Government
Office for Science

Foresight

Walking in the UK transport system: how and why is it changing?

Future of Mobility: Evidence Review

Foresight, Government Office for Science

Walking in the UK transport system: how and why is it changing?

Professor Miles Tight

University of Birmingham

December 2018

This review has been commissioned as part of the UK government's Foresight Future of Mobility project. The views expressed are those of the author and do not represent those of any government or organisation.

This document is not a statement of government policy

This report has an information cut-off date of June 2018.

Contents

1. What is the current state of walking in the UK?

The National Travel Survey (NTS) for England (2016) provides some basic background figures for walking in England over the period 2012–2016, which are presented below. However, these figures exclude short walks, defined as being under a mile in length. From 2016 onwards, the survey was changed to collect data on walks between 50 yards and one mile. It is not currently possible to adjust the earlier data to permit comparisons with more recent surveys, though guidance from DfT on this issue is expected later this year.

Figure 1.1: (Left) Average number of walking trips per person per year excluding short walks: England, 2002-2016 (NTS0303)

Figure 1.2: (Right) Average walking miles per person per year excluding short walks: England, 2002-2016 (NTS0305)

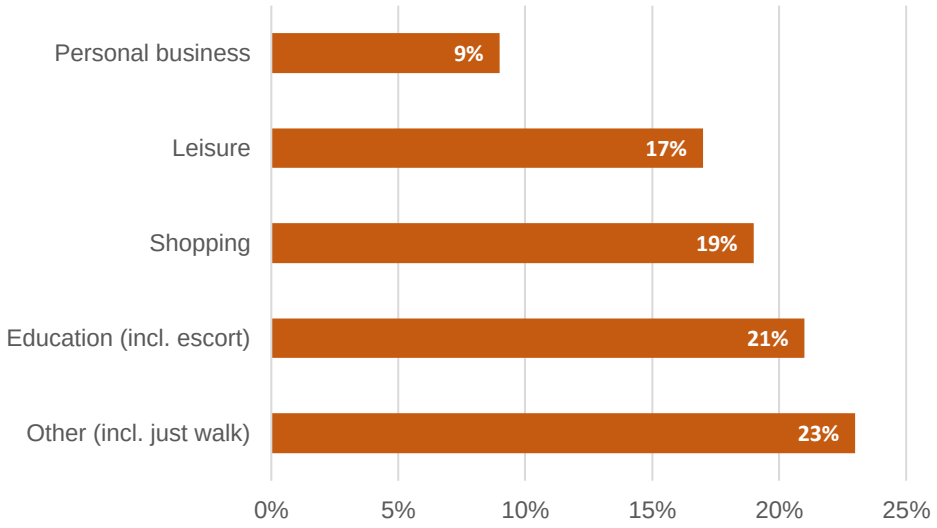
Source: National Travel Survey for England

These show a downward trend in both trips (down 17%) and distance (down 19%) over the period 2002–2016. Figure 1.3 shows the top five purposes of walking and Figure 1.4 the breakdown of walking trips by age and gender.

Walking is also important for its role in linking with other modes, e.g. to and from a bus stop, or train station. So walking is often a critical stage in enabling a longer trip.

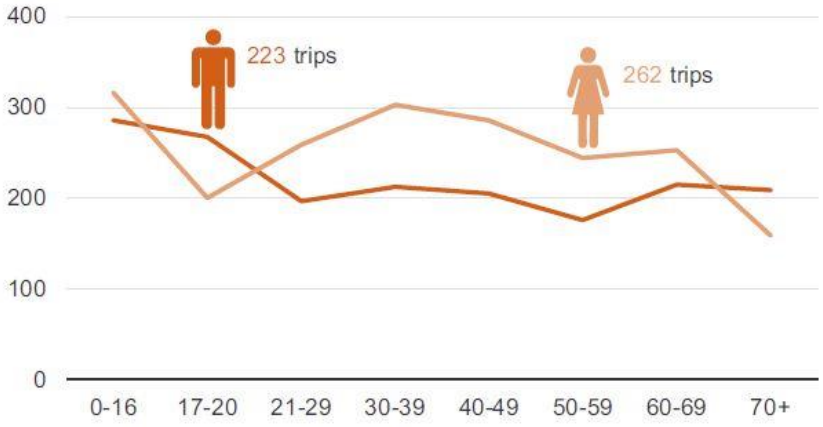
In Figure 1.3, it is interesting that commuting as a reason for walking does not make the top five (only 6.6% of trips). Figure 1.4 shows that among most age groups, women make more walking trips than men.

Figure 1.3: Top 5 purposes, as % of walking trips, England, 2016



Source: National Travel Survey for England (NTS0409)

Figure 1.4: Walking trips by age and gender



Source: National Travel Survey for England (NTS0601)

Figures 1.5 and 1.6 give some indication of the importance of walking in people's lives. The first summarises for the whole population the frequency of making walks of 20 minutes or more; the second offers the same summary disaggregated by age group.

Figure 1.5: Walking frequency (walks of 20 minutes or more): England, 2016

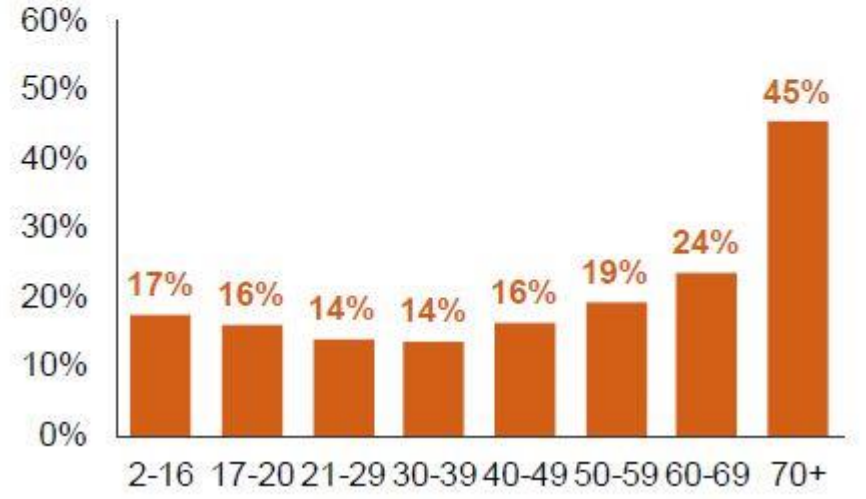


Figure 1.6: People walking for 20 minutes less than once a year or never: England, 2016

Source: National Travel Survey for England

Rather alarmingly these graphs show, especially from a health perspective, that walking for a substantial part of the population is relatively unimportant as a mode of transport. This is more pronounced for the elderly, though roughly one in five of the 50–59 age group walk for 20 minutes less than once a year or never. The link between active travel and health has been studied extensively and is generally accepted (see, for example Ogilvie et al., 2004; Richardson et al., 2005; Hinde and Dixon, 2005). In England figures show an increase in levels of obesity over the period 1993 to 2013 from 13.2% to 26.0% for men and 16.4% to 23.8% for women. The figures also show a rise in levels of child obesity (HSCIC, 2015). UK recommendations on physical activity levels for adults (19–64 years) suggest 150 minutes of moderate physical activity per week and recommend that activities such as cycling or fast walking are ideal ways of achieving this (Bull et al., 2010).

Walking means different things to different people. What is meant when we say we are going to walk can be quite different from one person to another. For many, walking is a leisure activity, something they do in the countryside, on a treadmill at the gym or pushing a trolley around the supermarket. However, it is often forgotten that it is also a transport mode, but an important one all the same and one which perhaps prompted the book by Hillman and Whalley (1979), *Walking is transport*. It is both a mode in its own right and a critical part of transport by other modes – the walk to the bus stop, the walk from the car park to the office, the (increasingly long) walk from the departure lounge to the gate at an airport. The data we have show that walking is an important part of urban travel. If we take England as an example, 2014 figures suggest 22% of trip stages are on foot in urban areas (Department for

Transport, 2015), a figure which surely underestimates the true importance of walking as it excludes stages of less than 50 yards and those off the public highway.

In 2017 the Department for Transport published The *Cycling and Walking Investment Strategy* (Department for Transport, 2017b), described as the biggest change in government policy for walking and cycling in decades due to its statutory nature and requirement for long term funding and a vision to 2040. It sets out government's aims of doubling levels of cycling between 2013 and 2025, and its ambition to "make cycling and walking the natural choices for shorter journeys, or as part of a longer journey". The strategy also provides ambitious targets for increases in these modes, and outlines its plans for investment in walking and cycling infrastructure.

This strategy was partnered by technical guidance in *Local Cycling and Walking Infrastructure Plans* (Department for Transport, 2017c) aimed at local authorities, and providing anew, strategic approach to identifying cycling and walking improvements required in the longer term (10 years) at the local level.

Much of the text in the following sections has been taken from or derived from three reports by the author (Tight, 2016; Tight, 2017; Tight, Raje, Timms, 2016).

2. What information exists about walking?

We know a lot about transport. Surveys are done with great regularity; technology is employed to permanently count traffic on roads; emission rates and the characteristics of vehicles are assessed; and there are international comparative databases of transport activity in different places. Now there is even an index of the world's most bicycle-friendly cities – the Copenhagenize Index 2015.[1]

However, we know rather less about walking (see for example the rather limited national-scale information discussed above) and what we do know is patchy and often collected in inconsistent and incomparable ways. Even a basic and widely acceptable definition of what walking is and what we should measure is difficult to determine.

For example, where should we measure walking? In the context of urban areas, what are the boundaries, how do we treat cross-boundary trips, are we interested in the whole city/urban area, or just a sub-area, or somewhere with particular walking issues? What range of activities should we be interested in – all activities, leisure and tourist activities or just utility trips or perhaps just the journey to work? What about children's play activities, sojourning activities or skate-boarding? Do we include the short walk trips at the ends of longer trips and, if so, how do we delineate these? What about walking in shopping malls (consider the distance one is virtually forced to do around a single IKEA store for example)? What about walking through stations and other 'off-road' public places?

Are we interested in health outcomes? If we are, do we need to consider effort as well as distance? Do we need to understand the mindset and motivations of the walkers? Who should we consider – do we include residents and non-residents in city-wide surveys? When should we collect data and does the data adequately reflect different activity patterns – such as peak hour trips, school travel, evening social and leisure, weather effects, lighting effects.

Finally, what is the best way to collect the data? Should we use person/household/employer-based surveys or location-based surveys? Can some of the data be collected using automated methods? How does this tie in with existing data collection?

Such a range of questions is not easy to address in an adequate and consistent manner. Clearly, at one level, we should seek to know everything, but there will inevitably be practical trade-offs to be made.

[1] An index of the world's most bike-friendly cities. Available at http://copenhagenize.eu/

For example, at a national level in the UK there are two main sources of information about levels of walking – the National Travel Survey (NTS) and the Census.

The NTS is based on travel diaries collected from a large national sample in Britain and has been undertaken annually as far back as 1988, and is supplemented by data from more ad hoc and less regular surveys conducted since the mid-1960s. Recently the survey area has been restricted to England. Its aim is to establish longer-term trends and so is less useful as a means of understanding more immediate changes. While the NTS is an immensely useful source of information on travel, providing good consistency and having some advantages for the study of walking (for example there is some information on trip stages – that is, walking as part of a longer trip), it also has weaknesses. There is probably some degree of under-reporting of short trips, particularly for walking (changes to the data collection process from 2016 have partially sought to address this). There is no information on routes. Perhaps most importantly, it is not possible to break the locational information down much below the national level so it cannot, for instance, be used as a tool for explaining differences between cities.

The UK Census is undertaken nationally every 10 years and involves all households, though the focus of the survey covers all aspects of life, not just transport. From a sample perspective, it far exceeds the NTS, though there are other key limitations. Principally, it does not cover walking in any great detail and the main focus is on travel to work. It is, however, possible to get some idea of more local variations in walking from this source. This is less feasible using the NTS data, due to its limited sampling. However, little information is available on changes which occur in the intervening 10 years between Censuses.

Some urban areas undertake their own diary-based travel surveys as a matter of course. For example, London runs its own household-based travel survey. This provides useful data on the amount of walking done by Londoners. However, since no information is collected on the walking done by those who do not live in the area, it does not provide information on the amount of walking done in London; yet a large number of people commute into the city every day and tourists do a great deal of walking.

Importantly, neither of these sources gives any hint about suppressed demand for walking (people who would like to make walking trips but, for various reasons such as safety fears, do not; or perhaps those who, for the same reasons, adjust their routes to miss certain locations). They only provide a record of some aspects of what actually happens (Luiu et al., 2017) and provide some discussion of unmet travel needs for elderly people.

These sources provide little information about the quality of walking environments, the responses of those who are doing the walking in those environments or their motivations and reasons for walking. There are now some survey techniques developed to record such features, though their use is infrequent and far from consistent. One example is the Welsh Active Travel Design Guidance's Walking Route Audit Tool (WRAT) developed to assist local authorities with auditing walking routes (Department for Transport, 2017c). Additional guidance is available from the

Local Cycling and Walking Infrastructure Plans: Technical Guidance for Local Authorities (Department for Transport, 2017c).

More ad hoc surveys of walking are conducted particularly by highway and city authorities. They often provide a lot of detail, are often based on observation and often linked to potential or ongoing work on aspects of the urban environment. While useful for the specific locations involved, there is rarely any systematic organisation of such surveys or consistency of application across different locations. Again, it is not possible to get a feel from such surveys of how much walking or what type of walking happens in a given city or urban area.

The Active Lives Survey by Sports England provides local authority level data on a range of activity measures which include walking, but walking is not its focus (Sports England, 2017).

To progress, develop and maximise the capabilities of walking as a mode of transport for the future, we need to know much more about it, ideally addressing the issues raised above. In particular, we need the means to understand fully how locations differ and where we can learn from examples of good practice. As a first step, considerable work has gone into developing an International Walking Data Standard (Sauter et al., 2015), thinking through many of the issues raised above and working with cities and practitioners to develop something which is useful, but also practical and achievable. The International Walking Data Standard is now a tool which, if used widely, might provide a starting point for understanding more about the nature, scale and function of walking as a transport mode in our urban environments and how it varies from place to place. The key hurdle now is to persuade cities and other urban areas to use the tool; Transport for London and Hong Kong are now using it and other cities are exploring its use.

3. What influences walking?

In the UK the Sustainable Travel Towns initiative showed it was possible to change walking and cycling behaviour substantially through a combination of measures, including promoting those modes and through provision of personal travel planning in schools and workplaces and to individuals (Sloman et al., 2010). In the three towns involved (Darlington, Peterborough and Worcester) walking trips increased by between 10% and 13%. Cycling trips increased by between 26% and 30%, though this range was perhaps on the high side as one of the towns also received further funding as a Cycling Demonstration Town during the same period.

From the literature, various definitions emerge of the key elements of an integrated policy to significantly change walking and cycling levels in urban areas (see for example Forsyth and Krizek, 2010; Wardman et al., 2007; Boarnet et al., 2011; Rietveld and Daniel, 2004; Pucher et al., 2010). These include changes to land use, provision of dedicated infrastructure, development of supportive public transport systems, managing demand for motorised transport, measures to change attitudes, some consideration of the needs of freight transportation, and the general coherence and consistency of policy affecting all these areas.

Generally there is the sense that appropriate packages of measures, tailored to the circumstances and context of a location, have the potential to be more effective than single measures. Precise specification of a package is not straightforward and needs to be developed to suit the location – co-creation of such packages of measures with local people who know the area is important. Some measures may be essential but not enough on their own to bring about substantive change. For example, it is unlikely that walking will ever take off in the suburbs of low-density US/Australian cities until the issues of density and land use are addressed. However, it may be that such measures alone are not enough to bring about the change required. Other supportive measures might be necessary, such as addressing safety issues.

On land use, much work has looked at the effects of urban density (see for example Udell et al., 2014). Using a meta-analysis, Bartholomew and Ewing (2008) showed that various compact growth scenarios applied to US metropolitan areas could potentially reduce motorised traffic by 17% by 2050. Boarnet et al. (2011) showed that compact areas and smart growth, designed with pedestrians in mind, can significantly increase levels of walking. Newman and Kenworthy (1989) looked at data from cities around the world and showed that urban densities influence use of non-motorised modes of travel, with higher levels in denser cities. Distance from home to the urban centre is often critical given the location of jobs and services in the centre (Southworth, 2005; Larsen et al., 2009; Pont et al., 2009; Winters et al., 2010). Land use mix is also shown to be important with greater variety being associated with higher levels of non-motorised vehicle use (Stead and Marshall, 2001).

Forsyth et al. (2008) suggested that it is possible to design an environment with walking in mind, but that the relationships between walking levels, physical activity and physical design are not straightforward. Retrofitting existing environments is particularly difficult due to the limited scale of change it is possible to make given the largely fixed features of the existing environments. Other studies have also shown

the beneficial effects of walking and cycling infrastructure (Jones and Thoreau, 2007; Hatfield and Murphy, 2007; Jaakkola, 2012; Zhang and Chang, 2014; Spierings, 2013, Wardman et al., 2007). More recently Ogilvie et al. (2016) have undertaken a longitudinal cohort study specifically looking at the effects of a new piece of high-quality local infrastructure, the Cambridgeshire Guided Busway. This included an extensive traffic-free path for cyclists and pedestrians. Results showed that the provision of the infrastructure led to a reduction in car travel and a movement towards greater use of active travel modes for commuting.

Ewing and Cervero (2010) show that proximity of residence to transit stops can encourage walking. Other studies have shown the importance of well-thought-out connections between the walking and transit networks (Curtis, 2005; Porta and Scheurer, 2006). Cahill et al. (1996) show that as transit declines in an area, so does walking and cycling.

A number of studies have looked at the effects of policies which make car use more difficult. There are strong arguments for greater restrictions on car use from a whole range of perspectives – safety (WHO, 2009), environment (Burr et al., 2004; COMEAP, 2010; RCoP, 2016), social exclusion and the development of a more inclusive society (Hine, 2012; Lucas, 2006; Mullen et al., 2014).

Improving attitudes towards walking and cycling could result in increased use of those modes. Generally attitudes towards cycling appear to be rather more polarised than those towards walking. Anable (2005) segmented the population into six groups with different views towards transport, concluding that optimising the potential to change attitudes and behaviours needed to tailor measures to encompass these different views. Similarly, Gatersleben and Appleton (2007) identify the importance of taking account of the full range of different motivations for travel, in particular the mix of distances and the complexity of different trip requirements. Various studies identify the difficulties of breaking habits and persuading people that other transport options are as attractive as car use (Domarchi et al., 2008; Gardner and Abraham, 2007; Hinde and Dixon, 2005). The importance of more wide-scale societal change is identified by a few authors, in particular the idea that a change in transport activity is not necessarily driven only by change in transport, but that other elements of our lives also influence our transport behaviours. Pooley et al. (2013) provide a discussion of some of these elements; they include flexible hours of work to make it easier to fit walking and cycling into household routines, and the provision of appropriate household storage space for walking and cycling-related equipment.

Most research focuses on walking and cycling for private transport, either for leisure or for more functional reasons. The use of walking and cycling as a means of freight transport appears vastly under-researched and the potential is unclear. On a practical level there are now a whole range of companies which offer delivery of various commodities by bicycle and some evidence of businesses which rely on this mode for delivery. There is also a lot of work on design of bicycles for various purposes and, perhaps most tellingly, an annual international cargo bicycle festival (City of Groningen, 2018). The development of walking as a mode of goods delivery is less clear, though some items of ‘freight’ are routinely delivered on foot by, for example, the UK postal service.

The evidence shows that it is possible to put in place packages of measures which can significantly improve both levels of walking and cycling and the quality of the experience. The potential benefits are considerable. The difficulty is in overcoming the many barriers, both real and perceived. Examples from around the world indicate what is possible. The figures cited in the following section summarise the recent situation in a number of countries and show that some cities, such as Münster in Germany in 2013, have been able to achieve a staggering 60.8% of trips by walking and cycling (Bruns, 2014).

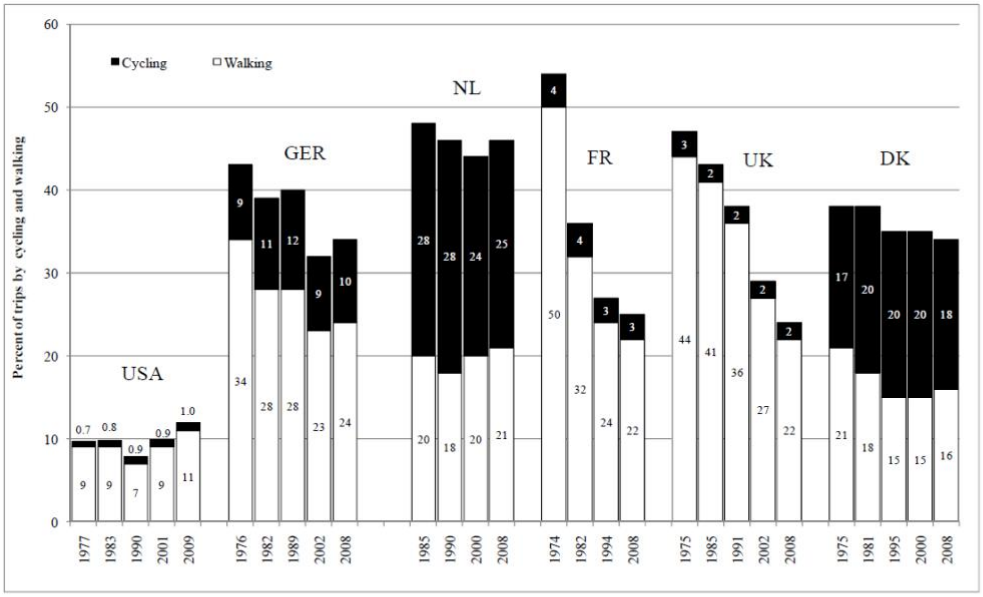
Such examples arguably serve as a benchmark for the future. We need to think carefully about the future of our cities and urban areas and the kinds of transport systems we wish to see. Without the vision and an appropriate dialogue with the various stakeholders involved including, perhaps most importantly, the public, it is unlikely that such visons will be realised. We need to build up an understanding of how such change may be brought about in the least disruptive and most manageable way. This may mean fundamentally changing the existing power relationships between different transport modes; one possibility might be consideration of the rules of presumed liability which differ from country to country, but which in some countries place a greater sense of responsibility on the vehicle which poses the greatest risk. Such visions may also call for provision of a greater proportion of funds for active modes of transport, and consideration of novel ways of financing to encourage change (see for example Saffrey and Rajé, 2014, on cycling infrastructure).

Effects of policies in other areas of transport and in sectors other than transport can have effects on walking that are often difficult to determine in advance and even unpredictable. For example, a move towards autonomous vehicles (AV) could have the effect of turning people away from walking if such vehicles were readily available, were priced right and the ownership models were appropriate. Changes in the economic circumstances of the nation can have the effect of moving people away from motorised modes, as can changes in the availability and capability of IT systems, social networking and mobile phone technologies, all of which could influence the need to travel.

4. Good existing examples

At an international level, figures that make genuine comparisons meaningful are hard to find. This perhaps provides a strong argument for greater standardisation in the collection of this type of data for active travel modes (Sauter et al., 2015). Pucher and Buehler (2010) managed to compare the proportions of walking and cycling trips between six countries (the USA, Germany, Netherlands, France, UK and Denmark) as far as was possible over the period from the mid-1970s to 2008/9 (see Figure 4.1). This showed a range of trips by active travel modes from 46% (Netherlands) to 12% (USA) in the most recent year. Of the six countries, the UK and France were showing significant decline in the proportion of walking and cycling trips over the period, while the others showed a more stable overall position with some positive trends in the most recent years, especially for walking – a clear indication that it is possible to bring about positive changes in the use of these modes if the necessary conditions for change are in place.

Figure 4.1: Trend in combined cycling and walking share of all daily trips in the USA, Germany, the Netherlands, France, the UK and Denmark: 1974–2009



Source: Pucher and Buehler, 2010

Given the potential benefits of walking and cycling to the urban environment and especially to health, it seems reasonable to try to provide for growth in these modes. A big stimulus for change has been the increasing awareness of the relationship between transport and detrimental environmental, social and health effects (Royal College of Physicians, 2016; Urry, 2013a; Urry, 2013b; Geels et al., 2011; Little, 2010). In some cities, there now appears to be a transition towards more sustainable forms of transport with initiatives to promote less dependence on private transport and provide infrastructure which offers viable alternatives.

A selection of cities displaying increased movement away from car travel is shown in Table 4.1. These are chosen to represent the sort of change underway rather than offering a comprehensive compilation of all such urban areas. Note that the figures provided are from different sources derived from a range of survey methods and comparisons should be approached with caution. EU advice is that 'unfortunately there are no reliable single international or European statistical reports showing modal share of bicycle use per country, related to all journeys' (European Parliament, 2010).

The case of Ferrara in northern Italy is of particular interest as it has achieved Dutch levels of cycling in a country where cycling is reported to make up only 4% of the national mode share (European Parliament, 2010), and there has also been a 3% growth in walking in the city.

Seville provides another example of how sustainable transport change may take place. Through promotional activities and infrastructure provision, utilitarian cycling in the city has risen from negligible levels to become an important component of the modal split (Marqués et al., 2014). For many years campaigners fought to have cycle lanes installed in the city (Walker, 2015) but it was only when the political environment was receptive to the idea that infrastructure investment began to take place. In recent years, 75 miles of segregated cycle lanes have been installed and the average number of bikes used daily in the city has risen from just over 6,000 to more than 70,000 (Walker, 2015) – 6% of all trips were made by bike in 2011. Walking has also seen a 6% growth over this period. This growth suggests parallels with the induced traffic effect usually associated with road building: if dedicated, comprehensive and relevant active travel infrastructure is provided and people feel involved in the development of that infrastructure, they will use it.

Turning now to London, Transport for London (TfL, 2015) suggests that the combination of policy and infrastructure investment has resulted in a modal shift from car-based travel. It reports that since 2000,

'London has achieved a net shift in mode share (at the journey stage level) of 11.0 per cent away from private transport, principally the car, towards public transport, walking and cycling – a feat unprecedented in any major city. This shift has been consistent across the years with the net shift from 2008 being 3.3 per cent. This reflects consistent policies to encourage public transport use and enhancements to the public transport networks and to encourage walking and cycling.'

TfL (2015) also reports that cycling levels demonstrated a stronger rate of growth between 2013 and 2014 than they had over recent years, increasing by 10.3% over that period. In addition, 6.4 million 'walk-all-the-way trips' were made on an average day in London in 2014. This is an increase of 9.3% since 2008, which TfL mainly attributes to 'population growth over the period (which was also 9.3 per cent). This gives a walking mode share (for all travel) of 24 %, which is identical to the position in 2008'.

Table 4.1: Mode split for selected cities

City	1st timepoint	2nd timepoint	Change
Ferrara, Italy **Source:** **EPOMM Modal Split Tool City Survey**	2008 Car 56% Public transport 5% Walk 12% Cycle 27%	2013 Car 42% Public transport 14% Walk 15% Cycle 29%	 Car -14% Public transport +9% Walk +3% Cycle +2%
London, UK **Source:** **(2001:EPOMM Modal Split Tool City Survey** **(2014: TfL, 2015)**	2001 Car 41% Public transport 33% Walk 24% Cycle 2%	2014 Car 32% Public transport 45% Walk 21% Cycle 2%	 Car -9% Public transport +12% Walk -3% Cycle 0%
Seville, Spain **Source:** **(2007: EPOMM Modal Split Tool City Survey)** **(2011: Marqués et al., 2014)**	2007 Car 53% Public transport 14% Walk 31% Cycle 2%	2011 Car 35% Public transport 22% Walk 37% Cycle 6%	 Car -18% Public transport +8% Walk +6% Cycle +4%

In Ferrara, Seville and London a range of factors appear to have influenced change. Aspects of cultural, geographic, campaigning, political and infrastructure features have all influenced and enabled sustainable transport change, argue various authors (for instance, Dudley, 2013; Gillett, 2012; May et al., 2011).

Gillett (2012) suggests that policy windows may be relevant to successful introduction of change. Dudley (2013, pp.1139–1140) discusses this idea further with reference to the work of John Kingdon who introduced the concept:

'one of the principal concepts that inextricably links a physical dimension of time to the success and failure of ideas is that of the policy window. Thus, Kingdon argues that, while many ideas float around in a type of policy primeval soup, the ones that last, as in a natural selection model, meet some criteria whereby some ideas survive and prosper, and some proposals are taken more seriously than others [Kingdon 1995: 117] *… Kingdon emphasizes that policy windows open infrequently, and do not stay open for long, but that basically a window opens because of change in the political stream, such as a change in administration or a shift in national mood, or it opens because a new problem captures the attention of government officials.'*

In the case of Seville in particular, such a policy window would appear to have opened and made the introduction of more active travel provision possible. May et al. (2011, p.1429) highlight

'the importance of leadership for policy change and implementation, and addressing the more transformative aspects of intervening in a system. Leadership can draw on a variety of "knowledge cultures", which can all share in collective decision-making and possible actions for the future. These knowledge cultures include those applying at individual, community, specialist, organisational and holistic dimensions.'

5. The Future

The UK Visions 2030 project (Tight et al., 2011; Timms et al., 2014) was unusual in its aim to consider how walking (and cycling) might provide a greater proportion of our urban transport needs than currently in most urban areas. The focus of the project was specifically the UK, but the approach is applicable more widely. It used a visioning approach to try to stimulate thinking about alternative futures where urban transport was much less car-focused and more dependent on walking and cycling. It also explored possible pathways towards such futures; for instance, how might we move from where we are at the present to alternative versions of 2030? The visioning approach seems useful when thinking about the long term because it makes thinking about major change possible in terms of both infrastructure and its provision, and in terms of changes to existing policy direction. It also creates an opportunity for aspirational thinking which sidesteps the short-term barriers that often stifle adequate consideration of new ideas.

The project developed three visions for the year 2030 based on an imaginary UK city, similar in size and form to somewhere like Nottingham (with a population of around 310,000 in 2013).

Vision 1 was a best practice future that assumed UK urban areas would be able to adopt and implement aspects of best practice for walking and cycling by 2030, drawing mainly from the experience of leading European countries. This vision was compelling and relatively easy to justify as there were many examples of places where it existed and worked. Indeed, there are a few urban areas in the UK where many aspects of this vision are already reality, Cambridge perhaps being the best example. The project worked closely with a number of urban areas in the UK to explore how its ideas might be transferred to real places, some of which were starting from low levels of walking and cycling. Interestingly, the findings showed there were plausible pathways to move these urban areas from their low base to Vision 1 in a 20-year period, despite the huge scale of change required.

Vision 2 went further – a utopian vision where public transport, walking and cycling provided for most urban transport needs and which involved a radical change in current practices, way of life and transport consumption patterns. Vision 2 was critically different to Vision 1; at the time of development, it appeared to be beyond the achievement of most urban areas and hence a more aspirational future. Vision 3 was different again, a dystopian future that considered a world where there had been major problems in the period up to 2030 – possibly conflict or environmental issues – which had resulted in shortages of fuel. As a result, in Vision 3 society reacted by redesigning the focus of urban transport with considerably more emphasis on low fuel-dependent transport such as walking and cycling.

Figure 5.1 provides a short background to each of these visions, giving some images of how parts of the urban area look now and how these might change by 2030. The figure also gives approximate mode shares (of personal transport) for each of the Visions along with baseline 2014 figures for urban areas in England. The figures are trip stages, taking some account of walk trips at either end of public transport and other trips (though not walk stages under 50 metres or off the public highway). Each

of the futures assumes that these mode shares become the minimum standard across all urban areas.

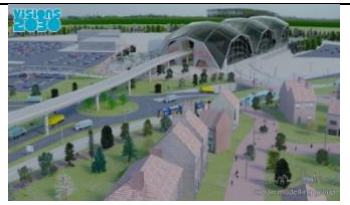
In the context of the Vision project, it is interesting to compare the Mayor of London's Draft Transport Strategy (under consultation at the time of writing) which says 'The Mayor's aim for 2041 is for 80% of all trips in London to be made on foot, by cycle or using public transport' (Mayor of London, 2018).

The future is notoriously difficult to predict. See, for example, Dunn et al. (2014) for an excellent collection of images and descriptions of future cities created between 1900 and 2014 that perhaps say a lot about the attitudes and perceptions of the time when they were put together, rather than providing an accurate sense of the future. Some are clearly aspirational – visions of what might be, or what the authors or the consensus of the time felt the future should be – and others are perhaps a more serious attempt to predict how things might unfold. Interestingly, while many contain depictions of transport in the city, few focus very much on walking. A search of the literature on the future of walking yields relatively little beyond a thought-provoking series of papers edited by Sauter and Alves (2010) and a paper by Muhlrad (2010) focusing more on walking safety. This perhaps reflects the way we view walking, as something which is important to all of us, but not something high in our conscious minds – it is just something we do.

Earlier chapters of this report discussed some key areas which might be expected to influence how walking develops as a mode of transport in the coming years. We do not have access to a crystal ball, but on one level we do have the means to think more about how we would like our cities and urban areas to be and the role walking might play in that. We can also think about the types of conditions that we, as walkers, would like to experience and value; however little we may do it, almost all of us are walkers at some time.

There are compelling arguments for increasing walking levels in urban areas. There are also equally compelling arguments for reducing our dependence on motorised traffic in urban areas; in particular, the wide, extensive and varied impact on health and the environment and threat to future long-term sustainability. Motorised traffic is a major contributor to emissions of greenhouse gases, a major contributor to the huge number of deaths and injuries from road crashes around the world, and is responsible for a vast number of deaths and long-term health problems and the blight of vehicle noise.

Figure 5.1: Future visions of how urban area transformation might change how transport modes share street space by 2030 (overleaf)

	The current situation The current mode split is the UK average for urban areas: 24% walking, 2% cycling, 10% public transport and 64% car.	**Vision 1 – European best practice** The mode split for this vision is 32% walking, 13% cycling, 25% public transport and 30% car.	**Vision 2 – A move away from the motorcar** In this vision the mode split is 37% walking, 23% cycling, 35% public transport and 5% car.	**Vision 3 – A future without fuel** The mode split for this vision is 40% walking, 40% cycling, 15% public transport and 5% car.
An older **Victorian Street** built initially for very different traffic requirements to now and which has adapted slowly to changing circumstance. It is constrained for space by the building line; houses were designed before the need for parking was considered, the streetscape is cluttered and mixed uses are difficult to accommodate. Noise, safety and local air pollution are all issues which impact on travellers and residents. The visions show a decrease in motorised traffic with more room for on-street greenery and social space.				
A **more modern estate** towards the edge of town. Essentially a residential estate, perhaps run down with the range of social problems which can characterise such areas. Space is plentiful and hence, unlike the Victorian street, there is room to construct a more walking and cycling-friendly environment. There is a large primary school on the left hand side of the road and hence some distinctively time-bounded pedestrian issues. In Vision 1 it has distinct but adjacent cycle lanes; in Vision 2 a 'shared-street' layout; and in Vision 3 key stretches are pedestrianised on the same level.				
A **suburban shopping area** containing mid-range shops and a small supermarket. In part a through-route for both traffic and pedestrians, in part a destination in its own right. It is an area which has many problems, like issues for pedestrians, problems of parking and a complicated traffic mix, with public service vehicles and freight deliveries common. In the visions, a less complex mix of traffic improves wayfinding, flow and safety. Minimal car parking allows more space for active travel amenities.				
An **edge of town** location where the urban fabric meets open space. Beyond the city ring road there are now business parks and out of town shopping centres. Traffic on the ring road is heavy and pedestrian and bicycle access between the residential zones of the city and the facilities outside the ring road is difficult – most such access is by car. In Visions 1 and 2 the infrastructure for walking and cycling has been integrated with bus and rail routes, while in Vision 3 the land use has changed in favour of mobility hubs.				
A **suburban rail interchange**, an important link between the outer neighbourhoods of the city and the city centre. Access to and from the station on foot can be difficult due to conflicts with traffic. There are limited facilities at the station for bicycle parking. In Vision 1 it provides cycle and ride facilities; in Vision 2 it functions as a neighbourhood public transport interchange; and in Vision 3 it facilitates use of neighbourhood electric vehicles and other technologically advanced active travel modes.				

Source: Adapted from Current situation – Department for Transport (2015)

If current trends continue across the globe, the problems look set to worsen. The task of addressing these issues in a way which makes a meaningful change towards a more environmentally and socially sustainable future is a huge one. Consider the changes required to meet just the targets many countries have agreed on greenhouse gas emission reduction (see, for example, Department for Energy and Climate Change, 2008; Banister and Hickman, 2013). There is no magic bullet, and many potentially effective measures may not be widely popular and may have consequences for the economy and for lifestyles and behaviour.

Walking has a role to play. It will certainly not, on its own, solve all our problems but it can certainly contribute. It can help make our cities and urban areas more liveable, vibrant and pleasant places, framed around a human scale that helps to promote health and sociability. However, this is an idealised future and without a widespread desire, commitment and effort to promote change it will remain just that.

6. Research gaps

This section is based in part on suggestions arising from a meeting of UK/EU practitioners and academics held in The Hague, 4–5 September 2017, entitled *Making walking attractive*.

Strategy/leadership

The following questions highlight areas of consideration for the strategic direction and leadership of walking in the UK:

- national strategic leadership on walking – what can be learnt from elsewhere, how can it be enhanced in the UK?
- how can pedestrians be encouraged to take greater responsibility for their actions, especially on safety issues?
- how can local authorities be encouraged to promote change and shift a focus that is currently largely on management (outside London)?
- how do we raise the profile of walking (in research arenas and in public perception) to the level of air/rail/car?
- how might we promote good practice elsewhere – for example, encouraging uptake of the London Mayor's 2041 target of 80% walking, cycling, public transport?

As mentioned earlier, the recent DfT Cycling and Walking Investment Strategy provides a national steer on these issues, and if taken forward, will have a positive impact. Similarly the DfT report *Investing in Cycling & Walking: Rapid Evidence Assessment* (Brook Lyndhurst, 2016), whilst not completely resolving the research gaps highlighted, gives some insights into how these problems can be tackled.

Links to other modes

A more useful focus on public transport, such as promoting the use of bus journeys to increase walkability would involve public transport operators and other stakeholders in thinking beyond the bus/train trip: How do people access and leave stops? How far are people prepared to walk to catch a bus? Is thinking about what happens within 500 m of stops appropriate? Can we change this in the long term to create a fitter society, made up of people more willing to walk further?

Patterns of walking

The following list identifies current data needs:

- a knowledge bank on walking
- neighbourhood indicators of the health of walking – children playing in the street, using roads on their own; and can these indicators be used to understand reasons for differences in quality of walking environments? Should we be measuring smiles/happiness?
- potential impacts of AV on land use and distribution of activities
- safety data; for instance, patterns of where older people fall on pavements
- how changes in the environment affect the walking behaviour of distinct social and demographic groups
- data that disaggregates walking as a mode of transport from its leisure and social aspects and asks whether promotion of one necessarily leads to improvements in the others

Other gaps

Other gaps in the research have been identified:

- effects of mode shift on air quality/health
- social/cultural aspects of walking: can we understand the role of walking in people's lives and is there a culture of walking in the UK we can build upon?
- gentrification risks: if we significantly improve areas for walking, is there evidence that those areas change, become more desirable/attractive, increase costs of housing, force long-term residents in poorer areas to move out? Are there unforeseen equity issues in promoting walking

Various other research gaps are also embedded in the more detailed text above.

7. References

Anable, J. (2005). 'Complacent car addicts' or 'aspiring environmentalists'? Identifying travel behaviour segments using attitude theory. *Transport Policy*, 12, 65–78.

Avineri, E. and Goodwin, P. (2010). *Individual behaviour change: Evidence in transport and public health.* London: The Department for Transport.

Banister, D. and Hickman, R. (2013). Transport futures: Thinking the unthinkable. *Transport Policy*, 29, 283–293.

Bartholomew, K. and Ewing, R. (2008). Land use–transportation scenarios and future vehicle travel and land consumption: A meta-analysis. *Journal of the American Planning Association* 75(1), 13–27.

Boarnet, M.G., Joh, K., Siembab, W., Fulton, W. and Nguyen, M.T. (2011). Retrofitting the suburbs to increase walking: Evidence from a land-use-travel study. *Urban Studies*, 48(1), 129–159.

Brook Lyndhurst (2016). *Investing in Cycling & Walking: Rapid Evidence Assessment*, report for the Department for Transport. Available at: https://www.gov.uk/government/publications/the-effectiveness-and-benefits-of-measures-to-increase-walking-and-cycling-rapid-evidence-assessment

Bruns, H. (2014). *Side by side: Promoting walking and cycling in the city of Münster*. Paper presented at the Walk21 Conference, Sydney, October 2014.

Bull, F.C. and the Expert Working Groups (2010). *Physical activity guidelines in the UK: Review and recommendations*. School of Sport, Exercise and Health Sciences, Loughborough University, May 2010.

Burr, M., Karani, G., Davies, B., Holmes, B. and Williams, K. (2004). Effects on respiratory health of a reduction in air pollution from vehicle exhaust emissions. *Occupational and Environmental Medicine*, 61, 212–218.

Cahill, M., Ruben, T. and Winn, S. (1996). Children and transport: travel patterns, attitudes and leisure activities of children in the Brighton area. Brighton: University of Brighton, Health and Social Policy Research Centre.

City of Groningen. (2018). *International Cargo Bike Festival*. Available at: http://www.cargobikefestival.com/).

Committee on the Medical Effects of Air Pollutants (COMEAP) (2010). *The mortality effects of long-term exposure to particulate air pollution in the United Kingdom*. London: COMEAP.

Curtis, C. (2005). The windscreen world of land use transport integration: experiences from Perth, WA, a dispersed city. *Town Planning Review*, 76, 423–454.

Department for Energy and Climate Change (2008). *The Climate Change Act (2008*). Available at: http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf.

Department for Transport (2014). *Transport statistics Great Britain 2014*. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/389592/tsgb-2014.pdf.

Department for Transport (2015). *National travel survey – England 2014*. London: Department for Transport.

Department for Transport (2017a) *National travel survey – England 2016*. London: Department for Transport.

Department for Transport (2017b). *Cycling and walking investment strategy* 2017. London, Department for Transport.

Department for Transport (2017c). *Local cycling and walking infrastructure plans, technical guidance for local authorities*. London: Department for Transport.

Dudley, G. (2013). Why do ideas succeed and fail over time? The role of narratives in policy windows and the case of the London congestion charge. *Journal of European Public Policy*, 20(8), 1139–1156.

Dunn, N., Cureton, P. and Pollastri, S. (2014). *A visual history of the future: Future of cities* working paper. London: Foresight, Government Office for Science.

European Platform on Mobility Management (2016). EPOMM Modal Split Tool. Available at: http://www.epomm.eu/tems/http://www.epomm.eu/tems/

European Parliament (2010). *The Promotion of Cycling* (IP/B/TRAN/FWC/2006-156/lot7/C1/SC6). Brussels: European Parliament.

Ewing, R. and Cervero, R. (2010). Travel and the built environment. *Journal of the American Planning Association*, 76(3), 265–294.

Forsyth, A. and Krizek, K. (2010). Promoting walking and bicycling: assessing the evidence to assist planners. *Built Environment*, 36(4), 429–446.

Forsyth, A., Hearst, M., Oakes, J.M. and Schmitz, K.H. (2008). Design and destinations: Factors influencing walking and total physical activity. *Urban Studies*, 45(9) 1973–1996.

Gatersleben, B. and Appleton, K.M. (2007). Contemplating cycling to work; attitudes and perceptions in different stages of change. *Transportation Research Part A*, 41, 302–312.

Geels, F., Kemp, R., Dudley, D., and Lyons, G. (eds) (2011*). Automobility in transition? A socio-technical analysis of sustainable transport*. London: Routledge.

Gillett, D. (2012). *Sustainable urban transport paradigms – politics and policy*. Internal Step-Change Report. Leeds: Institute for Transport Studies, University of Leeds.

Goodman, A., Panter, J., Sharp, S.J. and Ogilvie, D. (2013). Effectiveness and equity impacts of town-wide cycling initiatives in England: A longitudinal, controlled natural experimental study. *Social Science and Medicine*, 97, 228–37.

Hatfield, J. and Murphy, S. (2007). The effects of mobile phone use on pedestrian crossing behaviour at signalised and unsignalised intersections. *Accident analysis & prevention*, 39, 197–205.

Health and Social Care Information Centre (HSCIC) (2015). *Statistics on obesity, physical activity and diet*: England 2015. London: NHS Digital.

Hillman, M. and Whalley, A. (1979). *Walking is transport*. London: Policy Studies Institute.

Hinde, S. and Dixon, J. (2005). Changing the obesogenic environment: insights from a cultural economy of car reliance. *Transportation Research Part D, Transport and Environment* 10(1), 31–53.

Hine, J. (2012). 'Mobility and transport disadvantage' in Grieco, M. And Urry, J. (eds.) *Mobilities: New perspectives on transport and society*. Farnham: Ashgate, 21–40.

IPCC (2014). *Climate change 2014 synthesis report summary for policymakers*. Intergovernmental Panel on Climate Change. Available at: http://www.ipcc.ch/

Jaakkola, M. (2012). 'Helsinki, Finland: Greenness and urban form'. In Beatley, T. (ed.), *Green cities of Europe: Global lessons in green urbanism*. Washington DC: Island Press, 109–128.

Jacobsen, P.L. (2003). Safety in numbers: more walkers and bicyclists, safer walking and bicycling. *Injury Prevention*, 9, 205–209.

Jones, P. and Thoreau, R. (2007). *Involving the public in redesigning urban street layouts in the UK*. Presentation at 3rd Urban Street Symposium, June 24–27, Seattle, Washington.

Larsen, K., Gilliland, J., Hess, P., Tucker, P., Irwin, J. and He, M. (2009). The influence of the physical environment and sociodemographic characteristics on children's mode of travel to and from school. *American Journal of Public Health*, 99(3), 520–526.

Luiu, C., Tight, M.R. and Burrow, M. (2017). The unmet travel needs of the older population: a review of the literature. *Transport Reviews*, 37(4), 488–506.

Lucas, K. (2006). Providing transport for social inclusion within a framework of environmental justice in the UK. *Transportation Research A*, 40, 801–809.

Kingdon, J.W. (1995). *Agendas, alternatives and public policies*. 2nd edition. New York: HarperCollins.

Marqués, R, Hernández-Herrador, V. and Calvo-Salazar, M. (2014). Sevilla: a successful experience of bicycle promotion in a Mediterranean context. *The Sustainable City IX*, 191, 769–781.

May, M., Tranter, P. and Warn, J. (2011). Progressing road safety through deep change and transformational leadership. *Journal of Transport Geography*, 19(6), 1423–1430.

Mayor of London (2018). *Mayor's transport strategy 2018*. London: Greater London Authority.

Muhlrad, N. (2010). 'The past and the future of pedestrian comfort and safety in Europe'. In Joao Ramos, M., and Alves, M. (eds), *The walker and the city*. Lisbon: Associacao de Cidadoas Auto-Mobilizados, 73–79.

Mullen, C., Tight, M., Whiteing, A. and Jopson, A. (2014). Knowing their place on the roads: What would equality mean for walking and cycling*? Transportation Research Part A*, 61, 238–248.

Newman, P. and Kenworthy, J. (1989). *Cities and automobile dependence: an international sourcebook*. Brookfield, VT: Gower.

Ogilvie, D., Egan, M., Hamilton, V. and Petticrew, M. (2004). Promoting walking and cycling as an alternative to using cars: systematic review. *British Medical Journal*, 329(7469), 763.

Ogilvie, D., Panter, J., Guell, C., Jones, A., Mackett, R. and Griffin, S. (2016). Health impacts of the Cambridgeshire Guided Busway: a natural experimental study. *Public Health Research*, 4(1).

Pont, K., Ziviani, J., Wadley, D., Bennett, S. and Abbott, R. (2009) Environmental correlates of children's active transportation: A systematic literature review. *Health & Place*, 15, 849–862.

Pooley, C., Horton, D., Scheldeman, G. and Harrison, R. (2010). Shaping the city for walking and cycling: A case study of Lancaster. *Built Environment*, 36(4), 447–460.

Pooley, C., Jones, T., Tight, M., Horton, D., Scheldeman, G., Mullen, C., Jopson, A. and Strano, E. (2013). Promoting walking and cycling: *New perspectives on sustainable travel*. Bristol: Policy Press.

Porta, S. and Scheurer, J. (2006). '*Centrality and connectivity in public transport networks and their significance for transport sustainability in cities'*. Presented at World Planning Schools Congress, 13–16 July 2006, Mexico City.

Psarikidou, K. and Urry, J. (2014). *Innovating mobility systems for low-carbon cities*. Working paper 1. Liveable Cities Research Challenge II. Lancaster: Centre for Mobilities Research.

Pucher, J. and Buehler, R. (2010). Walking and cycling for healthy cities. *Built Environment*, 36(4), 391–414.

Raje, F. and Saffrey, A. (2015). *The value of cycling*. Birmingham, UK: Phil Jones Associates/DfT/University of Birmingham.

Richardson, C., Faulkner, G., McDevitt, J., Skrinar, G., Hutchinson, D. and Piette, J. (2005). Integrating physical activity into mental health services for persons with serious mental illness. *Psychiatric Services*, 56(3), 324–331.

Rietveld, P. and Daniel, V. (2004). Determinants of bicycle use: do municipal policies matter? *Transportation Research Part A*, 38, 531–550.

Risser, R. (2010). Pedestrians are second class road users. In Joao Ramos, M. and Alves, M. (eds), *The walker and the city*, 73–97. Lisbon: Associacao de Cidadoas Auto-Mobilizados.

Royal College of Physicians (RCP) (2016*). Every breath we take: the lifelong impact of air pollution*. Report of a working party. London: RCP.

Sauter, D. and Alves, M.J. (2010). The future of walking. COST 358 *Pedestrians' Quality Needs*, final report, Part C (Executive Summary), chapter 5. Available at: https://fussverkehr.ch/wordpress/wp-content/uploads/2016/08/PQN-Final-Report-short.pdf

Sauter, D., Pharoah, T., Tight, M., Martinson, R. and Wedderburn, M. (2015). *International walking data standard: Treatment of walking in travel surveys towards internationally standardized monitoring methods of walking and public space*. Presented at the Walk21 Conference, Vienna, 20–23 October.

Sloman, L., Cairns, S., Newson, C., Anable, J., Pridmore A. and Goodwin, P. (2010). *The effects of smarter choice programmes in the sustainable travel towns*. London: Department for Transport.

Southworth, M. (2005). Designing the walkable city. *Journal of urban planning and development* 131, 246–257.

Spierings, B. (2013). Fixing missing links in shopping routes: Reflections on intra-urban borders and city centre redevelopment in Nijmegen, The Netherlands. *Cities*, 34, 44–51.

Sport England (2018). *Active lives adult survey*, November 16/17. Available at: https://www.sportengland.org/media/13217/v-mass-markets-digital-content-editorial-team-active-lives-march-2018-active-lives-adult-survey-nov-16-17-final.pdf

Stead, D. and Marshall, S. (2001). The relationships between urban form and travel patterns. An international review and evaluation. *European Journal of Transport and Infrastructure Research*, 1, 113–141.

Tight, M.R., Bristow, A.L., Pridmore, A. and May, A.D. (2005). What is a sustainable level of CO2 emissions from transport activity in the UK in 2050? *Transport Policy*, 12(3), 235–244.

Tight, M. and Rajé, F. (2014). *Walking and cycling – how can we deliver the infrastructure to support Dutch style growth?* iBUILD Working Paper 11. Available at: https://research.ncl.ac.uk/media/sites/researchwebsites/ibuild/WP11.pdf

Tight, M., Timms, P., Banister, D., Bowmaker, J., Copas, J., Day, A., Drinkwater, D., Givoni, M., Gühnemann, A., Lawler, M., Macmillen, J., Miles, A., Moore, N., Newton, R., Ngoduy, D., Ormerod, M., O'Sullivan, M., Watling D. (2011). Visions for a walking and cycling focussed urban transport system. *Journal of Transport Geography*, 19, 1580–1589.

Tight, M., Timms, P. and Watling, D. (2012). *The role of visioning techniques to create sustainable urban transport futures*. Presented at 1st International Conference on Urban Sustainability and Resilience, London, 5–6 November.

Tight, M.R. (2017) The future of walking? In: Mulley, C., Klaus Gebel and Ding Ding (Eds) *Transport and Sustainability Volume 9: Walking*, Chapter 19, pp 387-389. Emerald books, London (published July 2017).

Tight, M.R., Raje, F. and Timms, P. (2016) Car-free urban areas: A radical solution to the last mile problem or a step too far? *Built Environment*, Vol 42 (4), pp603-616. DOI: 10.2148/benv.42.4.603.

Tight, M.R. (2016) Sustainable Urban Transport – the role of walking and cycling. *Engineering Sustainability*. Vol 169(3), pp 87-91. 10.1680/jensu.15.00065.

Timms, P., Tight, M. and Watling, D. (2014). Imagineering mobility: Constructing utopias for future urban transport. *Environment and Planning A*, 46(1), 78–93.

Transport for London (2015). *Travel in London*. Report 8. London: Transport for London.

Udell, T., Daley, M., Johnson, B. and Tolley, R. (2014). *Does density matter? The role of density in creating walkable neighbourhoods*. Melbourne: National Heart Foundation of Australia.

UITP (2015). *Mobility in Cities Database: Synthesis report*. Brussels: UITP.

Urry, J. (2013a). A low carbon economy and society, *Philosophical Transactions of the Royal Society A* 371(1986).

Urry, J. (2013b). *Societies beyond oil*. London: Zed.

Walker, P. (2015). *How Seville transformed itself into the cycling capital of southern Europe*. London: The Guardian, 28 January 2015.

Wardman, M., Tight, M.R. and Page, M. (2007). Factors influencing the propensity to cycle to work. *Transportation Research A*, 41(2007), 339–350.

Winters, M., Brauer, M., Setton, E.M. and Teschke, K. (2010). Built environment influences on healthy transportation choices: bicycling versus driving. *Journal of Urban Health*, 87, 969–993.

World Health Organization (WHO) (2009). *Global status report on road safety – Time for action*. Geneva: WHO.

Zhang, X. and Chang, G.-L. (2014). A dynamic evacuation model for pedestrian–vehicle mixed-flow networks. *Transportation Research Part C: Emerging technologies*, 40, 75–92.

This publication is available from www.gov.uk/go-science

Contact us if you have any enquiries about this publication, including requests for alternative formats, at:

Government Office for Science
1 Victoria Street
London SW1H 0ET
Tel: 020 7215 5000
Email: contact@go-science.gov.uk