



Active Travel Literature Review

Charlotte Healy
JSNA Officer
Public Health Intelligence

July 2017

www.jsna.info

Contents

1. Executive Summary.....	3
2. Introduction	4
3. National Context	5
4. Local Context.....	6
London	6
Kensington and Chelsea.....	7
5. Barriers to Active Travel.....	9
Healthy Streets.....	10
6. Initiatives to Promote Active Travel.....	12
6.1 School Travel Plans	12
6.2 Walking School Bus	13
6.3 Walking Promotion	13
6.4 Cycling Promotion	14
7. Key Points.....	16
8. Evidence Summary.....	17
9. References	19

1. Executive Summary

There is a wealth of evidence showing that an active life is essential for physical and mental health.

Physical activity guards against many diseases such as diabetes and cancer and also conditions such as obesity and depression. Being active plays a key role in brain development in early childhood and is also good for longer-term educational attainment.

In addition, active travel also reduces congestion, improves air quality and creates a safer and more pleasant environment. Small increases in activity can make a huge difference to health and making small lifestyle changes, such as choosing to make journeys by an active means, are an easy way to incorporate physical activity into everyday life.

The first step to increasing active travel is to identify the barriers that stop people from walking/cycling to their destinations. Of the factors that cannot be controlled for, greater distance, increasing household income and increasing car ownership are consistently associated with lower rates of active travel. Of the barriers identified that could be influenced, safety was continually raised as an issue with traffic safety and road crossings being the main concern. More specifically in London, the unpleasant environment was noted as a strong factor that reduced levels of active travel with the addition of a misconception around distances and walking speeds contributing to lack of walking.

School travel plans have the most research surrounding them although there is inconsistent evidence to demonstrate an effect of the school travel plans. Of the studies that demonstrated an increase in active travel, common aspects included a small element of curriculum work, and promotional work that targets parents and the local community although intervention effects over a longer period of time have not been measured.

Walking school buses are a popular initiative in local communities as they address the main safety concerns of parents. Where a walking school bus was implemented effectively, walking to school increased significantly. However, it is noted that in order to succeed a walking school bus must be paired with positive attitudes towards active travel, willing volunteers, a clear coordinator and enforce that children arrive on time at the bus stops.

Walking promotion initiatives are most effective when a multifaceted approach is used as walking packs alone do not produce significant results. The biggest increase in active travel was shown when there was a strong involvement of schools and teachers paired with specific materials directed at parents. Research into 'gamification' initiatives shows that children who engage with the initiative are likely to change their behaviour. However, the difficulty comes in finding a way to motivate and engage a large group of young people.

Although there is less research around cycling initiatives there are many schools with dedicated initiatives in place. 'Bike It' has been successful in increasing levels of cycling to school by up to 4x in children across London by running events such as cycling breakfasts, bicycle maintenance, and cycle rides. Studies evaluating the initiative focus on the importance of linking to families and that parents/carers were involved and encouraged to support and cycle with their children.

The evidence presented supports the analysis that NICE provides - Initiatives that involve the school, parents and the local community, often supported by an external coordinator, and that engage the children are most likely to demonstrate short and long term changes in active travel behaviour.

2. Introduction

This literature review is intended to advise the next stage of the 'Go Golborne' project based around promoting active travel. The aim of this literature review is to identify the national and local policy on promoting active travel and to review the evidence of interventions that have taken place at a local level. In this review active travel is referring to making journeys by physically active means, for example by walking or cycling. The review will focus on increasing active travel in children (0-18) and families.

Small increases in physical activity, especially amongst those who are the least active can bring great health benefits. A wealth of evidence shows that **an active life is essential for physical and mental health and wellbeing** (Penedo, 2005). Active travel has been shown to be a major contributor to overall physical activity in children. Those who actively travel to school accumulate more minutes of moderate-to-vigorous physical activity (MVPA) per day compared to those using motorized transport. However, the proportion of youth actively travelling is likely to decline if initiatives are not put in place (Pabayo ,2011).

Benefits of active travel:

- Improves physical and mental health
- Reduces congestion
- Lowers air pollution
- Saves money
- Can save time

The World Health Organisation (WHO) recognises that active travel can play a key role in promoting physical activity and improving overall health. In the Global Action Plan for the Prevention and Control of Non-communicable Diseases, including cardiovascular disease which has strong links to inactivity, the guidelines propose to “introduce urban planning and transport policies to improve the accessibility, acceptability and safety of, and supportive infrastructure for, walking and cycling”.

3. National Context

The Department of Health asked the **National Institute for Health and Clinical Excellence (NICE)** to produce public health guidance on physical activity. The guidance is for all those who have a direct or indirect role in promoting physical activity for children and young people.

NICE (2008a) makes 15 recommendations on physical activity by looking at collections of evidence, fieldwork data and comments from stakeholders and experts. They range from national policy to local planning, delivery and training.

A summary of the most relevant recommendations for increasing active travel at a local level are outlined below. The full report and recommendations can be seen here - <https://www.nice.org.uk/guidance/ph17>

- **Responding to children and young people** - This recommendation stresses the importance of consulting with children, parents and carers to identify factors that may affect whether or not they take part in physical activity and to explore what types of activity they may enjoy.
- **Multi-component school and community programmes** - This recommendation promotes multi-component physical activity programmes between schools, families, private sector organisations and community groups. These programmes could include advice on how to be physically active, community fun days, homework on benefits of being physically active etc.
- **Active and sustainable school travel plans** - Look at promoting walking and cycling as a method of travelling to school by ensuring schools provide suitable cycle training to pupils, safe routes to walk to school are mapped, recruit volunteers to run initiatives like the walking bus, develop parents and carers awareness of the wider benefits of walking and cycling to school (e.g. social wellbeing, confidence and independence).
- **Helping families to be active** - Focus on incorporating physical activity into daily life by encouraging parents to complete local journeys using a physically active mode of travel, and encouraging parents to allow their children to be more independent.

NICE have also looked at how the environment affects physical activity and provide the following guidance: “pedestrians, cyclists and users of other modes of transport that involve physical activity (i.e. public transport) should be given the highest priority within transport policy.” Specific transport policy recommendations by NICE include reallocating road space to support walking and cycling (such as by widening pavements and introducing cycle lanes), restricting motor vehicle access in residential areas, introducing road user charging schemes, introducing traffic calming schemes to restrict vehicle speeds, and creating safe routes to schools (NICE, 2008b).

4. Local Context

Key Facts - London

- Nearly 1/2 of car trips made by London residents could be cycled in around 10 minutes
- More than 1/3 of car trips made by Londoners as a driver or passenger could be walked in under 25 minutes
- Walking trips decreased by **30% between 1995 and 2013**
- 4 in 10 children in London are already overweight or obese.
- Children burn most energy playing outdoors, walking and cycling.
- Children who walk and cycle are more likely to become adults who walk and cycle
- The likelihood of being obese **falls by 4.8%** for each additional kilometre walked per day
- 50% of walking in London is done as part of public transport trips.
- Walking is a universal activity in London – there is little difference by gender, household income, ethnicity or employment status.

Taken from TfL 'Healthy Streets for London'

Mayor of London

Sadiq Khan, the Mayor of London is fully supportive of increasing walking and cycling amongst Londoners. Initiatives to promote cycling include creating a tube network for bikes, creating safer streets and improving key junctions, normalising cycling and raising awareness of safety with lorry drivers, pedestrians and cyclists. In addition, the Mayor has invested millions into creating the Mayor's Walk London Network which links up walking routes across London. It has also been found that many people are put off by walking around London due to **inconsistent signage and confusion about distances between areas**. Legible London, an initiative from the Mayor is combating this by putting in way finders that help to make it easier and give people the confidence to walk around London.

Kensington and Chelsea

In Kensington & Chelsea, the proportion of residents regularly undertaking travel by active methods (walking and cycling) is higher than the London average. **Across London, the rate of active travel has been increasing steadily since 2006.**

Key Facts - Royal Borough of Kensington and Chelsea

- **32.3%** of children ages 10-11 are overweight or obese (London average 38.1%)
- **24.5%** of children aged 4-5 overweight or obese (London average 21.9%)
- On average, RBKC residents make 2.8 trips per person per day
- 37% of journey's starting in RBKC are walked
- 4% of journey's started in RBKC are cycled
- 56% of households do not own a car

Taken from TfL 'Borough Factsheet 2016'

Kensington and Chelsea – Council Initiatives in Place

For schools with a valid travel plan there are many free initiatives and training courses, and a package of initiatives and resources to encourage walking. Schools can become a walking school meaning they make a pledge to make a real difference to the way people travel to school by encouraging walking.

A selection of the key initiatives offered by the council in Kensington and Chelsea can be seen below. These initiatives could complement any new initiatives put in place to promote active travel.

Initiative	Target	Effect	Notes
Bike It	School children	Across London the number of children cycling to target schools has quadrupled (do not have figures for K&C).	Started in RBKC in 2009 and ran until 2014. A dedicated bike it officer provides advice and support and helps schools set up events and initiatives.
Parking Enforcement Campaigns	Parents at school gates	Increased awareness to parents about benefits of active travel.	Children help to create bespoke leaflets that are given to drivers. Increased enforcement of bad drivers around school area.
Junior Travel Ambassadors	School children	Promoted road safety issues within the school and local community.	Gives pupils an active role in making roads safer and officers can also be used to help implement other initiatives.
Scout Surfers	School children	Increased children actively travelling to school.	Started in 2009, scooter safety training with wider promotional and educational activities

Walk Once a Week (WoW)	School children	Increased children walking to school.	Children who have walked, scooted or cycled to school for a minimum of one journey a week are rewarded with a specially designed badge.
Youth Travel Ambassadors	College students	Makes active travel into a competition to increase participation in college students.	Led by TfL, the RBKC team get people to use Map My Walk app which measures distance and calories burned.

Table 1 – Summary of key Kensington and Chelsea council initiatives to promote active travel

5. Barriers to Active Travel

Active travel to school has decreased dramatically over the past 20 years. To reverse the declining trend of active travel to school, one of the first steps is to identify the barriers that prevent children from walking or biking.

A review by Pont (2009) found that **greater distance, increasing household income and increasing car ownership** are consistently associated with lower rates of active travel among children. In addition, having a non-white ethnic background has a positive association with active travel. When looking at variables and possible interventions it was found that having **recreation facilities and walk/bike paths present** are associated with higher rates of active travel.

A systematic review (Lu, 2014) examines a multitude of studies that have explored barriers to active travel and identifies the most reliable results showing perceived barriers to children's active travel. The results (summarised below) suggest **traffic safety and distance** are the most significant barriers affecting active travel to schools.

Table 2: Summary of barriers to active travel identified in a systematic review (Lu, 2014)

Personal barriers (6 studies)	Physical environment barriers (18 studies)	Social environment barriers (10 studies)
No time (2)	Traffic safety (e.g., speed, volume) (8)	Neighbourhood safety (3)
Ease of dropping child off the way to work (2)	Distance (5)	Stranger danger (1)
Heaviness of the child's backpack (2)	Freeway/highway/crosswalks (4)	Crime/danger (2)
Child's preference of being driven to school (1)	Road safety (2)	Graffiti (2)
Walking as requiring too much planning ahead (1)	Bad weather (2)	Worry child will take risk (2)
	No/insufficient lights or crossings (2)	No other child to walk with (1)
	No direct route (1)	No adults to walk with (1)
	Lack of sidewalks (1)	Few children around (1)
	Busy street (1)	Getting lost (1)
		Stray dogs (1)
		Exhaust fume (1)
		Personal safety (1)
		Concern about something happening to child on the way (1)

Whilst these indicators provide a good overview of the barriers faced by children worldwide, they are not specific to the local environment in London. Out of the studies reviewed only 1 was based in the UK (Norwich), although nearly half of the studies took place in an urban setting.

The UK study reviewed (Panter, 2012) found that children whose **distances were less than 1km and children whose mothers walked or cycled to work were more likely to walk or cycle to school**. In addition, evidence for attitudinal, social and environmental factors, such as convenience of the car, parental encouragement and parental concern about dangerous traffic were associated with children’s active travel.

A further study by Panter (2010) found that children who lived in **highly connected, more deprived areas, with routes to school that were short, direct and included a busy road were less likely to walk or cycle to school**. The study suggests addressing components of road safety and urban design will be central to interventions to increase children’s active commuting along with gaining support of parents.

Healthy Streets

One of the main barriers of walking identified in London is an **unpleasant environment**. The Mayor of London and Transport for London (TfL) have developed an approach to creating ‘Healthy Streets’ in London which looks at using policies and strategies to help Londoners use cars less and walk and cycle more. 10 indicators (diagram below) have been identified that create healthy streets and that, if met, should increase levels of walking and cycling in Londoners.



Figure 1: 10 Healthy Street Indicators (TfL, Mayor of London)

Another barrier identified in London is the **misconception of walking speeds and distances**. People often perceive that it takes them longer to walk somewhere than it does in reality, especially if they are unfamiliar with an area. Many Londoners have a misconception about distances based on the tube map and how areas are connected in London. A lack of knowledge about how long it will take to walk and which route to take creates a large barrier to active travel.

A review (Lorenc et al. 2008) into the attitudes of children and parents on walking and cycling in the UK found four themes which stood out clearly:

- **a strong culture of car use**
- **fear and dislike of local environments**
- **children as responsible transport users**
- **parental responsibility for children**

This would suggest support for measures such as **cycle lanes and traffic calming**, in addition to promoting safe methods of active travel, could be beneficial.

6. Initiatives to Promote Active Travel

The evidence will be broken down into several categories of initiatives; school travel plans, walking school bus, walking promotion and cycling promotion.

6.1 School Travel Plans

School travel plans look to increase walking and cycling to school by implementing a range of promotional activities and sometimes infrastructural measures. A Cochrane systematic review (Hosking, 2010) has been compiled which examines the effect of organisation travel plans (school or work travel plans) on improving health. Organisational travel plans are complex interventions that aim to change how people travel, using a mix of different strategies, depending on the organisation in question in the hope that changing people's travel plans may indirectly affect health.

Ten studies were reviewed that were conducted in a school setting. These interventions included multiple components targeting the school, schoolchildren and sometimes additional bodies such as local councils. The type of intervention varied across studies, but included the time of a travel coordinator; activities through local councils to improve the safety of the neighbourhood; provision of safety and promotional information to encourage car-alternative modes of transport to school; within classroom educational modules and the organisation of walking school buses.

Of the 10 studies conducting travel plans in a school setting only **2 showed to increase active travel and reduced car use**. 2 studies showed mixed results and the other 6 showed no significant effect.

Two randomised controlled trials of school travel plans demonstrated mixed effects on travel mode (Rowland 2003 and Wen 2008). Of the studies that showed effects on active travel in a school setting, 2 were judged to be at less risk of bias. McKee 2007, a controlled before-after study, found that **active travel curriculum materials for teachers and classes, plus a child and family information pack, led to a significantly larger increase in mean distance walked to school** in the intervention group (602m) compared with the control group (47m). Mendoza 2009, a controlled before-after study, measured the effects of a walking school bus co-ordinator on walking to school when the walking school bus was not operating, and found that the **proportion of children walking to school increased significantly in intervention schools** (from 20% to 25%), but decreased significantly in control schools (from 15% to 7%).

There is insufficient evidence to determine whether organisational travel plans are effective for improving health or changing travel mode. No studies have assessed whether intervention effects are maintained over longer periods e.g. years. Currently, organisational travel plans should be put in place as part of well-designed research studies.

NICE Summary

- The introduction of safe routes to schools behavioural interventions can lead to increases in walking and cycling (both short and long term)
- Common aspects of successful interventions include a **small element of curriculum work, and promotional work that targets parents and the local community**.

6.2 Walking School Bus

Although walking school buses (WSB) can form part of school travel plans they will be considered as a separate initiative in this review due to their popularity and ability to be independent from school travel plans. A walking school bus is a group of children walking to school with one or more adults, usually parents/carers along a prearranged route. The local authority can be involved in setting up walking buses or sometimes parent/carers can set one up more informally. It can prove popular with communities as parents are often concerned about safety issues when allowing their children to walk to school.

A few studies have examined the effectiveness of a WSB. Yang (2014) concludes that the implementation of a WSB needs to be **paired with improving attitudes towards active travel** to have a significant impact. It is also mentioned that increasing the speed of the walking bus by reducing the amount of time children have to wait for others at each stop increases the effectiveness of the WSB. **Therefore children should be encouraged to arrive on time** if implementing a WSB.

A further study (Heelen, 2009) provides more evidence for a WSB intervention. A WSB was implemented for 2 years in 2 schools with a third acting as a control. Students self-reported their travel method and also wore an accelerometer to assess their physical activity. Results showed that **walking to school was 27% higher** in the intervention group with frequent walkers obtaining more than **25% physical activity** compared to passive commuters.

NICE Summary

- The **reliance on volunteers** and the impact of the loss of one or two individuals appears to be critical on the sustainability of the initiative.
- Walking school buses are focused and should focus on primary schools as age is a key determinant when looking at escorting children to school.
- There is some evidence to suggest that having a clear coordinator or champion for a walking bus may be an important component – the **organisational ability** of the coordinator can contribute to the long term future of the Walking Bus.
- Although walking buses are commonly delivered throughout the UK, their applicability to all areas remains uncertain as they are more likely to be successful in particular settings.

6.3 Walking Promotion

Walking promotion is often based around incentive schemes which can include competitions between classes/schools and games (known as gamification).

In 2011 a systematic review was conducted on interventions to promote active travel in schools (Chilion, 2011). Studies were collected across the UK, Australia and the USA, mostly in an urban setting

with most interventions involving the schools, parents and communities. Of the 14 studies only 3 interventions were shown to have a large or very large effect size.

The interventions with the highest effectiveness shared two common elements: **a) a strong involvement of schools through principals and teachers working actively in the intervention, and b) parents receiving specific materials and being encouraged to walk.** Teachers are often stretched and unable to take on extra responsibilities relating to children's travel and parents are often concerned about their child's safety.

The review demonstrated that interventions must address a complex and varied array of factors that influence children's modes of travel to school, including the physical environment around the school, economic characteristics of the families, social networks of the children, and cultural norms

An initiative called 'Beat the Street' aims to get children more active by encouraging them to walk and cycle in their neighbourhood using tracking technology with a reward scheme. One study (Coombes, 2016) has evaluated the impact of Beat the Street in Norwich, UK. Children aged 8-10 wore an accelerometer for 7 days before, during and after the intervention and also kept a travel diary. Whilst physical activity overall did not increase there was an increase in MVPA during the school commute times when the intervention group touched the Beat the Street sensors. **Active travel did increase by 10%** in the intervention group and decreased by 7 % for the control. Although there was not a large intervention effect for the Beat the Street initiative, **those who engaged with the intervention showed increases in active travel.** Further evaluation is needed, especially to look at more long term measures, but this study would suggest **promoting engagement with the initiative is crucial for success.**

NICE Summary

- There is some evidence to suggest **that walking campaign packs alone do not lead to increases in walking among school children.**
- There is evidence to suggest that walking promotion schemes, involving promotional materials, incentives and rewards, travel diaries for children and parents and provision of "park and walk" parking areas close to school and restriction of parking outside of schools contribute to increased levels of active travel and reduced car use.

6.4 Cycling Promotion

This refers to measures that encourage an audience to take up cycling and usually consists of information campaigns to promote cycling. They can be supported by classroom activities, games, proficiency schemes and addressing the safety concerns of parents and carers.

There is less research around cycling promotion as a means to increase active travel; however there are several cycling promotion schemes across the UK. 'Bike It' is an intensive programme of visits and

support by Bike It officers to promote cycling in schools, who run events such as cycling breakfasts, bicycle maintenance, and cycle rides. Two studies (Osborne, 2006 and Sustrans, 2007) have evaluated the Bike It programme with both studies reporting short term increases in cycling. In both studies cycle use rose so that those cycling to school daily increased from 3.9% to 11.3% (Osborne, 2006) and from 5% to 25% (Sustrans, 2007). Both studies reported that there is an important link to families and that parents/carers were involved and encouraged to support and cycle with their children.

NICE Summary

- The characteristics that appear to contribute to successful interventions are a cycle-friendly culture (supportive parents) and infrastructure with the distance to school appearing to be critical. In addition, **the involvement of external agencies** to facilitate schools to promote and maintain cycling proves successful in increasing active travel.
- There is some evidence that when encouraging children to cycle some self-reported levels of walking declined implying that some of the increase in cycling may have been offset by a decrease in walking.

7. Key Points

Number	Key Point
1.	The universal barrier of safety should be addressed to ensure parents/carers are supportive of an initiative to increase active travel
2.	The London specific barrier of inconsistent signage and confusion about distances between areas should be addressed in any initiative developed.
3.	Local barriers specific to the community should be gathered (through consultation with young people and parents/carers) and initiatives should be developed that directly combats/works around those barriers.
4.	A multifaceted approach should be developed involving the school, parents, local community, children and possibly an external coordinator.
5.	Initiatives that promote the use of scooters as a means of active travel should be considered.
6.	Engagement is an essential part of an initiative so a motivator that matches the needs of the target should be identified.
7.	In addition to the journey to school, other journeys that could be made be active travel should be considered when looking at initiatives (lack of research in this area does not mean it could not be successful).
8.	There is a risk that some active travel interventions may not be increasing active travel overall but rather changing modes from walking to cycling or vice versa. The focus of interventions should be around those children who are currently driven to school.

8. Evidence Summary

Intervention	Study	Intervention	Notes	Effect
1. School Travel Plans	Rowland (2003)	School travel plan		Reduced car use for intervention group 24% (intervention group), 22% (control group)
	Wen (2008)	School travel plan		The effect on car use was not significant. Students reported no difference in walking, parents reported increased walking in intervention.
	Mendoza (2009)	School travel plan		Change in car use not significantly different between intervention and control groups. Walking increased significantly more in intervention group.
2. Walking School Bus	Heelan (2009)	Walking School bus intervention	US Study	School-wide prevalence of walking to school was 27% higher in the WSB schools than control Also showed that school walkers did 25% more physical activity than non-walkers and gained less body fat.
	Yang (2014)	Walking School bus intervention	US Study	To maximise effect of WSB children need to arrive on time
3. Walking Promotion	Coombes (2016)	Beat the Streets	Pilot study, Norwich UK. Only 4 weeks, weather effects	No evidence of a large intervention effect of Beat the Street at 20 week follow-up Self-reported active travel increased Overall engagement was low but those who engaged more increased their physical activity
	McKee (2007)	Active travel resources for school curriculum and for individual participants		Walking increased significantly more in intervention group
4. Cycling Promotion	Osborne (2006)	Bike It - Intensive programme	40 pilot schools in 4 urban areas across the UK	Those cycling to school daily increased from 3.9% to 11.3%
	Sustrans (2007)	Bike It	1 pilot school – case study	Those cycling to school daily increased from 5% to 25%

Table 3: Summary of evidence of initiatives aiming to increase active travel

Appendix 1 - Methodology

This literature review will provide a summary and synthesis of the key evidence on the topic of active travel. The review draws from evidence summaries and reviews, primary research literature and key policy documents and grey literature.

Papers were selected for inclusion according to the criteria below:

- Research literature with a focus on:
 - Barriers that stop active travel in children and families
 - Interventions to promote active travel in children and families at a local level
- The search criteria included: 'active travel', 'active commute', 'physical activity', 'children', 'young people', 'families', 'initiative', 'intervention', 'barriers'.
- The review will include international literature but will focus on applicability to a London environment.
- Evidence published since 2007 (last 10 years). Earlier evidence may be incorporated when included in evidence summaries.
- English language only.

9. References

- Coombes, Emma, and Andy Jones. "Gamification Of Active Travel To School: A Pilot Evaluation Of The Beat The Street Physical Activity Intervention". *Health & Place* 39 (2016): 62-69. Web.
- Chillón, Palma et al. "A Systematic Review Of Interventions For Promoting Active Transportation To School". *International Journal of Behavioral Nutrition and Physical Activity* 8.1 (2011): 10. Web.
- Heelan, Kate A. et al. "Evaluation Of A Walking School Bus For Promoting Physical Activity In Youth". *Journal of Physical Activity and Health* 6.5 (2009): 560-567. Web.
- Hosking J, Macmillan A, Connor J, Bullen C, Ameratunga S. Organisational travel plans for improving health. *Cochrane Database of Systematic Reviews* (2010), Issue 3
- Lorenc, T et al. "Attitudes To Walking And Cycling Among Children, Young People And Parents: A Systematic Review". *Journal of Epidemiology & Community Health* 62.10 (2008): 852-857.
- Lu, Wenhua et al. "Perceived Barriers To Children'S Active Commuting To School: A Systematic Review Of Empirical, Methodological And Theoretical Evidence". *International Journal of Behavioral Nutrition and Physical Activity* 11.1 (2014): Web.
- McKee R, Mutrie N, Crawford F, Green B. Promoting walking to school: results of a quasi-experimental trial. *Journal of Epidemiology and Community Health* (2007);61:818-23.
- Mendoza J, Levinger D, Johnston B. Pilot evaluation of a walking school bus program in a low-income, urban community. *BMC Public Health* (2009);9:122.
- National Institute for Health and Care Excellence. Physical activity and the environment (NICE guideline PH8). (2008)
- National Institute for Health and Care Excellence Guidance – (2008)<https://www.nice.org.uk/guidance/ph17/evidence/review-5-active-travel-interventions-revised-july-2008-371248237>
- Osborne, P., Bike It, in WHO, Collaboration between health and transport sectors in promoting physical activity: examples from European countries. Copenhagen: (2006) WHO.http://www.euro.who.int/InformationSources/Publications/Catalogue/20070503_2
- Pabayo, Gauvin, T.A. Barnett Longitudinal changes in active transportation to school in Canadian youth aged 6 through 16 year *Pediatrics*, 128 (2011), pp. e404–e413
- Penedo, Frank J, and Jason R Dahn. "Exercise And Well-Being: A Review Of Mental And Physical Health Benefits Associated With Physical Activity". *Current Opinion in Psychiatry* 18.2 (2005): 189-193. Web.
- Panter, Jenna R. et al. "Neighborhood, Route, And School Environments And Children's Active Commuting". *American Journal of Preventive Medicine* 38.3 (2010): 268-278. Web. 12 June (2017).

Pont, Karina et al. "Environmental Correlates Of Children's Active Transportation: A Systematic Literature Review". *Health & Place* 15.3 (2009): 849-862. Web.

Public Health England, 2014, Everybody active, every day - An evidence-based approach to physical activity

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/374914/Framework_13.pdf

Rowland D, DiGiuseppi C, Gross M, Afolabi E, Roberts I. Randomised controlled trial of site specific advice on school travel patterns. *Archives of Disease in Childhood* (2003);88:8-11.

Sustrans, Bike It Case Study – Cinnamon Brow Primary School, (2007)

Transport for London, 2017, Healthy Streets for London <http://content.tfl.gov.uk/healthy-streets-for-london.pdf>

Wen L M, Fry D, Merom D, Rissel C, Dirakis H, Balafas A. Increasing active travel to school: Are we on the right track? A cluster randomised controlled trial from Sydney, Australia. *Preventive Medicine* (2008);47:612-8.

World Health Organization. Global action plan for the prevention and control of non-communicable diseases 2013-2020. WHO, (2013)

Yang, Yong et al. "Examining The Impact Of The Walking School Bus With An Agent-Based Model". *American Journal of Public Health* 104.7 (2014): 1196-1203. Web.