending time driving to school.

Author notes that a head teacher in one of the intervention schools regularly asks parents not to park so close to the school gates, but that they don't feel their children are safe unless they actually see them go into school. Such action may be mediated by culturally acceptable norms of "good mothering". (she refs a lit review study which has previously linked cars and good mothering).

Qualitative findings

The perceived threat of "stranger danger" could cause parents to restrict their children's independent mobility:

They're starting to want to go on their own, but, again, because of the issue of safety, one of us has to supervise.

Q: When you say "safety" are you thinking about road accidents in particular, or any other form of safety?

Possibly, the issue around strangers, abduction, they have to, if they went in the wood, say, they know they can only fo a certain distance because I need to be able to see where they are. (interviewee's emphasis in original, slightly truncated)

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

Other types of safety were also an issue:

And that road is lethal. It's lethal in a car. So if you're walking you are dicing with death. So we have to keep the children safe.

Cycle together as a family? No. We would be scared to let her cycle on roads.

As described above, theoretical models for health promotion assume that people exercise volition or free will in their behaviour. Interviews suggest that "family nreeds" play an important role and parents cannot change their behaviour in isolation. For example, a parent who wanted to continue walking to school after gaining employment, found objections from her family for the necessary earlier rising time. One-car households require shared decision making about car use.

The birth of a sibling may be pivotal, because coping with a baby or toddler while walking and older child to school may be tiring.

"A study of cultural parental values and priorities is helpful and suggests that "social processes" are as important as the cognitive in gaining an understanding of parental car-user behaviour." (author quote) TPB ignores the politics and problems of everyday lifestyles.

Recruitment of volunteers: Payment for "bus conductors" and escorts

Several interviewees were enthusiastic about walking buses, but unable to use them – for example because they needed to leave for work before it arrived.

I wish we could use it.

In one school, the walking bus only operates from one side of the school and those in another part of the catchment area feel "forgotten about".

Finding escorts for a Yellow Bus scheme was a problem

It wouldn't work without the escorts because, and I think they're a little naïve in that, because you cannot put 25 children on a bus and not expect problems with children from different school. Also the children have to cross roads, particularly to catch a bus.

(This has been reported in other literature – for example, mothers who volunteer tend to leave once their child leaves the scheme or school.)

A head teacher at one school reported that a grant to pay reasonable expenses to escorts alleviated problems. Elsewhere, the Walking bus Coordinator is paid role through the council.

Some parents are happy to volunteer, others are unable. For example, where work starts clash with the time needed to volunteer. One women objected to travel initiatives

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
which she believed were oppressively aimed at women, to get them out of cars: ***The language of John Prescott is to make women feel guilty.*** **The author suggest that the volunteer approach is reminiscent of 19th century philanthropy, with a particular focus on women's expected roles.** ***Alternative measures: Partial pedestrianisation of school approach roads*** **2 schools had restricted vehicular access because of the physical design of the streets resulting in higher proportion of part-car part-walk journeys – "Park and Stride". The author suggests that this may be an alterative – requiring just signage to prevent access at the key times.**				

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Authors: **Tranter & Pawson** **Year:** **2001** **Citation:** **Children's access to local environments; a case study of Christchurch, New Zealand** **Local**	**What was/were the research questions:** To explore the variability in children's independent access to local environment and to relate this to the socio-spatial nature of those environments in NZ cities. To compare children's freedoms to explore local neighbourhood with that in other Australian, UK and German cities. To explore the role of social traps in impeding the creation of a more child-friendly city. **What theoretical approach (e.g. Grounded Theory, IPA) does the**	**What population were the sample recruited from:** Children aged 9-11, parents, teachers in 4 Christchurch schools. **How were they recruited:** NR **How many participants were recruited:** Groups of 8-10 10-yr old children in each of 4 schools. Interviews with principals in each school. Informal discussions with	**Brief description of method and process of analysis:** A case study of children's independent access to local environments in Christchurch. Examining "licenses" to use or explore local environment (eg to come home form school alone) and the age at which these are given as an indicator of freedoms.	**Limitations identified by author:** None **Limitations identified by review team**: This research is very much framed in terms of the local Christchurch environment. Despite efforts to compare more internationally. There are no details about the methods of conduct or analysis of the interviews and little qualitative data is provided. No details about ethics of

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Environment 2001; 6(1): 27-48 **Quality score:** **-**	**study take (if specified):** Not methodological. Theoretical – child friendly cities should guarantee the right to play which is important for children's personal and social development and well-being (as well as to the community), and should not be "ghettoised" in playgrounds alone. Wild spaces are important as well as formal spaces. Such cities should also be safe from traffic, assault, molestation & pollution. As they mature, children should be free top exp[lore their neighbourhood enjoying increasing degrees of independent access. **How were the data collected:** **What method (s):** Questionnaires Group interviews **By whom:** NR **What setting(s):** Christchurch, New Zealand	teachers and parents at the beginning and end of the school day. Questionnaires received from 436 children and 297 parents (response rate 68%). **Were there specific exclusion criteria:** NR **Were there specific inclusion criteria:** Schools selected on the basis of variables hypothesised to impact on access to local areas – parental income, traffic levels.		interviewing children, how they were accessed or consent given. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** NR

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
	When: NR			

Key themes (with illustrative quotes if available) relevant to this review:

Questionnaire: Determinants of Freedom

Consistently age, traffic volumes and gender of child impact on the freedoms that they enjoyed with older children and boys given consistently more freedoms. (note that playing ion the street has least gender divide – perhaps because parents can see their children – eliminating fears of stranger danger – when they play in front of the house.) Parents fear traffic danger for boys and assault and abduction for girls. Higher socio-economic groups may also have a more protective culture.

North New Brighton School

These children were to be given a range of freedoms to explore local environment. The location means there is bushland, open spaces, dunes and beaches to explore. Some evidence that parents fear molestation more than traffic dangers. But traffic still a consideration when taking children to school.

….outside the school itself. We have problems with double parking and very careless parking on wet days. (Parent. My edit)

Parents are concern ed only with their own children. Once the they have picked up their children they drive fast and carelessly past other children. (Parent)

Teachers and parents mentioned a "lane" or "alleyway" near the school with over grown shrubs and trees may have added to fears about molestation and bullying.

They should clean up the "alleyway" – turn it into a park with a lawn. Mum doesn't want us to go there (Child).

Westburn School

Westburn has high socio-economic status and, on contrast to the other three school, no state housing. A main road running past the school operates as a (symbolic and real) barrier for children's independent access, placing pressure on parents to drive or accompanying their children and extra traffic thus reinforces the barrier effect.

Parents try to compensate for low freedom levels by ferrying them to various activities. Lots of places are visited together in their efforts to be "good parents" (same total visits are made as other school children but more with parents), including visits to friends.

Westburn children seemed aware that they were missing out on freedoms found by other children.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

When you are in the car, you don't have freedom. You can stop your bike and look at something, but when you are in the car, you can't stop. (Child).

When you walk you can go with friends. (Child).

It's fun walking and cycling to school. You can see things like road works. (Child).

However, parents at this school have clear ideas about where it was appropriate to play, and lacked the freedom to play on the street, even where roads were quiet.

Streets are for cars. Playgrounds are for children. (Parent)

There seems to be a particular culture of "being a good parent" strongly developed in this school. Other contributing factors are the large gardens in Christchurch and the fact that new developments are required by town planners to provide green space.

Greater concern about traffic among these parents, means they are more likely to contribute to traffic danger by driving their children to school (described by the authors as a "social trap" – causing what they want to avoid). Children also echoed most concern about traffic danger (more than strangers, bullies or dogs – from survey data)

Avonhead school

(RG note. I think all these findings come from the survey – no quotes provided).

Children had middle range freedoms, influenced buy low traffic levels (which increase freedoms) and high socio-economic status (which replace children's freedoms with those accompanied by an adult). Of all school children, most played in front of their houses, reflecting the quiet residential areas with many cul de sacs, and a lack of more exciting nearby locations.

Traffic was less of a concern for parents and children than in Westburn, and was given similar emphasis to strangers. Children preferred walking and cycling round their neighbourhood, rather than being driven, as this allowed them to be with friends and stop at the shop. Children were aware of which streets, due to lack of traffic, were considered suitable for play.

Woolston school

Mixed findings – lowest level of freedoms such as coming home from school alone but highest in terms of catching buses, and visiting friends alone. This may be due to lower levels of car ownership, and proximity of main bus routes.

Licence to cross roads alone was high, despite high traffic volumes, perhaps due to marked pedestrian crossing near the school.

Provided children use the pedestrian crossing on Ferry Road, the route to school is very safe. However, many school children cross along the length of Ferry Road.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
(parent) **Parents rated fear of molestation and assault more than traffic danger, despite high traffic volumes.** **Comparison with other countries** **German 10yr old children have the highest levels of freedom. Christchurch children have highest levels related to cycling. Christchurch and Sydney have lowest levels of catching buses alone.** **German children tend to live much closer to facilities, especially compared to NZ and Australia. German transport systems are best overall, and used by all ages. IN addition, children on their own are seen as being under everyone's supervision in Germany, with UK, NZ and Australia having a stronger sense of individualism, and lack of collective responsibility.** **When parents drive their children everywhere, they reinforce unsustainable transport habit in children and reduce independent access to the local environment. Child friendly cities which encourage walking and cycling will benefit the whole community socially, economically and environmentally.**				

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Authors: **Steinbach, Edwards, Green & Grundy** **Year:** **2007** **Citation:** **Road safety of London's Black and Asian minority ethnic groups.** **A report to the London Safety Unit. LSHTM.** **Quality score:** **-**	**What was/were the research questions:** Part A Quantitative work: Relationships and Risk To described the relationship between ethnicity and road traffic risk. Not extracted here. Black children appear more at risk of road traffic injury than others in London. Part B: Qualitative work: Policy and Practice To put the findings of part A into a policy context to explore policy implications. - use exiting data on borough professionals views, with additional interviews with key stakeholders, to describe the current context in which policies to address ethnicity are developed. - Undertake qualitative pilot work to identify potential research questions in this area, and generate exploratory hypotheses for future studies. – to generate data on travel patterns, explore differences among ethnic groups, gather views on possible strategies for addressing	**What population were the sample recruited from:** Reanalysis set – NR New data - NR Parents and children were "an opportunistic sample". No further details. **How were they recruited:** NR **How many participants were recruited:** Reanalysis - 40 borough professionals and other stakeholders, plus 32 Road Safety Plans. New data – 7 stakeholders. 7 Young people and 3 parents from different ethnic groups. **Were there specific exclusion criteria:** NR **Were there specific**	**Brief description of method and process of analysis:** Existing data set was reanalysed (borough professionals and borough Road Safety Plans) to specifically assess – what boroughs are currently doing to address possible links with ethnicity; what data they need; what the challenges are. Stakeholders – aimed to identify how the "problem" of ethnicity and RTAs has been framed in London, views on interventions and further research needed. Parents and young people interviewed to explore views on the links between explore and risk, behaviour and "ethnicity" as both a structural factor and identity.	**Limitations identified by author:** NR **Limitations identified by review team**: Little or no detail about methods of sampling, data collection or analysis. The reanalysis is of transcripts for Green and Edwards. **Evidence gaps and/or recommendations for future research:** NR for qualitative. For report overall, limitations of the existing road injury data by ethnicity are noted and it is suggested that ,pre detailed, relevant local research than the STATS19 is required. Detailed work to establish with young people, strategies for keeping them safe, are required. Research with communities identified as high risk

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
	inequalities. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** None reported **How were the data collected:** **What method (s):** Interviews **By whom:** NR **What setting(s):** London **When:** NR	**inclusion criteria:** NR		(including the recently arrived) is also required. **Source of funding:** Transport for London

Key themes (with illustrative quotes if available) relevant to this review:

How important is the issues of road safety to BAME communities in London?

There was low awareness of road safety as a priority among stakeholders, parents and young people. Some saw it as an "inevitable" risk, therefore not toed to social inequalities.

> ***I would go as far as to say that in the past you'd see road casualties being just an acceptable hazard that people would seek to live with and I think that would go across all communities (Policy maker)***

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

Even where is was considered to be potentially the result of social factors, it was seen as low priority compared to gun and knife crime. It was not generally seen as a specifically Black or minority issue.

I was quite shocked to be told that it was an issue specific to the black community. (Community organiser)

I wouldn't say that there was any major drive from the community around this, partially because I think the community was probably not aware that this was an issue, it was not aware that there was an inequality.

This suggest more awareness might mobilise communities around this issue, although challenges in identifying exactly which communities, among London's large number, are at risk were acknowledged.

Safety professionals were also concerned that the relatively crude data from STATS19 was not appropriate for developing interventions. (STATS19 is the assignment to an ethnic category given by police officers in London to each casualty and to drivers or riders: White skinned European, Dark skinned European, Afro-Caribbean, Asian, Oriental, Arab, Unknown).

Ethnicity and road traffic injury: the perceptive of London boroughs

Road safety plans

The authors looked for how far ethnicity was addressed in borough Road Safety Plans, but found that, as for deprivation in general, RTPs largely focussed on broader targets. Of the 32 RSPs examined, only a minority assessed ethnicity: 5 reported casualties by SATS19 (incl. 3 reporting trends); 3 referred to increased risk for "Black" pedestrians, but did not report figures and 4 reported they had carried out an Equality Impact Assessment.

Views of professionals

Previous project work by the same author team found that, given relatively weak evidence at the time about ethnic inequalities of risk, "ethnicity" was seen as an issue to be taken into account when delivering intervention, not through prioritising resource allocation. In summary borough road safety professionals reported – crude findings on "ethnic" differences may not be useful given unique settled and recently arrived population mixes in each borough; too little was known about why there might be a link between ethnicity and injury risk in order to target interventions effectively; work relied on good links with local ethnic monitory community groups.

Reanalysis of this data focused on addressing these areas.

The evidence base

In the absence of reliable data, professionals had to rely on personal experience and observation.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

It [ethnicity] isn't given in normal statistics…we really just don't know, the only way we can get it is by feel, when you're going to places…but you go to another area and it might be completely the opposite, so its quite difficult to establish. (Prior research, edit in original)

Key problem was the lack of relevance of London-level data to their locality, while local areas contain too few injuries to analyse accurately by ethnic group.

In addition to limitations of the STATS groupings in distinguishing between different groups, it also only identifies visible minorities – eg no way of seeing if Jewish children are more at risk.

Being aware of inequalities is not sufficient to know how to target resources. There is a big evidence gap around what works to reduce inequalities (even more so with ethnicity than with deprivation – the latter may be addressed by engineering solutions targeting geographical areas deemed deprived. Ethnicity is a personal attribute, though geographical area could be used as a proxy to target.)

Different perspectives on addressing ethnicity

Views ranged from concern about potential risk differences across different ethnic groups but unsure what to do (largely Inner London) and those who did not see it as relevant in their borough (largely Outer London).

An approach of "tailoring" (based on ethnicity, age, disability etc) to the needs of recipients, rather than "targeting" particular communities, was seen as appropriate: "Tweaking" (participant quote). Most agreed translation of materials was not cost-effective when so many languages were used and when the beneficiaries (children)mostly had good language skills. Newly arrived communities or publicity for consultation events might be seen as worth translating, but not individual materials.

Developing community links

This was relatively unproblematic for settled communities, many of which had their own routes fro asking for particular services (eg Islamic school asking for help with road safety, Bengali women's group asking for information). In some cases, requests were the only route by which such tailoring would be provided:

We would do it on request…we have been asked to do something on Turkish radio. (Prior research, edit in original)

Such systems may not be present in newly arrived, less visible or more transient population or those reluctant to deal with statutory authorities.

Accounting for ethnic inequalities

Authors note that possible explanation offered are not based on robust evidence, and should not be read as "evidence". but are speculative based on common-sense or observation. They are often aware that such experience is filtered through stereotypical assumptions about the behaviour of their, or other, ethnic groups.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

Structural accounts

Some suggested key reasons, linked to deprivation, about road environment, or access to alternative play areas.:

> ***In the poorer deprived areas of London, you'll find a lot of the roads don't actually have…this middle part, the island. (Community organisation, edit in original)***
>
> ***In some poor boroughs, there isn't a lot of option and activities for young people. Most schools have got rid of their parks and sports centres, so many young people in deprived areas don't have any social activities to get on with, so most of them are just, if you like, hanging out on the road sides because they haven't literally got anything to do. (Community organisation. Curtailed by me)***

Knowledge

Previous study identified lack of knowledge about road layout and crossings as a potential problem for newly arrived communities and this was echoed by community leaders and policy makers, but not the young people and parents interviewed, in this study. The latter saw themselves as knowledgeable about safety.

Culture

Respondents were generally circumspect about attributing cultural differences as explanations of risk differences. There was evidence of racists stereotyping about others' behaviour (RG note that these comments are not given attributes to numbered individuals)

> ***A lot of people who are Gujarati speakers, their whole attitude to life is different, they undervalue life.***
>
> ***Some of the afro-Caribbean kids have not self discipline when they are crossing the road.***
>
> ***In that community you get a lot more of children looking after children.***

In general, professionals, community leaders and policy makers did not refer to cultural differences, instead some comments suggest that *exposure* to risk might be the result of differences in transport choices linked to ethnically defined identity.

> ***It is sometimes that people at the lower end of the economic spectrum sometimes think that actually things like cycling is indicative of your status. So basically it's people can't afford cars that actually will cycle….and as it happens, the black community, broadly speaking, is the poorest section of the community…I can recall even walking, for example, and having people from my community saying "why are you walking"" (Community organisation, edits in original)***

Young people and parents were more likely to draw on cultural differences as explanations for different rates of injury, for example, differences in whether children were accompanied to school or different leisure activities.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

I think white kids aren't out on the streets so much. (parent)

Few young people discussed their own culturally specific style, but did identify what might put others at risk.

The style they ["Black" children] like to follow is, is about appearing cool and part of that is never rushing or never like moving out of the way for anyone else…it's something about the image that means that they don't, you know, they feel almost the traffic should stop for them, rather than stop for the traffic. ("white" boy/young person)

The Asian kids are more in the houses, because of their religion, and black and white kids are out in the street more. ("Black" girl/young person. My truncation.)

This latter view echoed by Indian girl

…I'm allowed out by myself, but I see Indian girls are really less out by themselves unless they're like eighteen or something" ("Asian" girl/ young person, my edit)

In general however, parents, young people and professionals stressed the "sameness" of behaviour and found it hard to believe there were ethnic differences that might explain different risk outcomes.

Young people's choices: convenience, safety and socialising

Road safety was not a high priority for young people in the study. All were aware of road safety advice and could talk knowledgably about what they had been told. Their accounts suggest that other dangers are more significant, and other priorities, such as getting to school on time, more pressing.

Sometimes I have to run across Padstock Road in the mornings cos I see the bus coming and you have to get it. (Young person)

Following what planners call "lines of desire" could reduce safety advice being followed. These are favoured routes used to navigate streets because most obvious, even if less safe.

There are some, some obvious places where, if you looked at a map you might not think we don't need to put a crossing there, but when you are actually there it's very obvious that you need a crossing. (Young person. My truncation)

More significant dangers were higher in the minds of young people. Postcode, school and small neighbourhood allegiances were recognised, even though none of the young people belonged to gangs. There were fears of being attacked, assaulted or mugged in other areas, on the bus or when walking through areas. Violent crime, including gun and knife crime, was feared. This means that choosing "safe" routes around London are centred less on traffic than these other key concerns.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

Peers influence travel choices, who want to travel to school with their friends, and would alter routes to meet friends at bus stops. One boy had stopped cycling because his mother wouldn't let him do it unless he wore a helmet.

Like none of your friends wear one, so you'd feel odd, different. Some do, this one girl, but she's not my friend. No one does, not our friends. (Young person)

There was little direct relationship between knowledge and behaviour in this study.

There were some suggestions of different patterns of socialising between young people form different ethnic groups. The two "white" centred around going to each others' houses – indoor activities like playing video games. The two "black" children talked about being outdoors – on the streets about side friends' houses, in the playground or park. Asked why outside was better than in:

Cos your house might be messy or something, and you can just be outside, sitting on the wall and chatting or riding your bike or playing football with your friends ("Black girl/ young person)

Such activities would not be picked up by the travel data available.

Children adapted their activities to avoid what they perceived as more "dangerous":

There are some areas I'd rather walk through in the morning than walk through kind of mid-afternoon when there's lots of people about that I might run into (YP)

If I'm on my own I sit downstairs on the bus, I don't look, I don't make no comments and you don't involve yourself. (YP)

Transport mode choices may, therefore be influence by ethnicity, both directly in terms of structural constraints arising from where you lived, but also in terms of "identity" in that choices of transport have symbolic meanings that are shaped by ethnic identity, as well as the influence of peers.

Addressing inequalities

Community organisations felt that, if road traffic injury were to be on their agenda it was best done as part of a broader concern with community safety. Alternative safe spaces to play, other than the street were mentioned, and these were also part of the perceived focus for addressing gang culture problems.

More evidence about inequalities in injury risk and ethnicity was required to allow resources to be targeted, but needed to be done sensitively without victim blaming those at greatest risk. Equally, fears about this should not be used as an excuse not to act.

Why are you saying Black people? Why is it always us black kids that is the problem? (YP)

Some [practitioners] have said that "well, we don't want to look like we've stigmatised [some communities]. Its rubbish…but that's what their fear is. (Policy maker)

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Authors: **Kennedy, Wheeler & Inwood** **Year:** **2004** **Citation:** **Kent Quiet Lanes Scheme** **TRL Report 602** **Quality score:** **-**	**What was/were the research questions:** Not totally clear, but overall to detect changes in traffic flows, speed and non-motorised traffic use over time. The qualitative work aimed to explore residents' views and attitudes about Quiet Lanes following scheme implementation. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** None reported **How were the data collected:** **What method (s):** Focus group discussions. **By whom:** NR **What setting(s):** NR – Kent in the area where quiet lanes had been implemented. **When:** October 2001	**What population were the sample recruited from:** Local residents **How were they recruited:** NR Efforts were made to ensure maximum variation, in terms of age, gender and road use – walkers, cyclists and horse riders. But in the event, only 1 cyclists and 0 riders took part. **How many participants were recruited:** 13 in total (7, 5 in each group) **Were there specific exclusion criteria:** No **Were there specific inclusion criteria:** NR	**Brief description of method and process of analysis:** NR	**Limitations identified by author:** Difficulty obtaining full complement of participants – especially not able to attract those who ride on local roads. **Limitations identified by review team**: The aim is a bit unclear, but seems general. Minimal information given about sampling, and the characteristics of the sample, nothing about recruitment, no details about conduct of the groups or the methods of analysis are provided. No quotes are provided Some of the questions seem more appropriate to a survey. **Evidence gaps and/or recommendations for future research:** NR

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
				Source of funding: Countryside Agency and Dept. for Transport.

Key themes (with illustrative quotes if available) relevant to this review:

Knowledge of the quiet schemes

Some had not heard of it. Signs were not self explanatory, and visitors would not be aware of the scheme.

Of those who had seen leaflets about the Quiet Lanes scheme, some felt they did not explain the concept fully - failing to identify how the idea would be achieved and enforced or the possible benefits..

Some criticism of the chosen location was noted – as lanes were rat runs and one used a car park overflow.

Cyclists suggested Quiet lanes were a good idea but that touring cyclists would prefer longer routes and need it to be advertised.

Use of the quiet lanes

General participants had used the Quiet Lanes as drivers, walkers, cyclists.

Ramblers and cyclists used the Quiet lane though not clear if this had changed since the designation – the general feeling was that this had not had an impact.

Lanes were felt to be too busy with traffic and too narrow for walkers with foot-paths preferred. It was acknowledged that local residents. Farmers and delivery vehicles needed to use the lanes.

Motorists were thought to be considerate in general – perhaps more so since the introduction of the Quiet Lanes.

Residents from outside the area riding quad bikes "in a manner likely to cause accidents, taking notice of noone" (authors' quote) was noted.

Recent road works had been very disruptive and made it difficult to assess the impact of the scheme.

New housing development was felt to have increased road use.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Signs and traffic calming **Most had not noticed any change to the direction signs in the Quiet Lanes Network, as they were locals who tended not to look at the signs. It was suggested that non-motorists may notice them, by motorists were unlikely to as they were often obscured by vegetation.** **Even if seen, the meaning of signs was not thought to be clear, carrying little information. Participants suggested some message such as "caution" or some way of telling the user what to do.** **Participants were aware of "false cattle grids" (a sort of rumble strip) but it was felt space at the side should have been left for cyclist and that riders might have problems with them.** **Success of Quiet Lanes Scheme** **It was felt they had made little difference to the Lanes. The signs lacked authority and it was suggested that speed limits or calming devices would have achieved the desired effect. It was thought "nonsense" to have both the Quiet Lane sign and a de-restricted speed limit in close proximity.** **Some questioned the suitability of the roads included in the scheme and questioned the method used for choosing them.** **There were reservations about using the lanes to walk and it was considered that many did not know their purpose. The idea that riders, cyclists and walkers might have priority was described as "wishful thinking". The scheme was thought to be a waste of tax payers money.** **It was suggested that such a densely populated area was unsuitable for the scheme and that the concept might work better in the country.** **Despite this, Quiet Lanes were thought to be a worthwhile idea, and expanding might make others aware of the needs of other road users.** **Possible improvements to the scheme.** **It was suggested that the scheme needed more advertising, in the local paper. (Leaflet drop had been some time before and it was thought people wouldn't have seen it). It was suggested that publicity should emphasise the need for drivers to behave responsibly.** **Lower speed limit or road humps were suggested top control vehicle speed and to encourage walkers, as roads are so narrow – put in pavements.** **It was suggested that traffic could be banned, or roads designated Access Only. Improved signage was also required.** **Better links to existing places where people walk, such as woodlands, were also suggested.**				

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
Authors: **Kennedy, Wheeler & Inwood (2)** **Year:** **2004** **Citation:** **Norfolk Quiet Lanes Scheme** **TRL Report 603** **Quality score:** **-**	**What was/were the research questions:** Not clear – overall project to detect changes in traffic flow, speed and attitudes. **What theoretical approach (e.g. Grounded Theory, IPA) does the study take (if specified):** None reported. **How were the data collected:** **What method (s):** Focus group discussions **By whom:** NR **What setting(s):** NR – local to Norfolk quiet lanes **When:** June 2001	**What population were the sample recruited from:** Local people. Efforts were made to ensure maximum variation, in terms of age, gender and road use – walkers, cyclists and horse riders. **How were they recruited:** NR **How many participants were recruited:** 18 (10, 8 in 2 FGDs) **Were there specific exclusion criteria:** NR **Were there specific inclusion criteria:** NR	**Brief description of method and process of analysis:** NR	**Limitations identified by author:** none **Limitations identified by review team**: The aim is a bit unclear, but seems general. Minimal information given about sampling, and the characteristics of the sample, nothing about recruitment, no details about conduct of the groups or the methods of analysis are provided. Minimal quotes are provided Some of the questions seem more appropriate to a survey. **Evidence gaps and/or recommendations for future research:** None **Source of funding:** Countryside Agency and Dept. for Transport.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

Key themes (with illustrative quotes if available) relevant to this review:

Knowledge of Quiet Lane Scheme

Participants had heard of the scheme through well attended village hall exhibitions, also posters, letters form the LA, meetings, newsletters and publicity in the local newspapers.

Locals were felt to be aware, while delivery people and visitors were not.

Use of Quiet Lanes

All participants used them – many had to as they lived on them.

Some had been using the lanes before the scheme, others used them now to cycle and walk.

Some suggested that this was increased although others felt traffic had not been decreased. Some felt that motorists did not respect the lanes, and drove too fast, especially in straights. Young people were thought to speed through the Lanes for fun. Visitors were thought by some to be for blame, though others thought both they and residents drove too fast. Lack of impact on speed led them to question if the scheme was working. Strongly felt that speed limits were needed to make the schemes work.

More people now used the scheme on a Sunday. Lanes were felt to be more enjoyable now they were Quiet Lanes. "help you relax". A village hall had been opened to serve refreshments for cyclists – not done prior to the scheme.

Horse-riders did not like them and sometimes felt intimidated by cyclists (when ringing bells) and walkers.

Some felt farm vehicles should take alternative routes. And HGVs from outside the area did not respect them. It was felt that bus routes should not use quiet lanes – buses perceived as enormous and always empty.

Success of the Quiet Lanes scheme

Mixed views about whether the scheme was working – some felt drivers slowed down for pedestrians – there was a "psychological effect" – while others felt that speeding drivers made it unsafe, and heavy buses and lorries still used the lanes.

Suggested that it was not working because it was still unsafe for children and that there would always be a conflict between walkers and motorists. Because of ditches alongside the road, it was felt that there was nowhere for pedestrians to get out of the way of motorists.

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes

Quiet Lanes were felt to benefit walkers, cyclists and riders, but some felt, not residents. Others thought a financial benefit might be accrued in terms of house prices.

The scheme was seen as an extra facility for tourists, and some holiday cottages were on the routes.

A possible benefit was seen to be sowing or preventing development and keeping the area rural.

In general thought to be beneficial, but that introduction of more schemes in other locations would increase awareness.

Quiet Lane signs

Signs thought to be too small – easily obscured by vegetation and missed by motorists.

The current sign (showing a family group walking) was felt to convey the wrong information – suggesting that people could walk safely or that the route was for walkers only

The sign makes it look like a footpath.

The alternative (without pedestrians) was felt to be to empty, and looked like noone was wanted on it.

Suggested text included "Watch your speed", "Be aware of walkers, cyclists and riders" or "pedestrian priority", or should show a speed limit.

It was felt that visitors in particular were not aware of what the signs meant and it was suggested that if they were introduced nationally, and publicised on TV, more people would understand the signs.

Possible improvements to the scheme

Most frequently voiced suggestion for improvement was the introduction of a speed limit – perhaps of different colour to normal, such as green. Extra enforcement, such as cameras, would not be welcome on the Lanes. Changing the signs as above was also mentioned.

Circular walks, taking in Quiet lanes and footpaths could be advertised, although there was some concern that Tourist Board advertisement might encourage inappropriate parking. National advertising was thought to be good as it would increase visitors awareness of the schemes aims.

It was suggested that the Quiet lanes fail because they "don't lead anywhere". They need to connect to schools, the coast and link into towns. Parralells were drawn with Holland where:

Study details	Research parameters	Population and sample selection	Methods of analysis	Notes
You can cycle into town without encountering traffic **The lanes also cross those not in the scheme and it was suggested that there should be signs on the main roads to warn motorists of possible crossing by pedestrians and cyclists, or to warn them that the main road was ahead. Bridges might be a solution.** **One participants suggested that the hedgerows had been removed by farmers enlarging their fields and that these should be allowed to grow back to improve the environment "to get the primroses back…"**				