

An analysis of urban transport

November 2009

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Transport is vital to the economic life of cities and the quality of life of those who live and work within them. Improvements to mobility increase access to employment, education, and recreation facilities whilst giving employers access to larger labour markets and more customers. However, city transport also results in a number of unintended negative effects; congestion—demand for road space exceeding supply—has traditionally been the prime focus for transport professionals.

But whilst the economic consequences of congestion are well documented (currently around £11bn per annum in urban areas), this report suggests that the costs to society of poor air quality, ill health, and road accidents in urban areas are each similar to congestion, exceeding £40bn. Transport also contributes to negative experiences of urban streets and public spaces which whilst so far unquantifiable, are of major concern to those who live and work in cities.

The challenge for decision makers at all levels is therefore to find ways of tackling congestion, poor air quality, ill-health, road safety, carbon emissions and unpleasant urban space simultaneously. This report aims to provide an evidence base for such policy decisions—it is not itself a statement of policy. Recognising the scale of this challenge, a detailed examination of the effectiveness of current policy is presented alongside some interpretation of what this might mean for future decisions.

Evidence suggests a growing need for a shared long-term vision for urban transport by all decision makers which rebalances its competing demands. Such a potential vision could be cities that:

- while the car will remain a central part of transport policy, greater mobility could be enabled by promoting a wider choice of journey;
- aim to reduce congestion and increase reliability, whilst promoting greater levels of walking and cycling; and
- assist streets and public spaces to become more enjoyable places to be, where exposure to harmful emissions is reduced, and quality of life is transformed

Otherwise, growing levels of traffic, primarily by car, will continue to worsen congestion. Greater levels of traffic will also create more spaces people find disagreeable and further discourage walking and cycling. Traffic can be dangerous and contribute to reduced life expectancy through toxic emissions and causes noise disturbance. Vehicles also emit a substantial quantity of the UK's carbon emissions and in some places have created inequalities in access to transport. It is likely, therefore, that part of any future urban transport policy will offer credible alternatives to the car. Two areas in particular show evidence of a potential to do so: cycling and walking, and buses.



Cycling and walking are excellent ways to become and stay healthy, and prevent a range of diseases. However, more than half of all trips less than five miles are taken by car. Many European cities have shown that policy can successfully encourage active travel, for example a quarter of all trips in the Netherlands are by bike compared to 1.5% in Britain; walking levels are also markedly higher.

Evidence suggests that interventions to alter behaviour should focus on both “hard” infrastructure and “soft” drivers of attitudes, be sustained, and targeted at particular groups. Travel planning (whether home, school or work based) and private and public sector employers could become an important part of this approach, particularly in facilitating an increase in cycling.



Another way to achieve the same result is to enhance the provision of alternatives for short car trips. Providing realistic and enhanced alternatives is crucial, as is increasing people's awareness of both the alternatives to the car and their benefits.

Buses are a cost-effective way to increase city transport capacity. Modern, reliable services can offer a credible alternative to the car, helping to reduce congestion. Improving the bus system can also reduce emissions and enhance accessibility to public services for the most excluded.

There is rarely a simple trade off between demands by vehicles and other users leading to roads and streets in urban areas often having competing functions between "movement" and "place". Improvements are likely from measures that more clearly establish the functions of the local network and consider whether conflicts between different functions could be reduced.

As well as better managing the road network, it will be important to improve the design quality of residential and retail streets. In particular it is often the case that pedestrianisation can lead to local economic benefits. Street design more generally can also be improved: best practice is far from widespread.

There will always be a role for the car, indeed they are likely to remain the predominant mode of transport in urban areas, especially for journeys not into the centre. That means more will still need to be done to tackle congestion by affecting either the demand or supply of road space. Central London and other cities internationally such as Stockholm, have shown the role that congestion charging can play as part of a comprehensive strategy. On the other hand, the Transport Innovation Fund referendum in Manchester showed a clear majority there against paying for road use in return for lower congestion. For cities with high levels of congestion that want to support sustainable economic growth without road pricing, it is essential other policies are put in place to effectively manage traffic.

That means first understanding the unique patterns and causes of congestion in different places. Once understood, cities could consider a range of proven responses such as city-region-wide traffic management (so that traffic lights are well co-ordinated and timings

optimised in real-time), the use of "red routes", smarter parking policies, better management of roadworks and streetworks, 20mph zones in residential areas, and comprehensive approaches for managing freight delivery and light vans.

Better aligning spatial planning with transport has the potential to significantly affect the demand for, and patterns of, travel over the longer term. Evidence suggests a number of potential ways to improve the current system. These range from raising the profile of transport in the planning system to undertaking strategic transport plan-making alongside housing and economic development. Over time, greater integration of these functions could lead to more sustainable land-use patterns that promote walking, cycling and public transport.



Current—and any additional—policy is being compromised by shortcomings in its implementation, especially in city-regions where the costs and opportunities from transport are greatest. Part of the challenge for our largest cities outside London is that different bodies are responsible for public transport, spatial planning, and the road network. As the 2006 local government white paper set out, it is for local leaders to shape their cities, support their businesses, and make things better for their residents. But there are concerns that the mechanisms Government has established (such as those in the Local Transport Act 2008 and the forthcoming Local Democracy Economic Development and Construction Bill) may not be used to their full potential by local authorities.

Many local authorities lack an overarching vision for an integrated urban transport system. This is particularly evident for walking and cycling, buses and traffic management. The current approach is often characterised by uncoordinated programmes and agencies working in isolation.

Evidence suggests that local authorities can sometimes focus too much on large capital projects instead of cheaper revenue interventions and not exploit opportunities to package smaller measures together into broader coherent

programmes when bidding for funding. In some places this has helped frustrate attempts at innovative transport policy.

There are several areas where skill levels are inconsistent across authorities and where better use of guidance and training could help. Most notable is traffic engineering and modelling, and the capacity to manage and procure bus services.

While improvements have been made to transport appraisal, there is further scope to better capture the benefits of walking and cycling, so that transport authorities make more rounded decisions on future transport investment.

This report shows that transport is vital to the success of urban areas, but that currently it causes considerable harm. New policy will need to consider the broad finding that congestion is not the only, or most important transport cost in urban areas. Evidence suggests many of the harms from urban transport will continue to grow unless action is taken. Consequently a choice will have to be faced between continuing to allow car growth to continue increasing congestion and further reducing the attractiveness of alternatives; or making public transport, cycling and walking more accessible so they are more frequently chosen.



Comments are welcome and should be sent to:

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This is a joint publication with Department for Transport, Department for Health, Department for Communities and Local Government and the Department for Environment and Rural Affairs.

1. Purpose

2. How and why we travel

3. Transport's impact on urban success

Economy

Health

Space

4. Policy effectiveness

Roads and streets

Modal shift

Spatial planning

5. Implementation

Governance

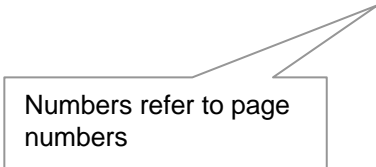
Leadership

Skills and capability

Appraisal and packaging

6. Conclusions and next steps

7. The aim of this document is to better understand how transport affects the success of urban areas, the effectiveness of current policy approaches and what this implies for future policy
8. It builds on and complements previous government publications
9. And it supports DfT's policy goals



Numbers refer to page numbers

The aim of this document is to better understand how transport affects the success of urban areas, the effectiveness of current policy approaches and what this implies for future policy

It is timely to ask this question:

- Despite recent falls in congestion, it is still at a level which is costly and is likely to rise again into the future
- Many cities and authorities are undertaking innovative approaches to improve urban transport, especially in active travel but there is scope to extend this further
- Manchester voted against a road pricing proposal in November 2008 making it less likely other cities would follow
- The Local Transport Act 2008 has introduced a range of new powers and opportunities for authorities but more could be done to encourage widespread take-up

This report is organised into six chapters:

Purpose

Page 6

How and why we travel?

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Transport's impact on urban success

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Policy effectiveness

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Implementation

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Conclusions

Page 131

The analysis in this document was guided by the following questions:

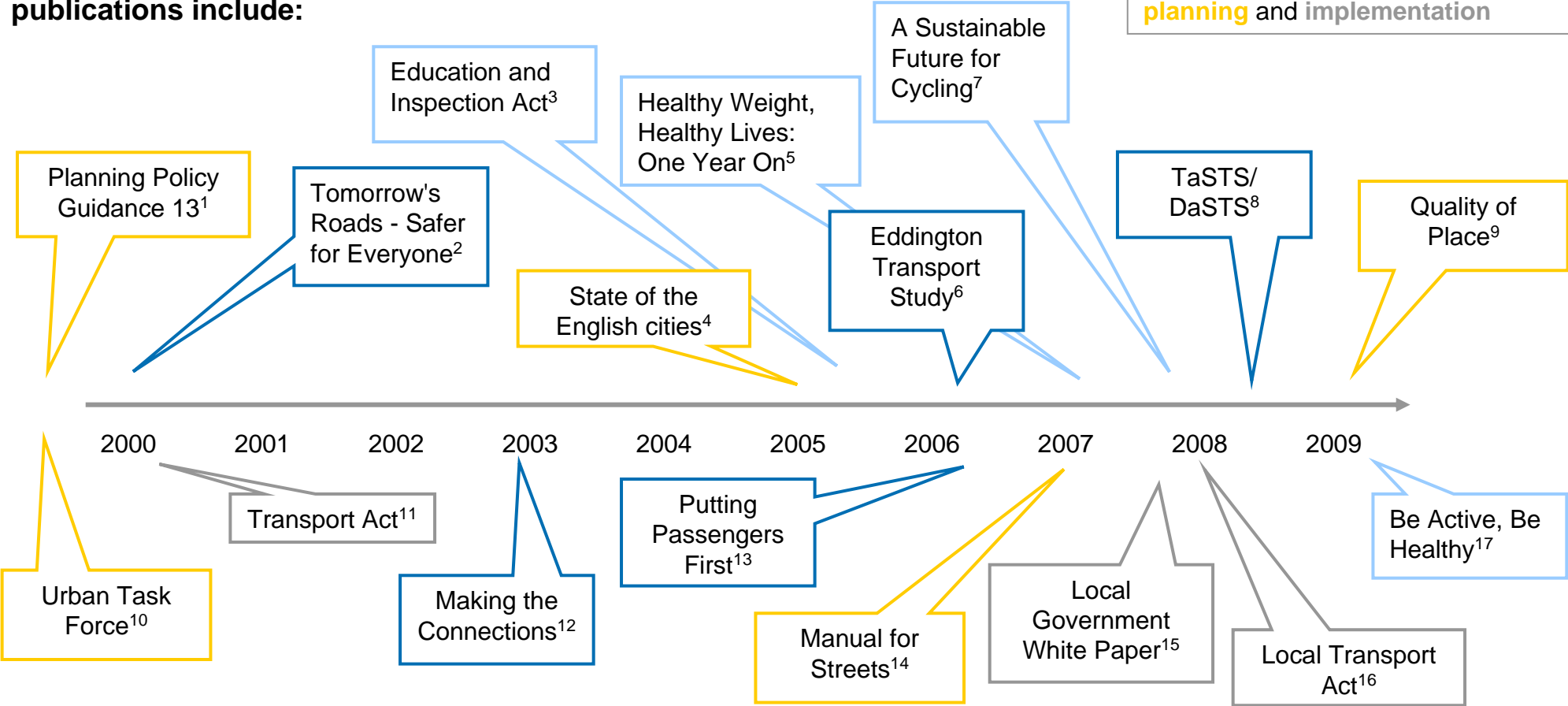
- What do we mean by urban success and how is this affected by transport?
- What approach is currently taken to use transport to improve urban areas in the UK and overseas?
- How successful have these been?
- What implications might these have for future policymaking?

This document does not contain any policy recommendations, but potential implications for policy are given throughout in yellow boxes like this

It builds on and complements previous government publications

There has been no recent focus on using transport to affect urban success holistically. Relevant policy publications include:

Selection of policy documents covering **transport**, **health**, **spatial planning** and implementation



(1,4,9,14,15) DCLG/ODPM (2,6,7,8,11,13,14,16) DfT (3) DCSF (4) ODPM (5,17) DH (9) Strategy Unit, Cabinet Office (10) Urban Task Force (12) Social Exclusion Unit, Cabinet Office

In November 2008 DfT published **Delivering a Sustainable Transport System (DaSTS)** setting out the five broad goals of the department¹

1. Support national economic competitiveness and growth by delivering reliable and efficient transport networks



This project focuses on three:

Urban areas are a major contributor to growth

2. Reduce transport's emissions of carbon dioxide and other greenhouse gases with the desired outcome of tackling climate change



Whilst incredibly important, carbon reduction is not a major focus of this project given other work ongoing in this area*

3. Contribute to better safety, security and health and longer life-expectancy by reducing the risk of death, injury and illness arising from transport and by promoting travel modes that are beneficial to health



Core part of the project, focused on urban areas

4. Promote greater equality of opportunity for all citizens with the desired outcome of achieving a fairer society



Not a direct focus of the project but distributional effects are considered throughout

5. Improve quality of life for transport users and non-transport users, and to promote a healthy natural environment



Quality of life and local emissions are in scope

(1) Delivering a Sustainable Transport System: Planning for 2014 and beyond, DfT, 2008 (*) For example DfT recently published Low Carbon Transport: A Greener Future <http://www.dft.gov.uk/pgr/sustainable/carbonreduction/>

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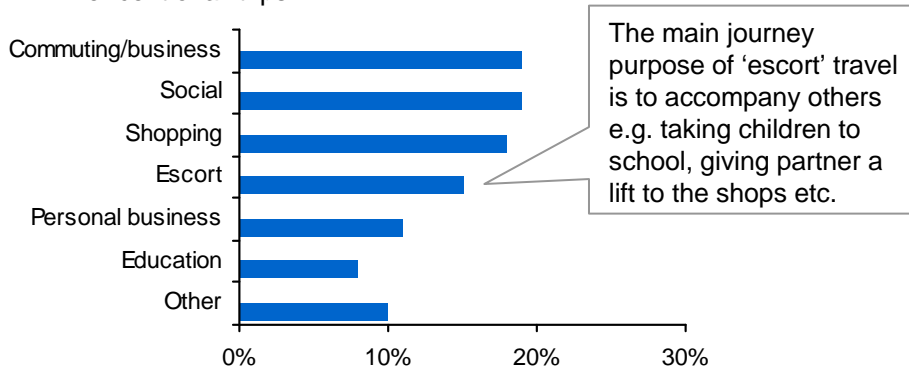
6. Conclusions and next steps

11. Travel occurs to allow people to undertake other activities, with travel demand closely aligned to the working and school day. Increases in journey speeds have allowed people to travel further
12. Public attitudes about the importance of transport are mixed although both citizens and the business community appear to attach high priority to improvements
13. Whilst large urban areas have the lowest car use in the UK this does not compare well with many European cities. Many car journeys are short and could be taken using other modes
14. Trip distance is a primary determinant of non-motorised travel, however the proportion of very short trips has declined
15. Walking and cycling have been in long-term decline as car use has grown
16. Bus use has grown in London and some provincial cities but declined elsewhere
17. Bus use accounts for the majority of public transport trips
18. Car use has continued to become cheaper and more available relative to buses
19. Higher density and larger settlements are associated with lower distances travelled and a greater use of public transport

Travel occurs to allow people to undertake other activities, with travel demand closely aligned to the working and school day. Increases in journey speeds have allowed people to travel further

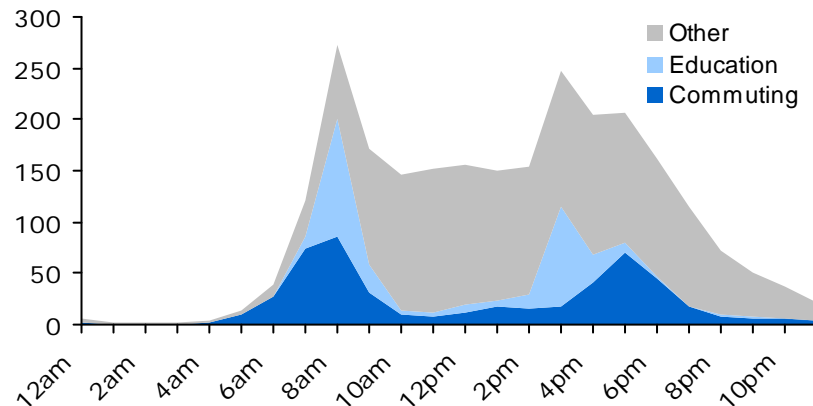
Most travel takes place in order to undertake other activities (a “derived demand”)¹

Per cent of all trips



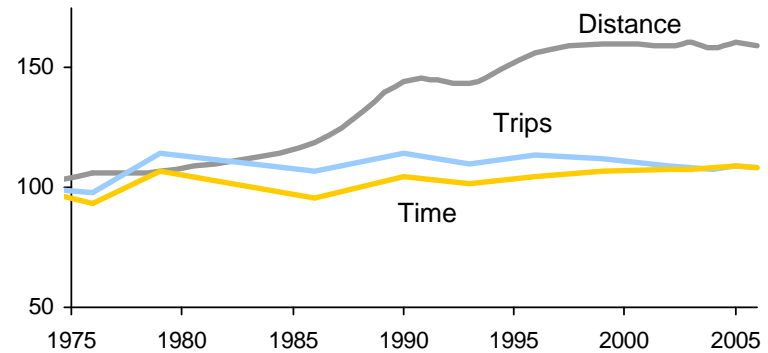
Transport is predominately a derived demand which concentrates around two peaks in the day

Personal travel by time of day and trip purpose (average hour = 100)¹



Improvements in transport have allowed people to make longer trips without increasing time spent travelling

Trips/distance travelled/time spent travelling per person per year (1972/73 = 100)¹



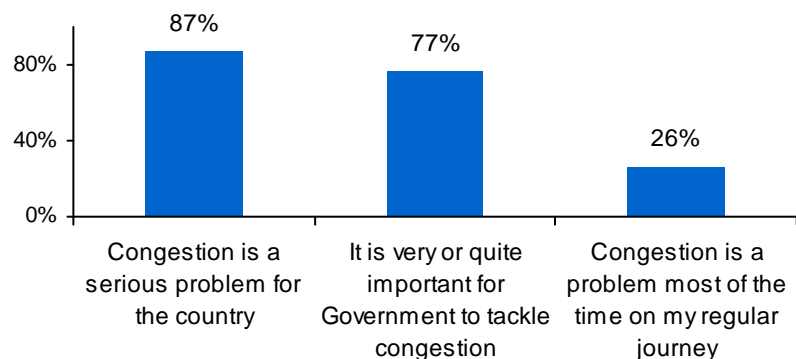
- Average trip lengths rose by 29% between 1985/86 and 1999/2001¹
- During this period average journey times increased only marginally (from 20 to 21 minutes) indicating that average journey speeds have increased:
 - over the same time car ownership increased from 16.4 million to 23.9 million (a 45% increase)²
- The conventional view is that people have used transport improvements to access better services and jobs. Some transport professionals³ argue that these results show that people have a “constant travel budget” and that faster speeds may lead to longer journeys without necessarily improving access

(1) National Travel Survey DfT (2002-2006); (2) Vehicle Statistics, DfT (2008); (3) see Metz (2008) The Limits to Travel <http://www.limitstotravel.org.uk/>

Public attitudes about the importance of transport are mixed although both citizens and the business community appear to attach high priority to improvements

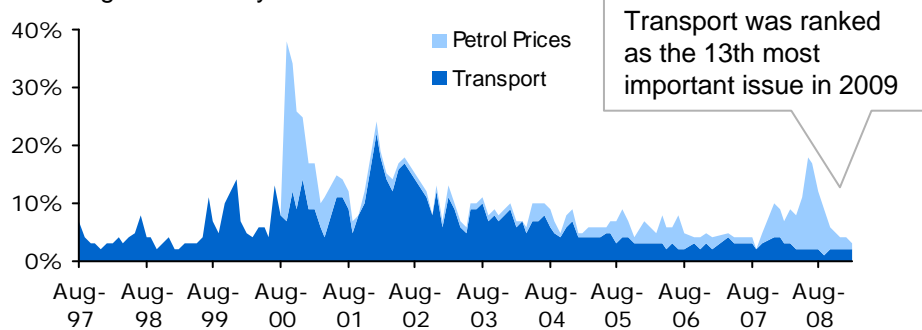
Many people say congestion is a major issue for the country when asked directly, though fewer say it is a major issue for them personally

Proportion agreeing with following statement about congestion¹



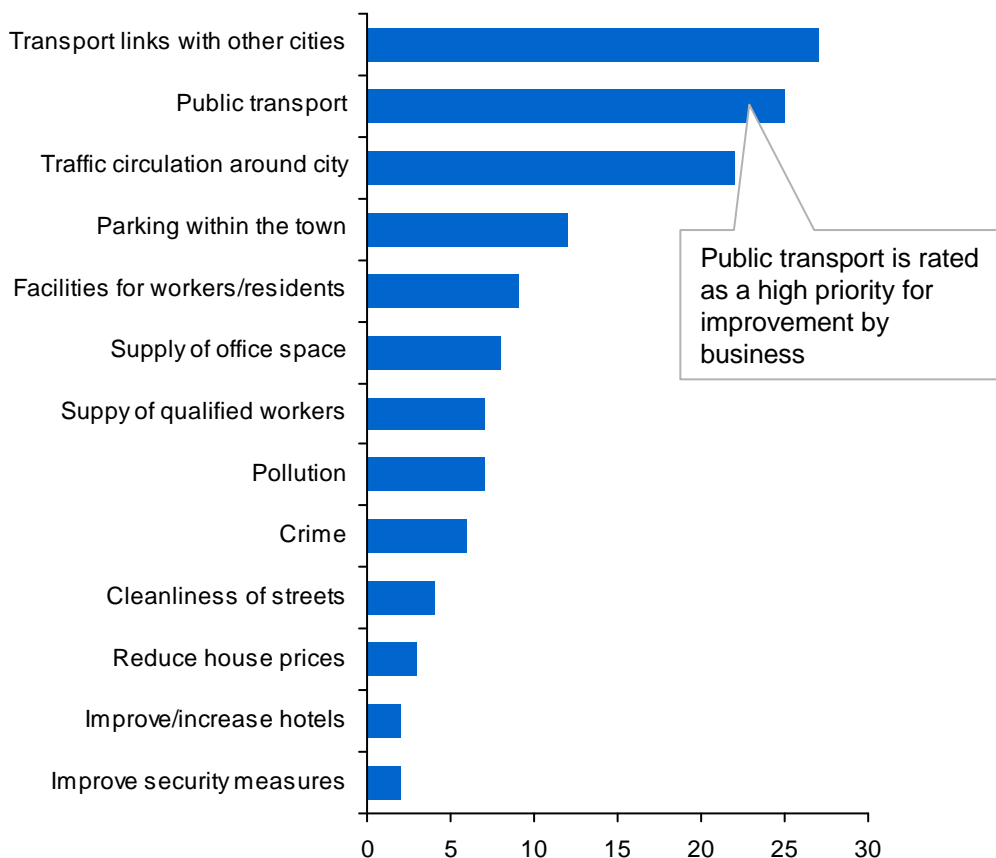
Few people cite transport as an important issue relative to others unprompted

Answer to "What do you see as the most/other important issues facing Britain today?"²



But transport is the primary concern when the business community are asked how cities could be improved

Percentage of businesses reporting that they would like to see this factor improved³

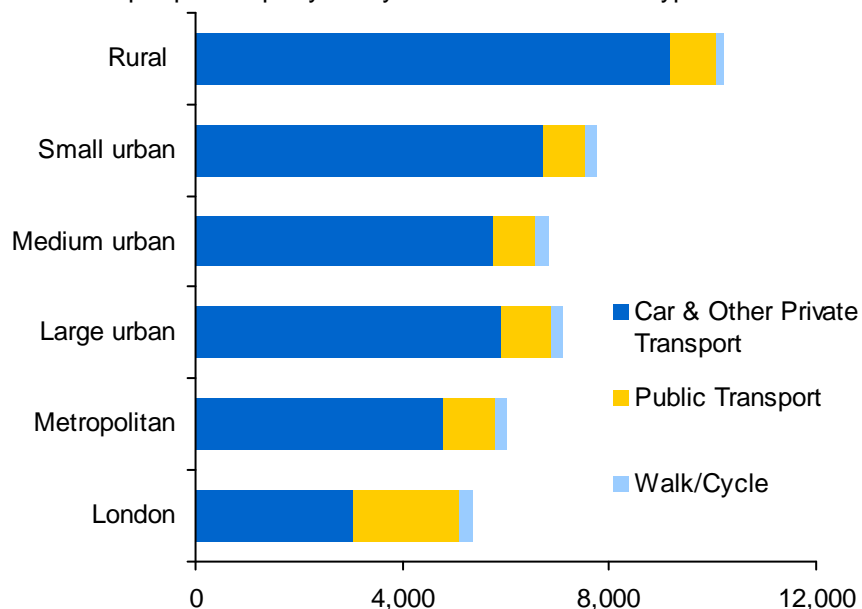


(1) ONS Omnibus Survey (Oct/Nov 2007) cited in DfT (2008) Public Attitudes To Congestion and Road Pricing; (2) Ipsos-Mori Issues Tracker; (3) UK Cities Monitor 2008

Whilst large urban areas have the lowest car use in the UK this does not compare well with many European cities. Many car journeys are short and could be taken using other modes

The car is the dominant mode in England but the distance travelled by car is less in larger urban areas

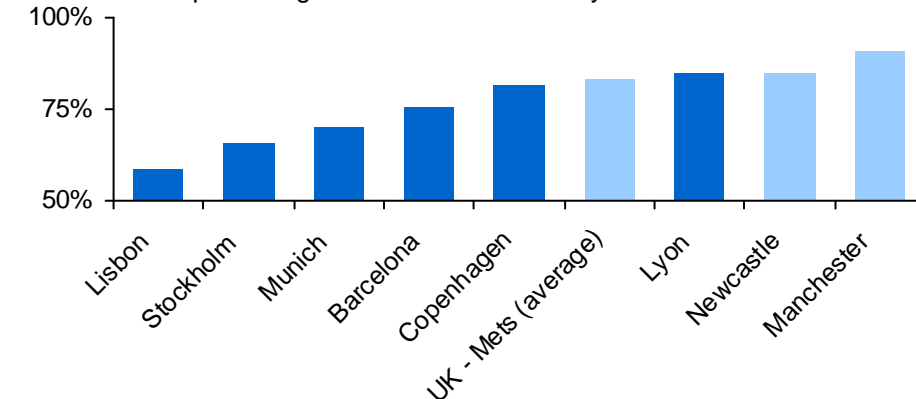
Miles per person per year by main mode and area type¹



- 43% of the distance travelled by Londoners is by public transport, walking or cycling. In other large urban areas the figure is 17%²
- If the difference in mode shares between London and other large urban areas was halved, the total distance travelled by car in the latter would reduce by 16%³

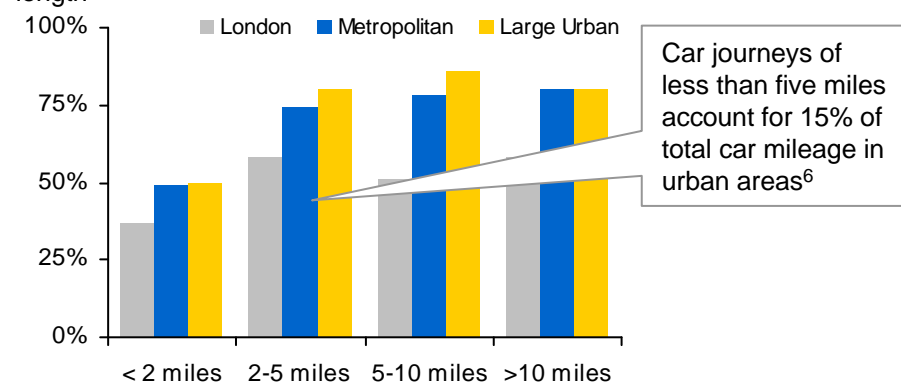
Car use in urban areas is higher than in other European cities

Car miles as a percentage of distance travelled by all motorised modes⁴



There is potential to reduce the high proportion of short distance journeys made by car

Distance travelled by car (percentage of total travel by all modes) by journey length⁵

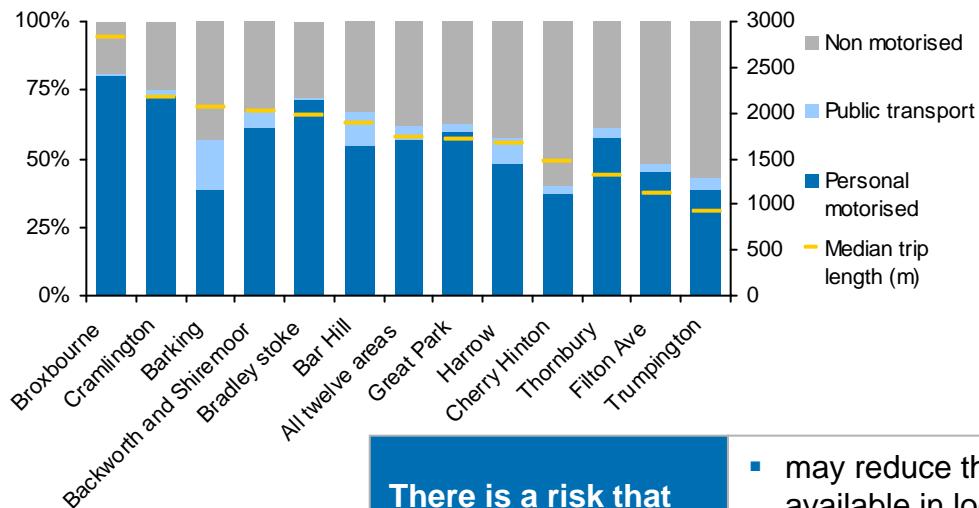


(1) DfT (2007) Travel in Urban and Rural Areas Factsheet, (2) TfL Travel in London (2009) (3,4) CfIT (2006) European Best Practise Update, (5) SU analysis of 2005/06 National Travel Survey Data, (6) Note: this calculation shows the first-round effect – in practice we might expect some induced demand as a result of lower congestion

Trip distance is a primary determinant of non-motorised travel, however the proportion of very short trips has declined

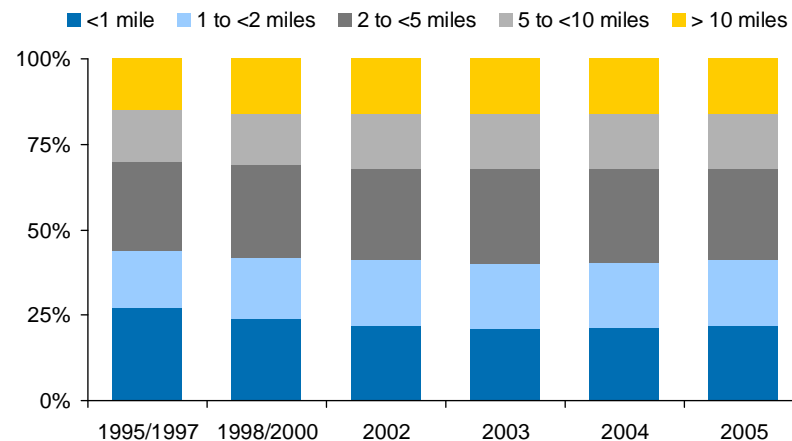
People are more likely to travel by non-motorised modes when distances are shorter

The percentage of trips made by non motorised trips increases as the median trip length in a suburb decreases¹ (length on right axis)



The proportion of trips less than one mile long has declined over time

Proportion of trips in Great Britain by trip distances²



There is a risk that transport and spatial layout of cities will be increasingly designed to cater for longer distance mobility. As a result, this:

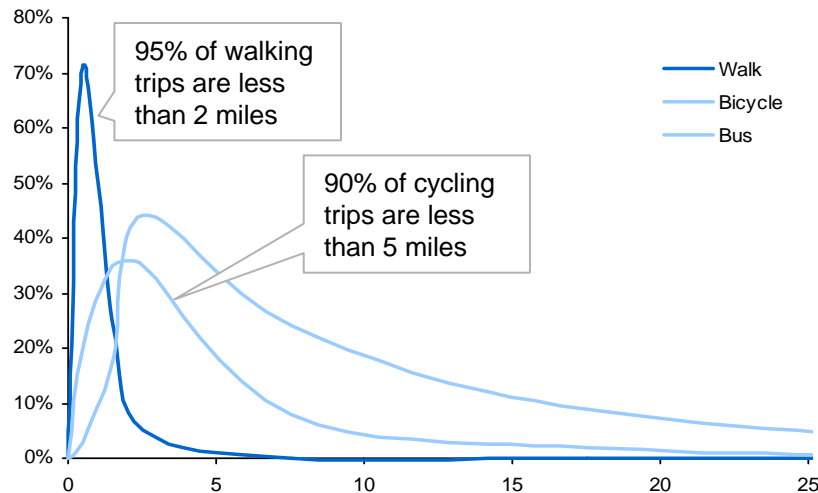
- may reduce the diversity of goods and services available in local areas
- could 'lock out' short walking trips as a viable transport mode
- could 'lock in' car dependency
- will accelerate the negative impacts of transport (such as increasing emissions, reduced health, reduced social cohesion and enjoyment of space)

(1) Local case study work: Executive summary and empirical work – Solutions (2009) (2) National Travel Survey – DfT (2006)

Walking and cycling have been in long-term decline as car use has grown

A range of modes are suitable for short urban trips and have the potential to replace car journeys

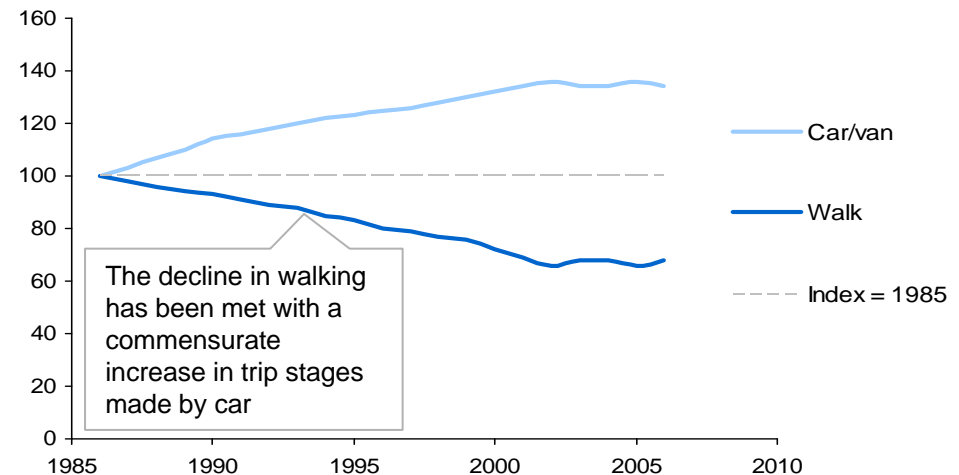
Modal profile: proportion of trips made by distance (miles)¹



- Walking is most often used for journeys of about one mile²
- Cycling for journeys of about five miles³ and buses for journeys between about three and fifteen miles⁴
- Research suggests people could replace 78% of their car journeys under five miles with a different mode⁵

However, walking has shown significant decline in the proportion of trips made

Proportion of trip stages in Great Britain by mode: Index 1985 = 100⁶

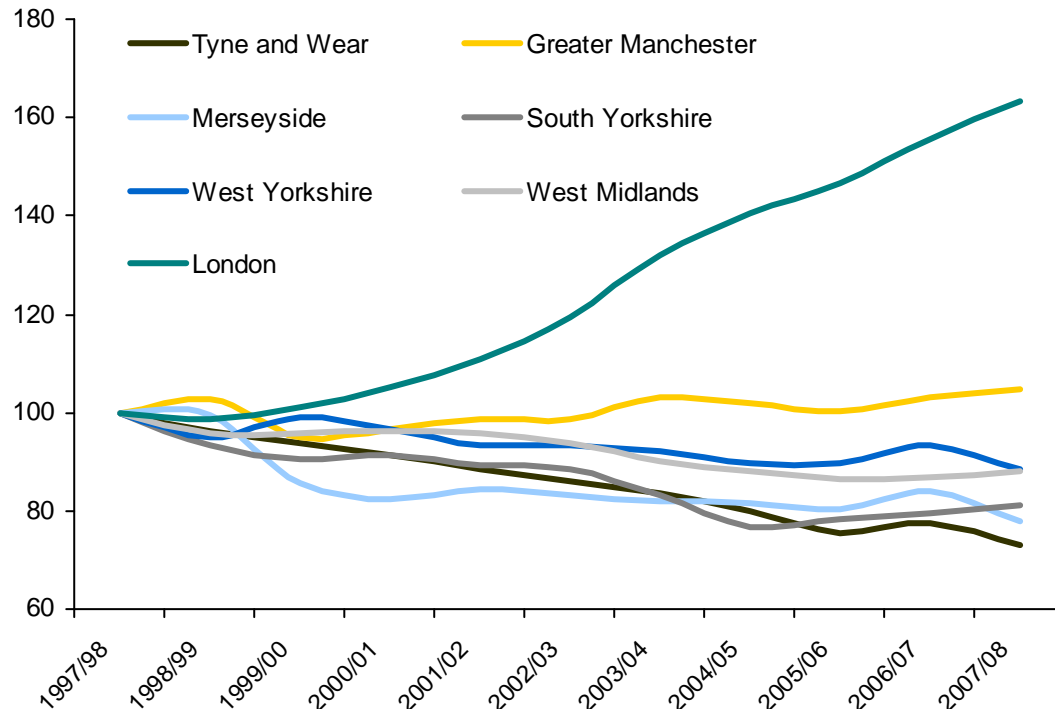


Cycling levels have show long-term decline since the 50s. Between 1952 and 1970 annual distance cycled fell from 23 billion kilometres (13% modal share) to 5 billion kilometres (1% modal share)⁴. Distance and mode share have stayed roughly at that level ever since

Bus use has grown in London and some provincial cities but declined elsewhere

Bus use outside London and Manchester has continued to decline

Bus passenger journeys by PTE area (1997/98 = 100)¹



A number of factors have influenced demand for bus use in recent years

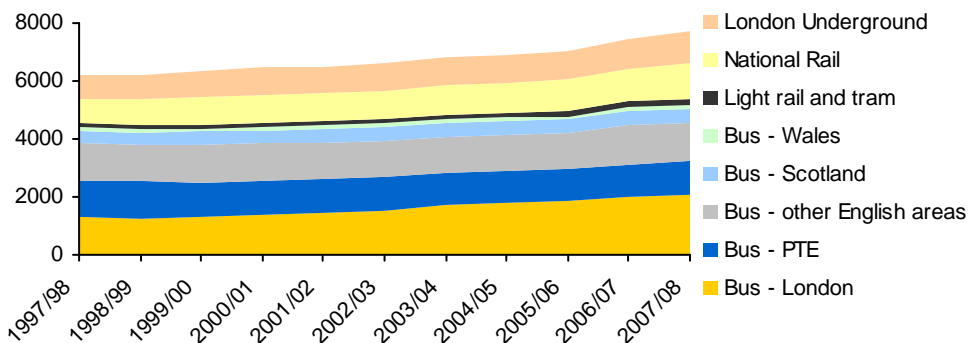
- **Increasing car ownership:** households with access to at least one car has increased from 70% to 75% in the last 10 years²
- **Falling motoring costs:** motoring costs fell 13% between 1997 and 2008 once the impact of inflation is removed³
- **Rising fares:** in comparison with falling motoring costs, bus fares have risen by 17% in real terms over the same period⁴
- **Introduction of national concessionary fare system:** the introduction of free bus travel for the over-60s was expected to increase bus demand by up to 5%⁵
- **Reduced services:** bus km run in PTE areas fell by 13% between 1997/98 and 2007/08 although it has started to increase in recent years⁶

There are examples of increased bus use in cities despite a fall in the number of bus journeys made within Metropolitan Areas

- **Oxfordshire:** bus journeys starting in Oxfordshire increased by 1.6% between 2001/02 and 2005/06 but the county has the highest number of journeys per head for a shire county⁷
- **York:** bus use increased by 45% during LTP1 (2001/02 to 2005/06)⁸
- **Cambridgeshire:** bus use increased by 21% between 2001/02 to 2005/06 and 40% increase in patronage on radial routes in Cambridge⁶. This was attributable to (amongst other things) the delivery of ten bus priority schemes, strong partnership with the main bus operator, and a major investment in Park and Ride⁹

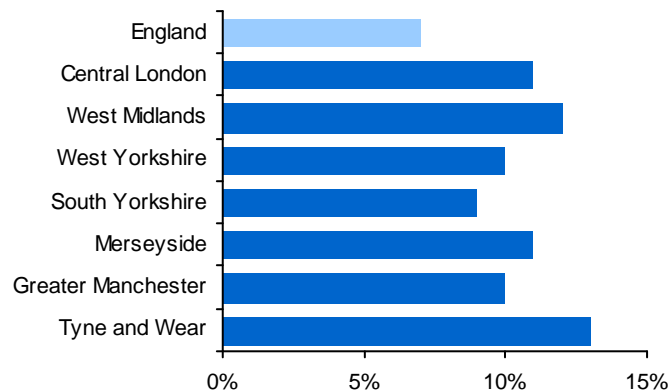
Over five billion journeys were made by bus in 2007/08 – two-thirds of all by public transport

Passenger journeys on public transport in Great Britain¹



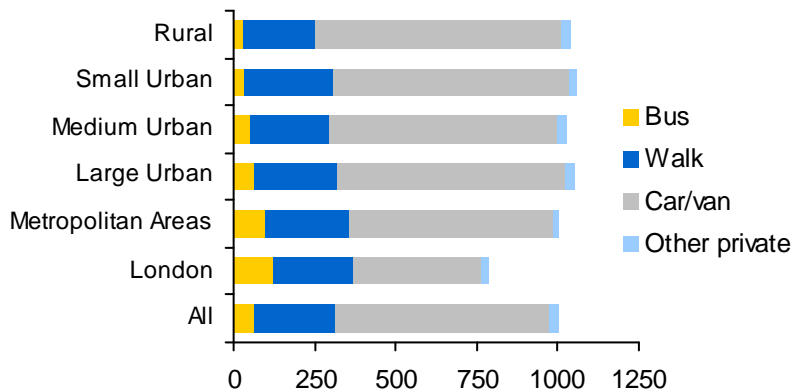
Over ten per cent of people in metropolitan cities travel to work by bus

Passenger journeys on public transport in Great Britain³



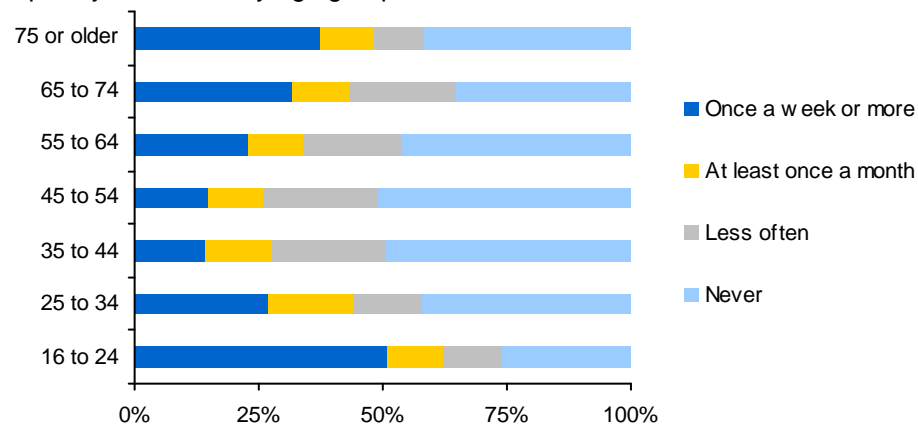
Buses are more heavily used in dense urban areas

Trips per person per year (2005/06)²



Bus use is highest amongst young adults and the elderly

Frequency of bus use by age group⁴



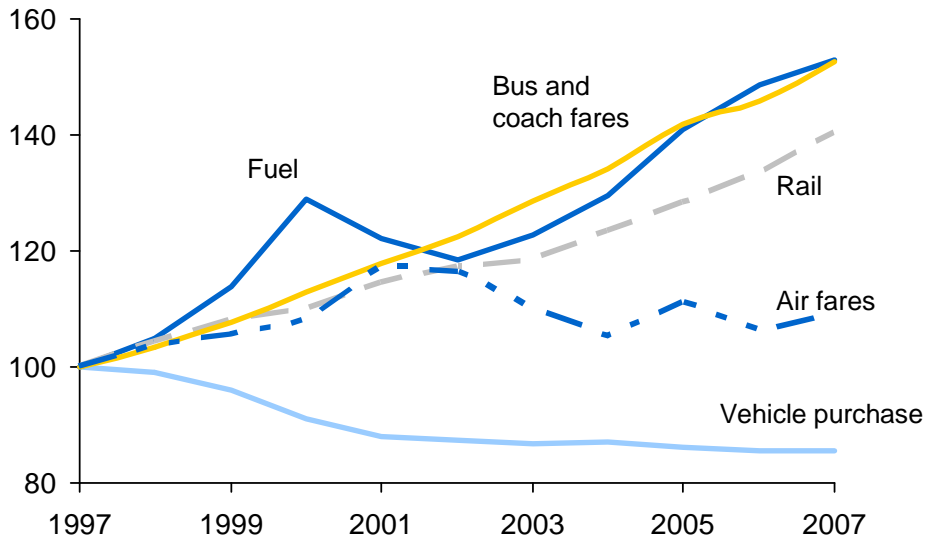
(1,3) DfT (2008) Public Transport Statistics Bulletin GB: 2008 Edition; (2) DfT analysis of National Travel Survey data; (3) DfT (2008) Regional Transport Statistics 2008; (4) DfT (2009) Public experiences of and attitudes towards bus travel

Car use has continued to become cheaper and more available relative to buses

The attractiveness of bus travel continues to fall relative to motor cars because of a combination of rising fares and greater car ownership

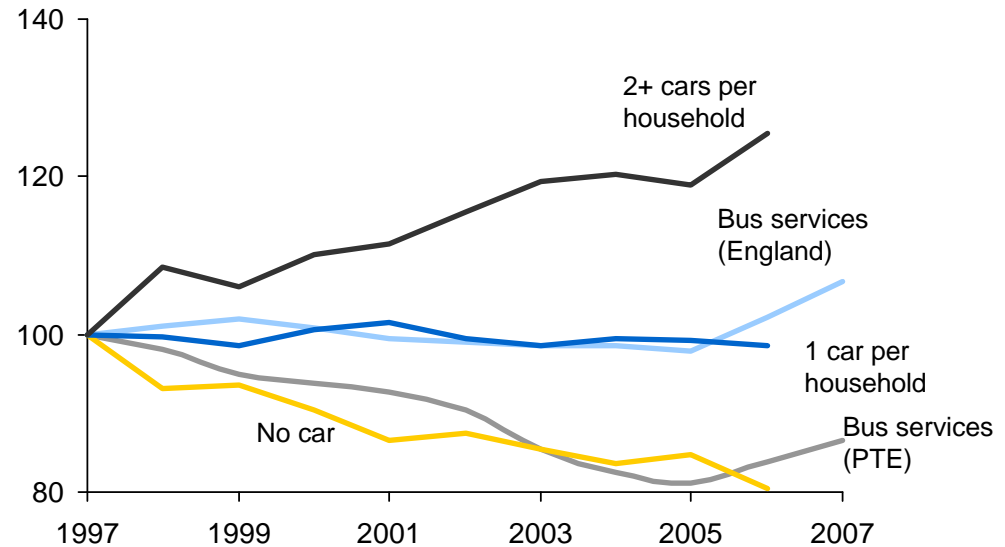
The costs of purchasing cars have fallen in real terms

Cost and price indices, 1997=100¹



Car ownership rates continue to rise whilst bus services outside London remain broadly static

Bus services (km operated) and number of cars per household, 1997=100²

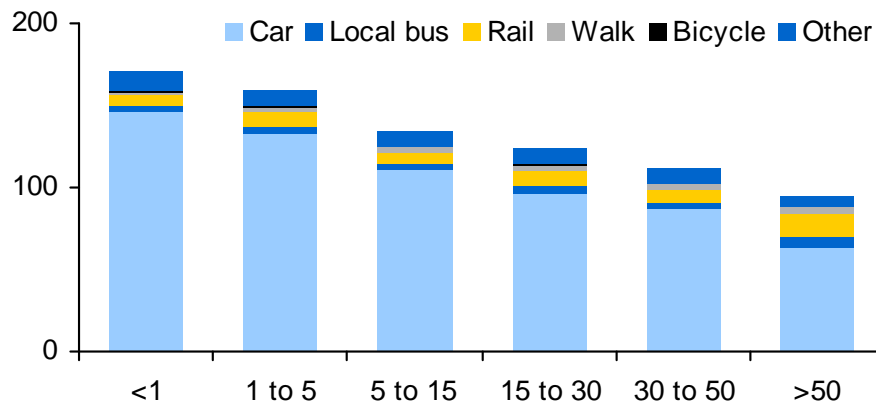


(1) DfT (2008) Transport Statistics GB (2) DfT (2008) Public Transport Statistics GB: 2008 Edition

Higher density and larger settlements are associated with lower distances travelled and a greater use of public transport

The use of and distanced travelled by the car falls with increased population density

Miles travelled per person per week by mode (1999-2001) broken down by population per hectare¹

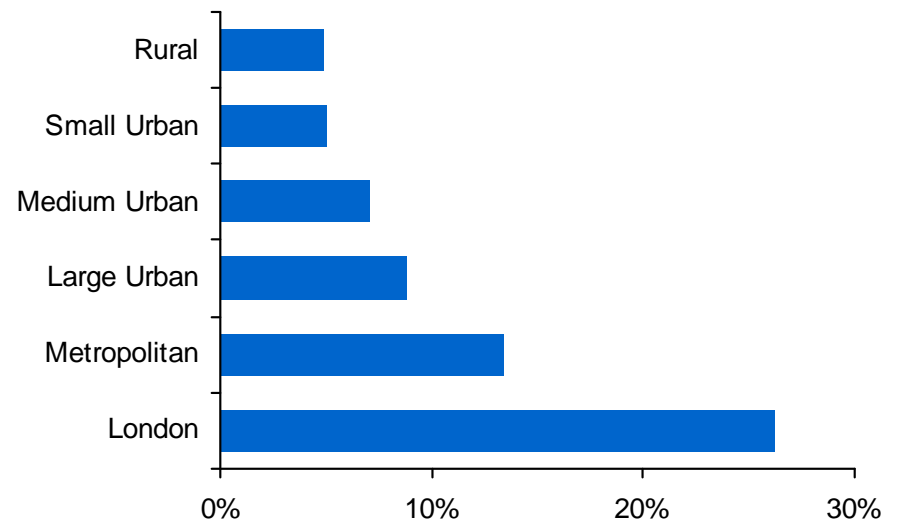


Higher densities²:

- Widen the range of opportunities for the development of local contacts and activities without using motorised modes such as cars
- Increase the scale of local spending which tends to widen the range of services which can be supported locally
- Tend to reduce average distances between homes and the location of services and employment
- Increase the viability of public transport – bus services become viable at 20-25 dwellings per hectare

Use of public transport increases with the size of urban areas

Mode share (trips) of public transport (2005/06)³



Larger settlements⁴:

- Increase the choice of facilities available to meet people's needs and wants
- Reduce the distances needed to be travelled to reach particular services and facilities (although this will be dependant on density and urban form)
- Increase the modes of transport that can be supported

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Skills and capability

Appraisal and packaging

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21. Dimensions of urban success with the greatest potential impact were identified, and then grouped into three areas: economic prosperity, health and enjoyment of space
22. It will be shown that the total cost of transport is at least £40bn in urban areas, of this congestion accounts for £11bn
23. The evidence below suggests a set of policy ambitions, which are used to frame the policy evaluation in the next chapter

Dimensions of urban success with the greatest potential impact were identified, and then grouped into three areas: economic prosperity, health and enjoyment of space

A long list of potential measures of urban success was developed¹...

Employment levels
Access to workforce
Population change
Intra-urban connectivity
Congestion
Green spaces
Productivity
Low income inequality
New businesses
House prices
Qualifications
Life expectancy
Health of citizens
Air pollution
Noise pollution
Liveability
Visual attractiveness
Place quality
Local connectivity
Climate change

...those most impacted by transport were identified...

Access to workforce
Connectivity
Congestion
Access to employment

Physical activity
Road safety and noise
Air quality

Environmental quality
Place quality
Availability of social networks

...and then grouped to aid analysis, these form the structure of this section:

Economic prosperity

Health

Enjoyment of space

All three areas contribute to quality of life

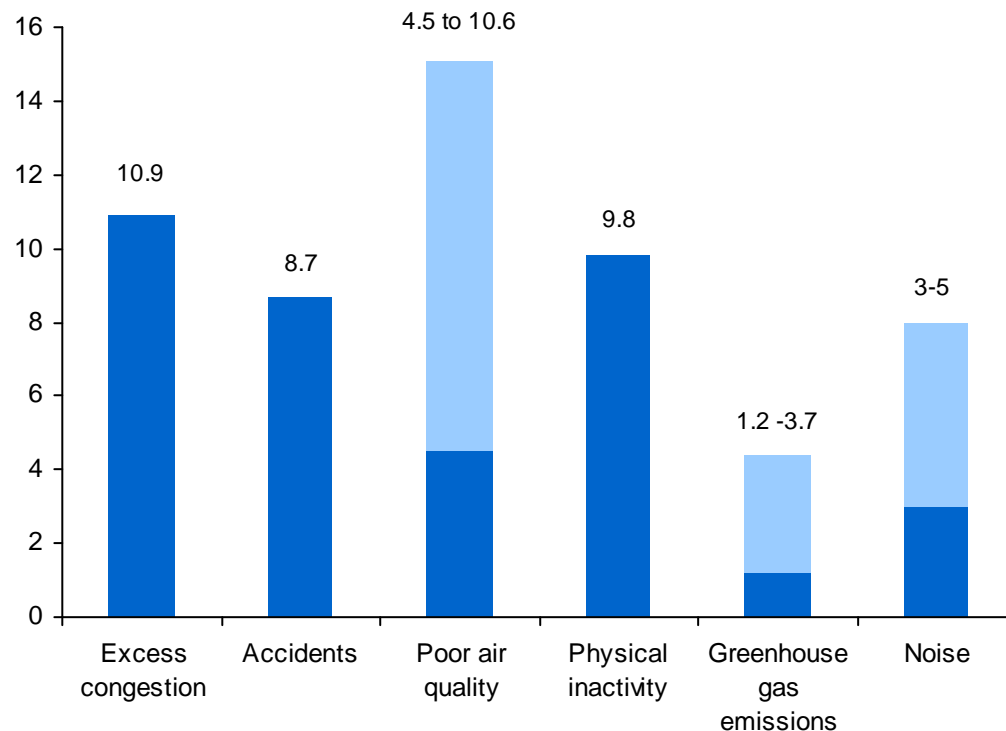
(1) The list was generated from several sources including State of the English Cities, IPPR Centre for Cities report 'Two-Track Cities' (2007), Policy Exchange report 'Living Cities' (2007), and the Joseph Roundtree Foundation report 'Poverty and Wealth across Britain 1968 to 2005' (2006)

It will be shown that the total cost of transport is at least £40bn in urban areas, of this congestion accounts for £11bn

This table gathers together all available evidence to give an idea of the scale of selected costs of transport harm in urban areas. It is not meant to be exhaustive or precise, but overall it is clear that congestion only accounts for around a third of the total⁸

All figures billion pounds (2009) ¹	London and ITA areas	ITA areas only	All urban areas with more than 10,000 people
Excess congestion (2009)	7.6	3.7	10.9
Accidents (2008)	5.1	3.2	8.7
Poor air quality (2005)	n/a	n/a	4.5-10.6
Physical inactivity (1998)	4.9	2.7	9.8
Greenhouse gas emissions (2003)	n/a	n/a	1.2-3.7
Noise (2008)	n/a	n/a	3-5
Low enjoyment of space	n/a	n/a	n/a
TOTAL	>17.6	>9.6	38.1>48.7

Congestion costs account for a third of the measurable costs of transport in urban areas



(1) DfT collated figures. Detailed references are given below. Years in parenthesis refer to the date of the study the figures are taken from.

(*) A detailed analysis of these data, with full referencing, is published alongside this report in The Wider Costs of Transport in English Urban Areas in 2009 (DfT)

The evidence below suggests a set of policy ambitions, which are used to frame the policy evaluation in the next chapter

Success area

Impacts on urban success

Implied policy aims

Policy area

Economic prosperity

- Excess congestion is an economic cost the market cannot solve
- Transport connectivity can have agglomeration effects

- Reduce excess congestion
- Exploit agglomeration effects

Efficient use of roads and streets

Health

- Urban areas have the highest rate of accidents costing around £9bn per annum
- Road traffic is the major cause of local emission in urban areas costing £5-10bn per annum
- Two-thirds of adults do not meet daily recommended activity levels, costing around £10bn per annum

- Reduce the use of motorised vehicles for short journeys and promote walking and cycling
- Reduce emissions
- Increase road safety
- Increase in the levels of active travel

Modal shift away from the car

Enjoyment of space

- High-quality street design can have local economic benefits
- People are often unsatisfied with the space they live and travel in because of transport

- Increase the quality of streets to make them more enjoyable

Spatial planning

Policy implication: as well as demonstrating harm, there must be a legitimate role for government intervention for efficiency (market failure) or equity reasons

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Skills and capability

Appraisal and packaging

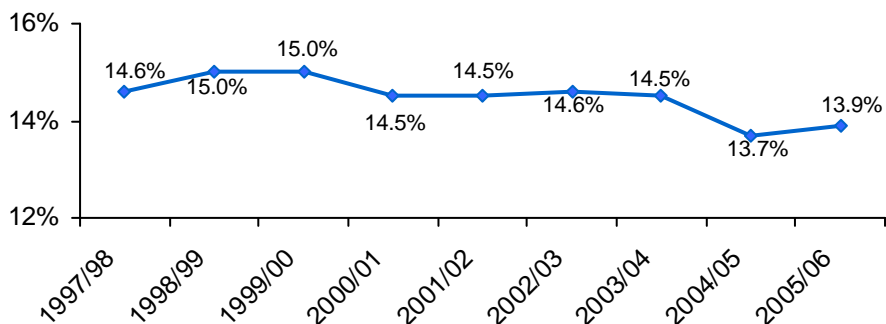
6. Conclusions and next steps

24. Transport is a major part of the economy and has significant costs, including “hidden” costs such as the land used for roads and parking
25. Transport can help and hinder economic prosperity through connectivity, congestion and accessibility
26. Negative impacts of transport to the economy are difficult to calculate. Congestion alone is around £10bn a year in large urban areas

Transport is a major part of the economy and has significant costs, including “hidden” costs such as the land used for roads and parking

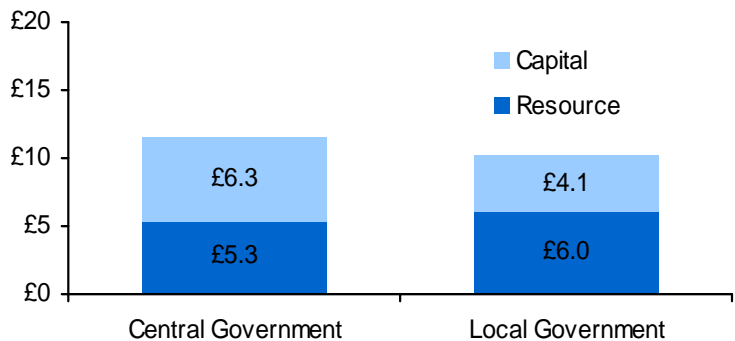
The average amount spent on transport has fallen slightly to £61.70 a week

Average household expenditure on transport as a proportion of total expenditure¹



Resource expenditure is £11.3 billion and capital expenditure £10.5 billion

Central and Local Government Expenditure on transport in Great Britain, 2005/06 (£ billion)²

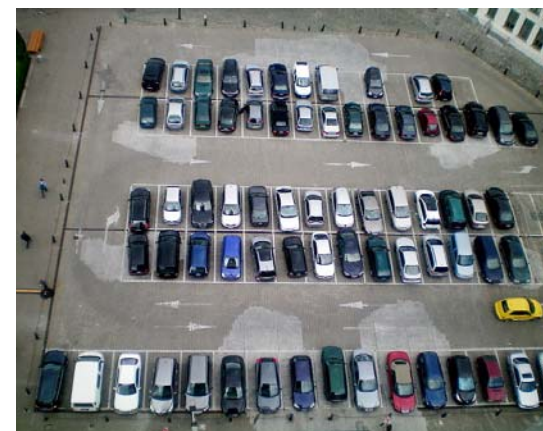


1.9 million people are directly employed in transport-related occupations (excluding local authorities)

Employee jobs in transport and related industries, March 2007²

Industry	Employee jobs
Transport Industries (e.g. bus/train drivers)	1,060,000
Transport Related Industries (e.g. car mechanics)	848,000
Total	1,908,000

- These are not the only resource costs of transport—it takes up around 6% of land in urban areas³



(1) SU analysis of ONS RPI statistics; (2) DfT (2008) Transport Statistics; (3) SU analysis of ONS data; there may be some double counting in the estimate of the area used for residential parking (some parking is on-street); also, a significant proportion of land (perhaps more than this) is used for off-street non-residential parking)

Transport can help and hinder economic prosperity through connectivity, congestion and accessibility

The transport system has a number of direct and indirect impacts on economic prosperity¹

Direct impacts
Direct costs for business, employees and customers



cost of fuel



cost of time

Indirect impacts
Reductions in transport costs change behaviours which improves productivity and economic prosperity as businesses, employees and customers adapt



deeper labour markets



clusters and agglomeration



smaller stocks held by firms



logistics innovations



more choice for consumers



increased trade

The impact the transport system has on the economy can be described by the level of connectivity, congestion and accessibility

Connectivity
The quality of the transport network in providing access between places that people want to travel to, measured by travel times and journey reliability

Congestion
The temporary impairment of connectivity during periods of high demand or when system capacity is temporarily reduced (e.g. by an accident)

Accessibility
The degree to which key services and employment can be easily reached by everyone, including those with disabilities or no access to private cars

(1)Adapted from The Eddington Transport Study (2006)
Note: the project has so far prioritised the impact of connectivity and congestion on the road network where costs are greatest, and looked at public transport connectivity and congestion in the context of this (i.e. in determining the feasibility and desirability of using alternative modes)

Negative impacts of transport to the economy are difficult to calculate. Congestion alone is around £10bn a year in urban areas

Performance	Conclusion	Evidence
Connectivity	<ul style="list-style-type: none"> Good connectivity in urban areas is vital to future economic growth Connectivity is difficult to measure and there is little evidence on how well UK towns and cities perform Most benefits of connectivity come from time savings, though agglomeration is important in dense urban areas 	<ul style="list-style-type: none"> 37% of output is produced in major urban areas¹. Employment is concentrated in the centre of these areas making good transport links vital to growth² One study found that the UK has relatively high road and low public transport connectivity compared with the rest of Europe³. Business perceives transport connectivity as a constraint⁴ High productivity and economic benefits exist from improved connectivity: a 10% reduction in travel time forecast to increase productivity by 0.4%-1.1%⁵ The agglomeration benefits of transport interventions are at least 5-10% of total benefits in core cities⁶
Congestion	<ul style="list-style-type: none"> The cost of congestion is highest in large urban areas during peak times Reliability is as important as a cost of congestion as lost time to some people Without intervention, congestion and the cost of excessive congestion, is anticipated to increase significantly over the next 15 years 	<ul style="list-style-type: none"> The marginal cost of congestion in large urban areas at peak time is estimated as 86p/km versus 11p/km on average (1998)⁷ Reliability deteriorates significantly in congested conditions. There is evidence that freight users value reliability improvements as much as time savings⁸ Average delay due to congestion is forecast to increase by 35% from an average of 19.8 seconds/km in 2010 to 26.7 seconds/km in 2025⁹ The cost of excess congestion is projected to increase from £16 billion in 2010 (1.1% GDP) to £34 billion in 2025 (1.7% GDP)¹⁰
Accessibility	<ul style="list-style-type: none"> There are pockets of poor connectivity in urban areas that can limit access to jobs and public services 	<ul style="list-style-type: none"> 33,000 people in major cities outside London – 0.3% - are not within a 20 minutes walk, cycle ride or public transport of a major employment centre¹¹

Policy implication: reducing congestion, and improving connectivity and accessibility in cities will deliver large economic benefits

(1) Regional GVA, ONS (2008); (2) E.g. 33% of Greater Manchester employment in the City of Manchester versus 18% of population, Annual Population Survey, ONS (2008); (3) European Best Practice 2006 Update, CfIT (2006); (4) UK Cities Monitor (2008); (5) Eddington Transport Study (2006); (6) Agglomerations in the UK, DfT (2006); (7) Surface Transport Costs and Charges: Great Britain 1998 – Samson et al (2001); (8) Cited in Eddington (2006); (9) DfT; (10) SU analysis based on Feasibility Study of Road Pricing, DfT (2004) and Eddington (2006), 2009 prices; (11) Making the Connections, SEU (2004)

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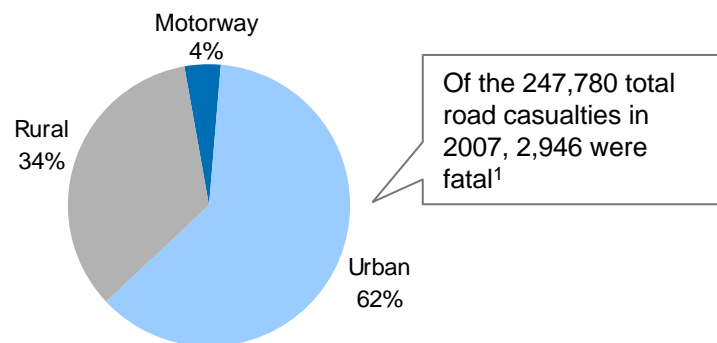
6. Conclusions and next steps

29. Those living in urban areas, and particularly the young and those living in deprived areas are most vulnerable to road accidents, which are estimated to cost £9bn annually
30. Air pollutants from transport negatively affect both short and long-term health. The estimated health cost of particulate pollution alone is between £5-10bn per annum
31. The majority of adults are overweight and do not exercise enough
32. Cycling and walking have potential to reduce health costs and wider economic losses by reducing the physical inactivity that contributes to a range of chronic diseases
33. Increasing physical activity has a positive preventative and therapeutic effect on a range of diseases. Walking and cycling are high enough intensity to have a positive effect on health

Those living in urban areas, and particularly the young and those living in deprived areas are most vulnerable to road accidents, which are estimated to cost £9bn annually

The majority of killed and seriously injured (KSI) casualties occur on urban roads

Breakdown of KSI casualties in 2007 by road type (percent)¹

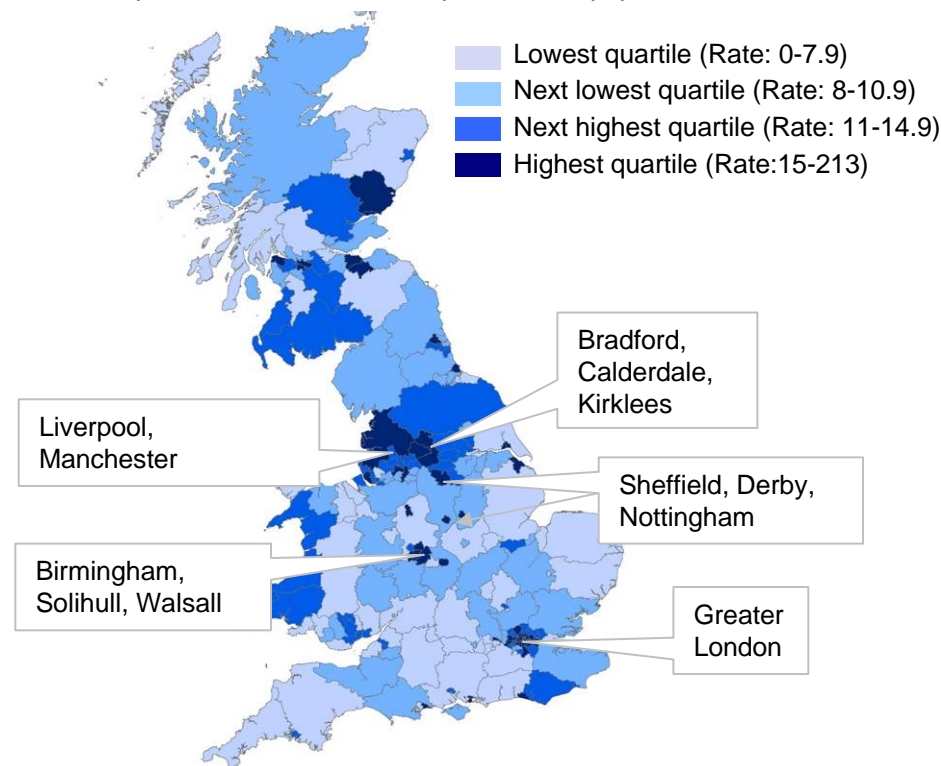


- Those involved in fatal or serious accidents are disproportionately young, male or from areas of high deprivation
 - 15-25 year olds represent approximately 15% of the population but account for 30% of urban road accidents²
 - 75% of all British road deaths are among men in 2007³
 - those living in the 10% most deprived areas were one and a half times as likely to be involved in a road accident relative to those living in the 10% of least deprived areas

In 2007 12% of people involved in road accidents were from the 10% most deprived areas, whilst 8% were from the 10% least deprived⁴

Pedestrian road accidents leading to serious injury or death occur at a greater rate in urban areas, taking into account population

Number of pedestrian KSI casualties per 100,000 population^{5,*}



Policy implication: the total annual cost of road accidents is £19bn with urban areas accounting for £9bn of this. There are likely to be ways to reduce this that cost less than this and so a potential role for government in doing so

(1,3) Road Casualties Great Britain: 2007 – DfT (2008) (2) DfT and ONS (4) Draft Road Safety Consultation Document – DfT (2009) (5) DfT/SU analysis of road safety statistics

*Note: The pedestrian KSI casualty rate is calculated on the basis of resident population

Air pollutants from transport negatively affect both short and long-term health. The estimated health cost of particulate pollution alone is between £5-10bn per annum

There is strong evidence that current levels of air pollution are damaging to health in the short and long-term^{1,2,3}

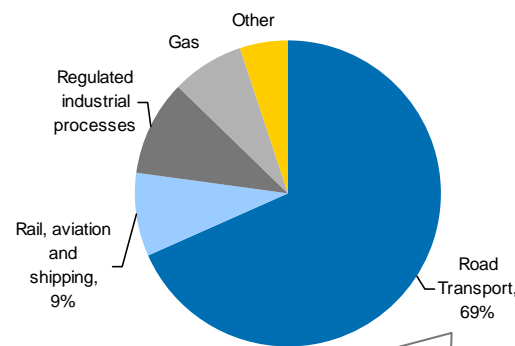
Short-term effects:	Long-term effects:
<ul style="list-style-type: none"> –are mainly respiratory and can lead to increased hospital admission, medication use and mortality –are more pronounced for susceptible populations including people with existing respiratory problems and the elderly –are estimated to lead to 12-24,000 premature deaths per annum 	<ul style="list-style-type: none"> –are both respiratory and cardiovascular and can result in reduced lung capacity and higher rates of lung cancer and heart disease –are population-wide and contribute to an average reduction in overall life expectancy of 7-8 months per person

Policy implication: local emissions have been falling since 1990 (and further falls expected) but estimates of the health costs associated are still in excess of £5-10bn per year⁵ suggesting further policy may be required

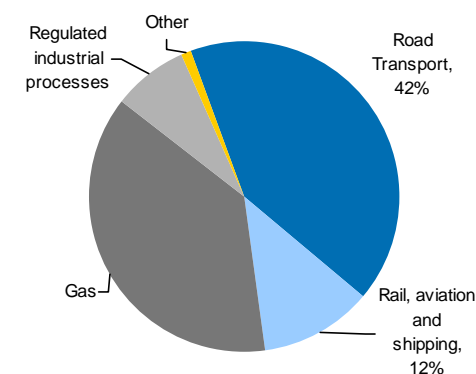
- Transport also creates health effects through the production of environmental noise. Levels of environmental sound do not reach the intensities needed to damage hearing but there is increasing evidence that environmental noise, from both aircraft and road traffic, is associated with annoyance, sleep disturbance, raised blood pressure and with a small increase in the risk of coronary heart disease⁷; transport noise bothered 21% of those questioned in a recent survey⁸

In urban areas transport is the most significant contributor to emissions of particulate matter (PM₁₀) and nitrogen dioxide (NO₂)

Contributions by source categories to total PM₁₀ emissions in London (2004)⁴



Contributions by source categories to total NO₂ emissions in London (2004)⁴

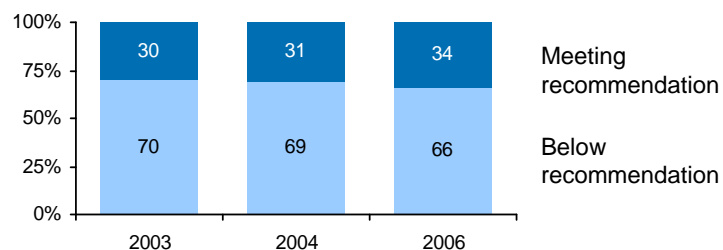


By July 2007 almost two-hundred Local Authorities in Great Britain had emissions levels high enough to warrant declaring Air Quality Management Areas (AQMAs) for NO₂ and PM₁₀. More than 95% of AQMAs were introduced due to transport pollution only, or are where transport plays a major role⁶

The majority of adults are overweight and do not exercise enough

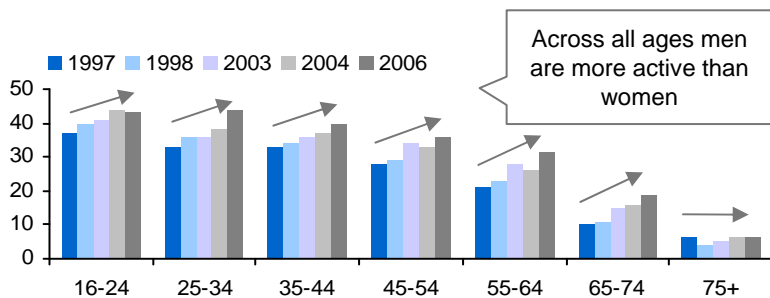
Two thirds of the adult population do not meet recommended activity levels

Proportion of adults (>16yrs) in England completing 30 minutes or more of moderate or vigorous activity on at least 5 days a week¹



Older people are less likely to meet recommended activity levels

Proportion of adults (>16yrs) in England completing 30 minutes or more of moderate or vigorous activity on at least 5 days a week by age²



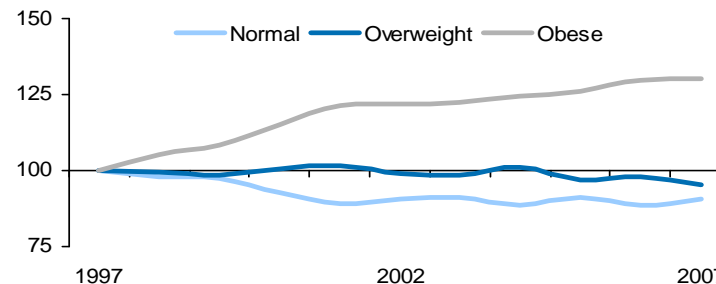
The majority of adults are either overweight or obese, a figure that is rising

Proportion of adults³

		Per cent of population		
	BMI Status	1997	2002	2007
Children	Overweight	13.0	13.8	14.0
	Obese	12.6	17.0	16.5
	Total	25.6	30.8	30.5
Adults	Overweight	38.5	38.1	36.7
	Obese	18.4	22.5	24.0
	Total	56.9	60.6	60.7

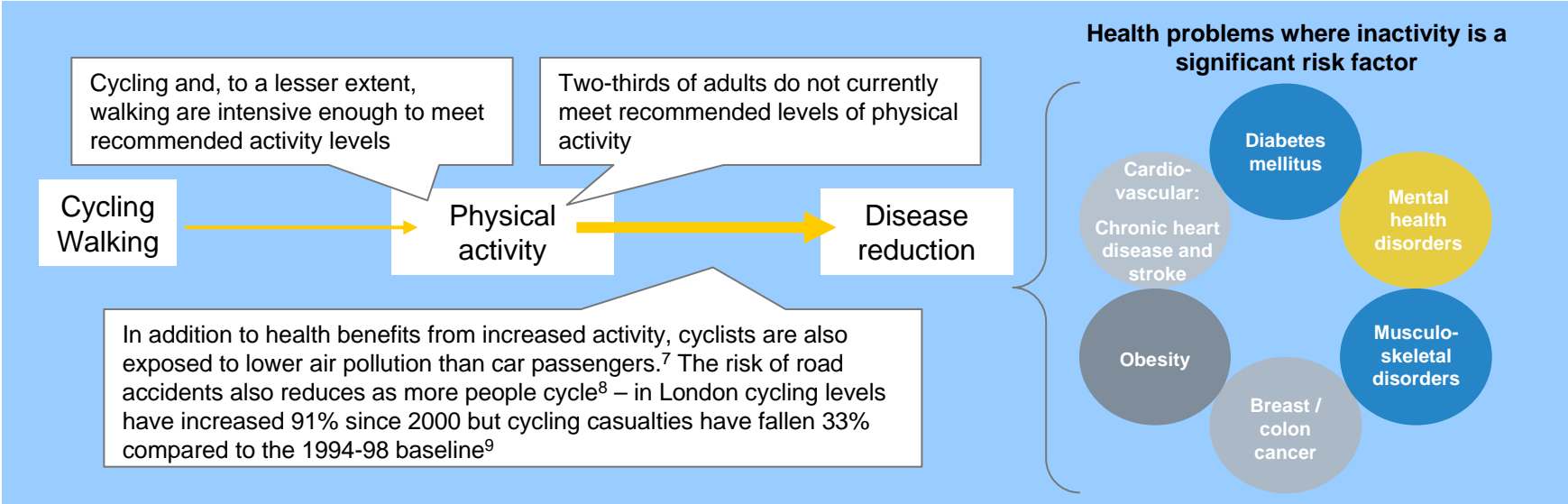
Estimates suggest more than 60% of adults could be obese by 2050⁵

Change in BMI status for adults (>16yrs) in England 1997-2007⁴



Cycling and walking have potential to reduce health costs and wider economic losses by reducing the physical inactivity that contributes to a range of chronic diseases

A major study from Copenhagen of over 30,000 individuals over a fourteen year period evaluated the impact of activity on health outcomes. After controlling for other variables the study found that those cycling to work reduced their relative risk of mortality by 39%¹



Adherence to current physical activity guidelines is associated with a significant (20-30%) reduction in risk of all causes of death²

- the recommended level of activity requires an energy expenditure of approximately four megajoules per week. This can be achieved by walking for 40 minutes on most days (achievable by four ten minute bouts), or by cycling for 140 minutes per week³ (for an average cyclist this is about three return trips a week)⁴

The largest marginal health impacts are achieved by encouraging sedentary and at risk groups to undertake moderate amounts of physical activity⁵

(1) All-cause Mortality Associated with Physical Activity – Andersen et al (2000); (2) Physical activity and all-cause mortality – Lee and Skerrett (2001); (3) Is active commuting the answer to population health? – Shephard (2008); (4) Analysis of National Travel Survey (2006); (5) At least five a week – Chief Medical Officer DH (2004); (6) Cycling and Health – Cavill and Davis (2007); (7) Road user exposure to air pollution – quoted in A New Deal for Transport: Better for Everyone (1998); (8) Safety in Numbers – Jacobsen (2003); (9) Cycle Safety Study – CTC (2009)

Increasing physical activity has a positive preventative and therapeutic effect on a range of diseases. Walking and cycling are high enough intensity to have a positive effect on health

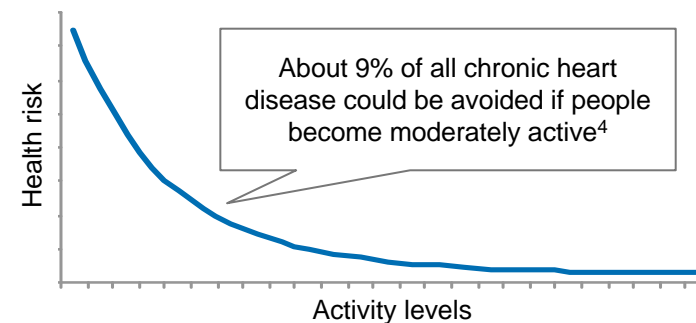
- Physical activity has a positive preventative and therapeutic effect on a range of diseases
- This association is strongest for the relationships between activity and a coronary heart disease, type two diabetes, osteoporosis and colon cancer
- The relationship between physical activity and health is dose-dependent; the more exercise a person does the healthier they will be:
 - this relationship is curved: the greatest reduction in health risks is produced by helping people to move from inactivity and low levels of participation up to moderate levels of participation¹
- The health impact of activity is based upon the duration, intensity and frequency of activity. The Chief Medical Officer established a set of recommendations for physical activity in relation to health²:

	Duration	Intensity	Frequency
Adults	30 minutes in total	Moderate intensity activity	Five times a week
Children	60 minutes in total	Moderate intensity activity	Each day

Policy implication: physical inactivity is estimated to cost around £10bn per year⁵ as a result of higher direct healthcare costs, absenteeism and lost productivity. Savings to this could be made through increased levels of cycling and walking, particularly with at-risk groups

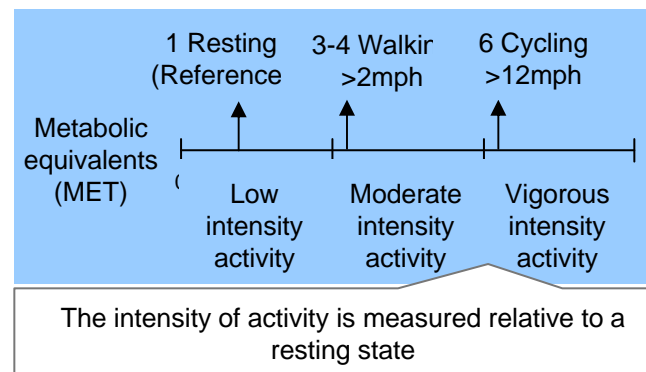
The largest health impacts will be gained by getting inactive people to become moderately active

Schematic exposure-response curve³



Active modes of transport are of sufficient intensity to help meet recommended activity levels and provide health benefits

Estimates of MET from physical compendium of activity⁴



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35. Transport is one of the most important factors in urban areas that affects enjoyment of space
36. Transport affects how we feel about different places, which in turn affects how and where we travel
37. Spaces that are more enjoyable can have economic and social benefits
38. Measuring enjoyment of space and transport's impact upon it is difficult
39. There is some evidence that enjoyment of space might have improved in the UK, but improvements are not evenly distributed

Transport is one of the most important factors in urban areas that affects enjoyment of space

Success

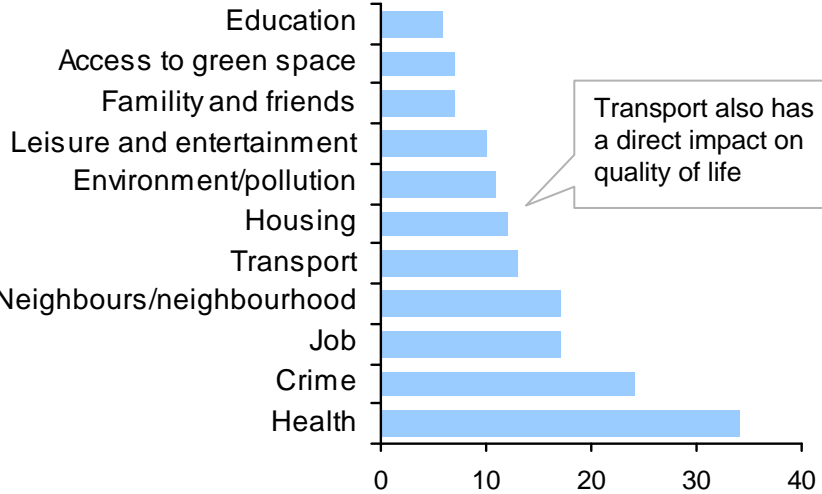
Space

Space is land between buildings within an urban area. It can provide direct and indirect environmental, social and economic benefits¹. Others call this 'public space' or 'public realm'

Enjoyment of space is how the physical environment contributes to quality of life. It encompasses only a proportion of all factors affecting quality of life

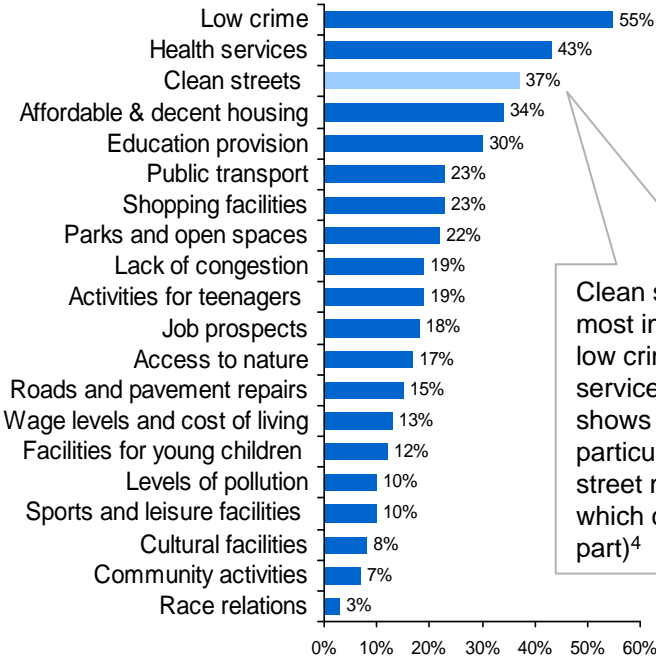
Transport is one of the main issues which directly affects people's quality of life but also indirectly affects many of the other issues which contribute to it

Per cent of respondents, areas of indirect impact in light blue²



Clean streets, public transport and lack of congestion are among the attributes seen as important in making places good to live in

Per cent of people stating factor is in top five most important things to make somewhere a good place to live³



Clean streets is the third most important factor, after low crime and health services. Other evidence shows people attach particular importance to street maintenance (of which cleanliness is a part)⁴

Nine out of ten people in England say road traffic is fairly or very important to quality of life⁴

Transport is the sixth most mentioned issue affecting people's own quality of life⁵

(1) Williams & Green (2001) Literature review of public space and local environments for the cross cutting review, (2) DEFRA (2001) Survey of public attitudes to quality of life and to the environment, (3) Audit Commission (2006/7) BVPI General survey, (4,5) Ipsos Mori (2007) Anti-Social Behaviour And Respect: People, Place And Perceptions

Transport affects how we feel about different places, which in turn affects how and where we travel

Success

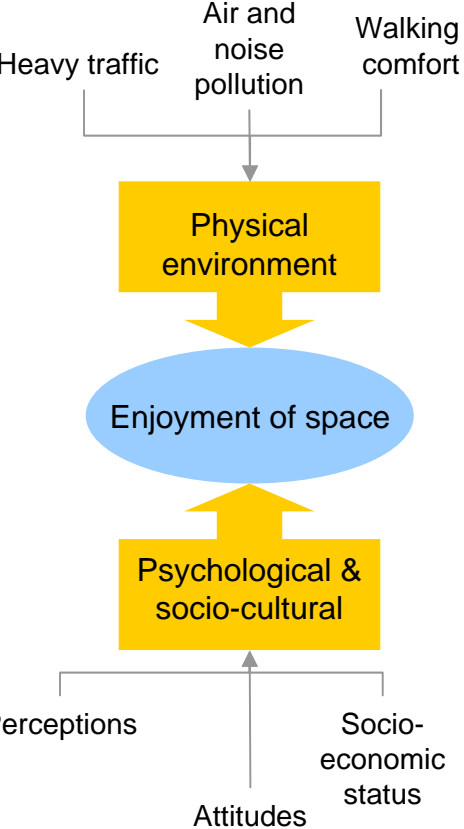
Space

Physical and psychological factors influence enjoyment of space¹

Whether or not we enjoy space evokes emotional and health responses

Enjoyment of space affects where and how we travel

This has a circular effect



Enjoyable spaces evoke pleasing emotions; spaces we dislike evoke displeasing emotions²

85% of people feel that the quality of public space impacts directly on how they feel³

Beautiful spaces provide higher recovery from stress and mental fatigue, faster recovery from illness and long-term health improvements⁴. In one study, heavy traffic resulted in longer recuperation time from stress compared to a traffic-free area⁵

A 1974 US study showed that drivers chose a scenic parkway route more often than a non-scenic expressway route, despite the parkway route taking more time⁶

85% of the English say walking outdoors in the countryside would be motivating, compared to 73% for parks, 27% for town or city streets and 14% on a treadmill at home⁷

A US study found that neighbourhoods with better connectivity and higher quality facilities generated three times more pedestrians per resident than neighbourhoods with disconnected street networks and substandard facilities⁸

The way we travel in a space influences whether and how other people travel, and what other activities they undertake

The impact of other people travelling is one of the biggest burdens on people's enjoyment of space

Policy implication: transport's impact is much wider than simply the economy and health. It can affect how people feel and behave

(1) based on Whitehead et al (2006) Effect of urban quality improvements on economic activity, (2,6) EPA (2001) Scenic Amenity, (3) CABE (2002) Streets of shame, (4,5) Velarde (2007) Health effects of viewing landscapes, (6) Dixon & Wolf (2007) Benefits and risks of urban roadside landscape, (7) Ipsos MORI (2009) General Public Survey, (8) Frank et al (2003) Health and community design,

Spaces that are more enjoyable can have economic and social benefits

Success

Space

Evidence shows social interaction has a direct impact on people's mental health and well-being⁶

The positive impact of urban quality improvements (e.g. pedestrianisation) on economic activity can be highly significant

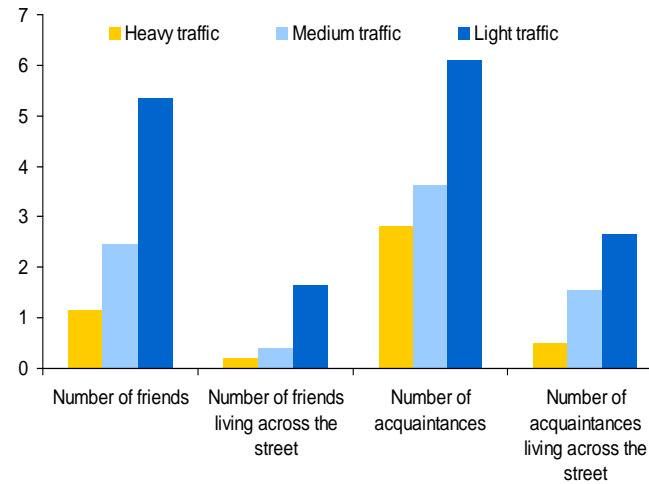
Economic impact	Per cent increases associated with urban quality improvement ¹
Retail footfall	20 to 40
Retail turnover	10 to 25
Retail rents	10 to 30
Office rents	15 to 35

Analysis of ten London streets showed that a modest improvement to street design quality could add an average 5.2% to residential prices and 4.9% to retail rents (however these results were not statistically significant due to small sample size)²

Very little research exists on whether improving the urban environment produces overall benefits to the economy i.e. do the above impacts involve displacement from other locations which thereby suffer negative impacts? One modeled case study in Manchester showed that improving urban quality increased projected long term employment by 2%³

People living on streets with heavy traffic are less likely to be friends with neighbours compared to people living on streets with light traffic

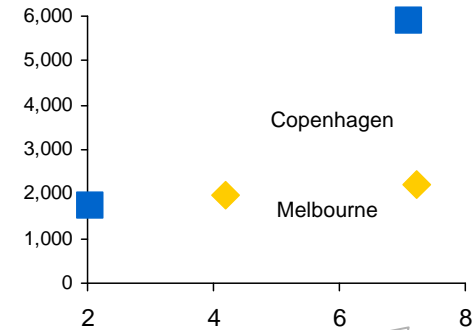
Number of friends/acquaintances people have, controlled for other factors⁴



- Analysis found that improved street lighting led to an overall reduction in recorded crime of 20%⁵
- The authors concluded that the lighting increased community pride and confidence and that this explained the recorded impacts, rather than increased surveillance or deterrent effects⁶

Improving pedestrian space increases public life

Number of stationary activities observed on summer weekdays, 10am-4pm (10,000m²)⁷



When pedestrian space increases, the number of people undertaking optional, social or recreational activities in public space increases

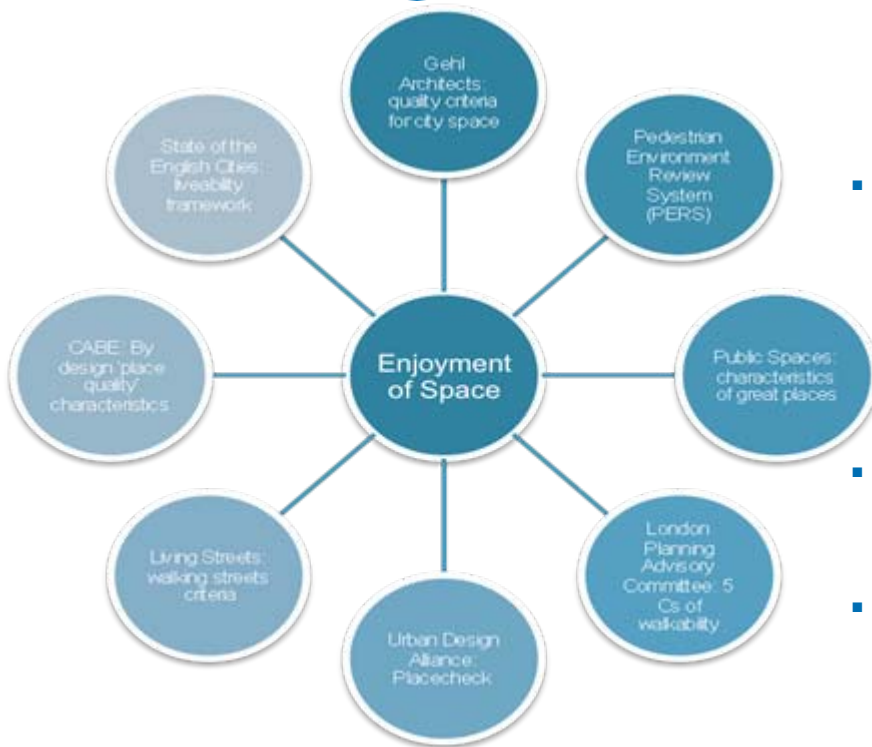
Policy implication: transport's effects on space are complex: more enjoyable areas often bring economic improvements and in turn makes spaces even better

Measuring enjoyment of space and transport's impact upon it is difficult

Success

Space

There is no unique way to measure enjoyment of space. Many sets of criteria and tools have been developed that in combination, can be used to assess it



One consistent aspect of these indicators is the ease by which pedestrians can access and move through space

There are many difficulties in measuring enjoyment of space:

- Most available criteria for enjoyment of space have not been applied very widely or systematically, so our ability to compare performance of UK cities with other cities, or over time, is limited
- Enjoyment of space is often subjective and individual. Measuring it requires surveying people's views and attitudes. Data is sometimes unreliable, and usually difficult to compare over time or in different places
- All spaces are different, and some enjoyable qualities in one space may not be enjoyable in another
- Enjoyment of space is local, therefore not readily comparable. It is only likely to emerge through case-by-case analysis¹

However, many people instinctively recognise enjoyable spaces²

Before and after: major city freeway in Strasbourg, France³



(1) DCLG (2006) State of the English Cities: Liveability in English cities, (2) (2009) Interview with Sir Peter Hall, (3) PB (2004) Gold Coast Light Rail Feasibility Study

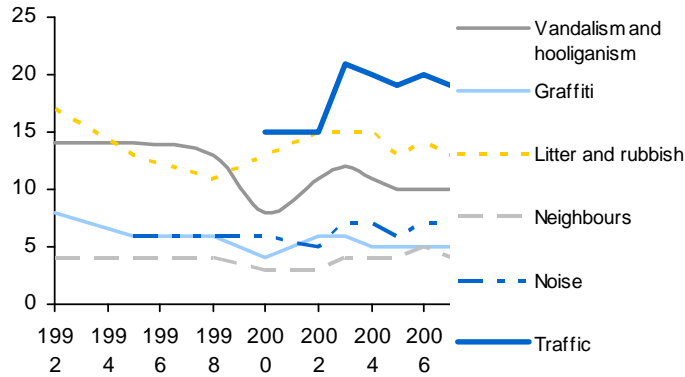
There is some evidence that enjoyment of space might have improved in the UK, but improvements are not evenly distributed

Success

Space

There is some evidence of improvements in enjoyment of space

Percentage of respondents who thought issue was a serious problem¹



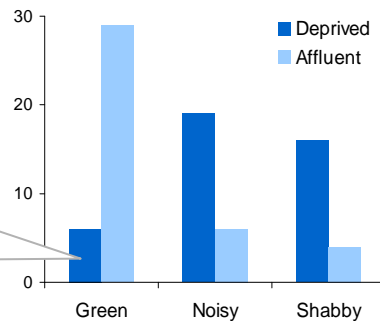
- A 2006 study cautiously suggested that English cities are now more liveable², although performance on some measures has not improved

Lower socio-economic groups are 22% more likely to think traffic in their area is dangerous to pedestrians and other road users⁴

Lower socio-economic groups are more likely to describe their local area as noisy and shabby²

- People living in deprived areas are much more likely to experience environmental problems such as under-maintained public space, graffiti and refuse on streets than people in less deprived areas³
- People living on main roads are more than three times as likely than people living on cul-de-sacs to say the impact of traffic on their quality of life is “serious”

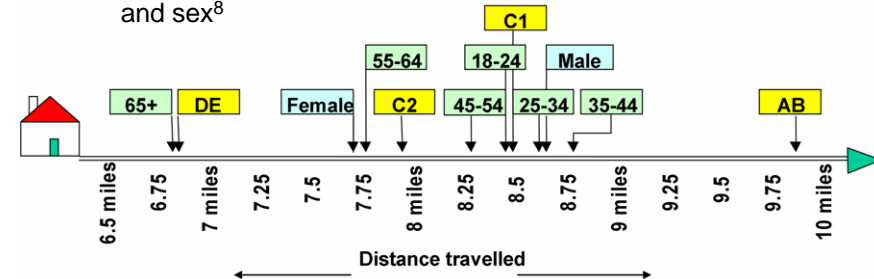
Which two or three of words if any do you most associate with your local area?⁴



Enjoyment of space matters much more to non-drivers, low socio-economic groups and the elderly

- More than half the population - including working age adults with no car or non-drivers, the young and old, do not drive^{5,6}
- If people have fewer cars in their household, they are more likely to think traffic in their area is dangerous to pedestrians and other users, and more likely to think it is important for a wider mixture of activities to be possible in the public spaces in their area⁷
- The elderly and poorer groups are more reliant on their neighbourhood

Average distance prepared to travel to access shops, leisure, work and distance moved from last home by social class, age and sex⁸



(1) CLG (2003/4) Survey of English Housing, (2) DCLG (2006) State of the English Cities: Liveability, (3) JRF (2005) Cleaning up neighbourhoods: Environmental problems and service provision in deprived areas, (4,7) DfT (2005) Attitudes to streetscape and street users, (5) DfT (2008) National Travel Survey, (6) National Statistics (2007), (8) The Future Foundation (2000) The Newspaper Society

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Skills and capability

Appraisal and packaging

6. Conclusions and next steps

41. Policies are grouped and then assessed against the three areas of success set out above: economic prosperity, health outcomes and enjoyment of space
42. Conflicts between different functions of roads and streets leads to high congestion and poor quality places
43. Competing demands for road space lead to a conflict between users
44. There is often lack of clarity over how to manage or resolve the conflicts between the different functions of urban roads and streets
45. And road and street design is rarely well informed by the needs of all road users, due to our limited knowledge about pedestrian trips and physical walking conditions
46. As a result, many residential and high streets are negatively affected by the priority given to the movement of vehicles
47. There is no integrated framework for managing local roads that takes into account both "movement" and "place" functions and there is limited guidance on managing conflicts

Policies are grouped and then assessed against the three areas of success set out above: economic prosperity, health outcomes and enjoyment of space

← Impact on quality of life →

Policy area	Desired policy outcome	Economic prosperity	Health outcomes	Enjoyment of space
Roads and streets	An optimal balance between movement and place functions of roads and streets	<ul style="list-style-type: none"> ▪ Congestion reduction and increased reliability 	<ul style="list-style-type: none"> ▪ Increased walking and cycling (and less emissions) 	<ul style="list-style-type: none"> ▪ Easier to navigate and more enjoyable streets
Modal shift	Enable a wider choice of journey than just the car, especially when this can benefit health and the environment; encourage active travel for short journeys	<ul style="list-style-type: none"> ▪ Congestion reduction (eg increased bus use) 	<ul style="list-style-type: none"> ▪ Increased walking and cycling (and less emissions) 	<ul style="list-style-type: none"> ▪ Appreciation of local community and environment
Spatial planning	Encourage the use of spatial planning to develop well connected mixed use urban areas	<ul style="list-style-type: none"> ▪ Reduced need to travel ▪ Agglomeration effects 	<ul style="list-style-type: none"> ▪ High quality street design encourages more people to walk and cycle and produces less emissions 	<ul style="list-style-type: none"> ▪ Mixed use areas with less traffic and roads are more pleasant to be in

Policies will be assessed against all three areas of quality of life: economic prosperity, health and enjoyment of space

Conflicts between different functions of roads and streets leads to high congestion and poor quality places

Policy

Roads and streets

Hierarchy

There are many functions of urban roads and streets—these often conflict

1. Vehicle movement



2. Cyclists/pedestrian movement



3. Provision of utilities



4. Public space



5. On-street parking



6. Public transport



7. Delivery, waste collection etc



8. Social functions



- Roads and streets in urban areas have many different functions. Conflicts and trade-offs between these functions need to be managed well if the transport network is to be successful at minimising congestion and encouraging high quality places
- These conflicts are badly managed in some urban areas leading to low quality of space, high congestion and poor outcomes for all road users. This is a particular problem where important strategic routes run through town centres
- Poor management of roads and streets is most often caused by:
 - designation of strategic routes by engineers based solely on the (historical) movement function of the road with little reference to the place functions the street performs, with designation of important streets developed in a parallel process by urban planners. This leads to conflicts between different functions on many roads/streets
 - limited guidance on what to do when there is conflict between different functions
 - strategic roads in cities outside London being managed by local authorities who have few incentives to take a city-wide view. This also prevents trade-offs between movement and place being made across entire strategic route corridors which would allow win-win solutions to be implemented

Competing demands for road space lead to a conflict between users

Urban streets and roads perform two functions: they act as a conduit for movement and they are places in their own right, especially important for residential streets and high streets

These functions lead to competing demands for space from vehicles (drivers/passengers in buses, cars, lorries, cycles) and those walking:

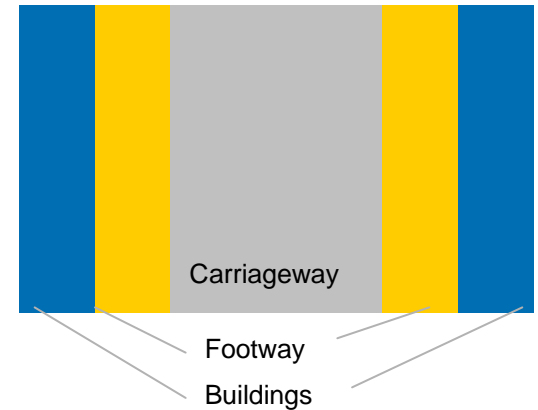
- on busier streets the demand exceeds the space available
- a trade off is sought, and frequently the place function is lost due to demand to keep vehicles moving

The problems vary according to the level of importance of the place or movement function. For example, a residential street has a high place function but ought to have a low movement function. A ring road would usually have a low place role but high movement function. The most difficulties arise where the place and movement functions are both high, such as high streets on arterial roads

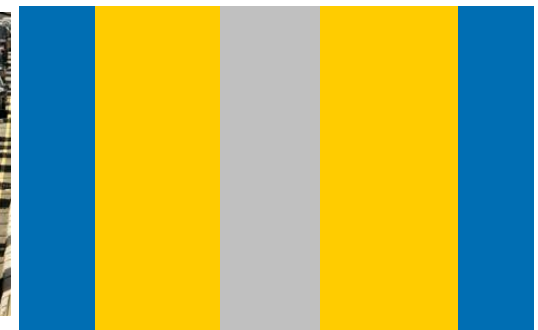
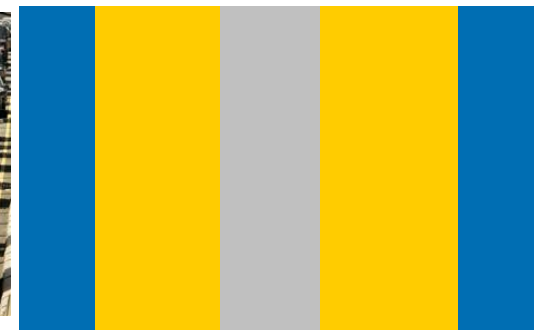
Simple reallocation of space from vehicles to pedestrians will not be the best solution on all streets:

- The priority needed for vehicles will vary depending on the type of street. If the movement function of the street can be downgraded, it should be possible to increase the amount of space allocated to pedestrians
- But where the movement function cannot be downgraded, other solutions will be needed

Space allocated mainly to traffic



Space allocated mainly to pedestrians



There is often lack of clarity over how to manage or resolve the conflicts between the different functions of urban roads and streets

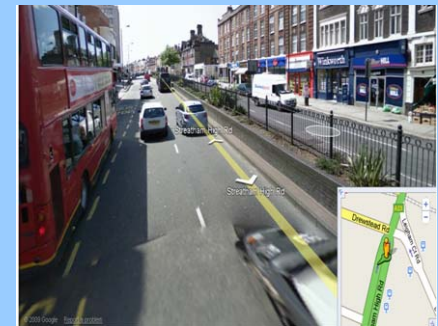
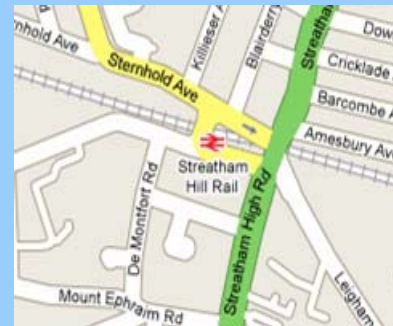
Conflicts between the different functions of roads and streets often lead to compromises resulting in both high congestion and unattractive public space

- Many urban roads are trying to achieve several different functions:
 - many strategic roads crucial to movement around a city go through important urban centres
 - on-street parking and deliveries take place on many strategic roads interrupting traffic flow
 - sub-surface utility networks are often underneath key strategic roads

- Lack of clarity over how these conflicts should be managed leads to poor outcomes for all road users in many urban areas:
 - many important urban ‘places’ and walking/cycling routes are dominated by motorised traffic making unattractive environments for other users (e.g. cluttered street furniture, air and noise pollution, poor road safety, narrow footways)
 - many important urban strategic roads are difficult for vehicles to move through (e.g. road blocked by on-street parking, deliveries and stopping buses, several pedestrian crossings frequently stopping traffic, traffic calming measures)

Example – Streatham Hill Town centre

- The A23 is a major strategic road linking Gatwick Airport, Croydon and Central London
- It passes through several important urban centres, including Brixton, Streatham Hill, Streatham and Norbury



- The section of the road through Streatham Hill Town Centre is a dual carriageway (with barriers separating opposing carriageways blocking pedestrian movement) carrying 32,000 motor vehicles per day, including over 1,100 HGVs.
- Cars are dominant, despite the important ‘place’ functions the street has (noted in the London Plan), though the need to cater for other functions (e.g. pedestrian movement) contributes to significant congestion
- The domination by cars seriously affects the quality of space for other users of the street – for example, it was named as “Britain’s Worst Street” in a 2002 BBC/CABE poll¹

(1) <http://news.bbc.co.uk/1/hi/uk/2270840.stm> Images: maps.google.com

And road and street design is rarely well informed by the needs of all road users, due to our limited knowledge about pedestrian trips and physical walking conditions

Travel statistics have tended to neglect the role of walking. For example, cities usually do not know

- Walking volumes on different roads and streets
- Volume of pedestrians crossing at junctions
- Origins and destinations of walking trips
- Numbers of people that access local services (such as public transport, schools and doctor's surgeries) by walking
- How walkable their area is (i.e. the function and quality of a place for pedestrians), and how this compares with other areas

This is resulting in some perverse outcomes

- Short walking trips are undervalued, which can mask the relative accessibility (hence welfare) of different communities depending on their location and whether or not they have use of a car³
- Street space may not be allocated proportionally to user volumes and needs; pedestrians may get proportionally less 'green time' at traffic lights than their volumes deserve
- Changes to pedestrian travel time resulting from transport schemes are not usually incorporated in project appraisals – potentially skewing real economic benefits

There are now technologies available that make systematic measurement of pedestrian movements possible without using expensive "clip board" methods^{1,2,3}

Method	Cost	Where in UK	How it works	Accuracy	Application
CCTV facial recognition	£4000, monthly maintenance charge of £60-£70	12 to 20 locations in London	Captures pedestrians walking by CCTV and then applies an algorithm to calculate pedestrian volume	85-99% ³	Best suited to busy locations. Has ability to accurately count in various conditions (crowded, different lighting conditions)
Pressure Pad	£1200-£2000, annual charge of £250-£500	24 TfL locations in London	Counts footsteps on the pressure pad beneath the footway surface using a pyro electric sensor	Accuracy +/- 5%	Used mainly across a mix of busy, medium and quieter sites
Vertical lasers	\$9000 ³	Select locations in London	Emits laser pulses to detect presence and direction of pedestrians	Accuracy 70-80% ²	Performance could be affected by different weather conditions

Automated pedestrian detection does has some limitations

- The capital costs of automated equipment may be high
- Specialised training may be required to operate it
- Automated devices are often not capable of collecting information on finer pedestrian characteristics and behaviours (e.g. age or mobility issues; movement direction)

(1) The Walking Plan for London - TfL (2004) (2) TfL Monitoring and Enforcement Cameras within London - TfL (2009) (3) Headicar (2009) Transport policy and planning in Great Britain

As a result, many residential and high streets are negatively affected by the priority given to the movement of vehicles

Residential streets

Until recently, guidance on designing streets in residential areas focussed on the movement function, which can result in domination by motor traffic and reduced the quality of life for local residents¹.

Evidence shows that:

- traffic levels on a residential street impact on social interaction, which is linked to residents' enjoyment of living in the area
- there is a link between traffic calming in residential areas and the number of journeys children make on foot rather than by car²
- the number of children playing in the streets and areas around their homes has decreased rapidly over the past thirty years
This is attributed mainly to parental and children's fear of traffic³
- 85% of adults felt it was important for children to be able to play safely in the street where they live, but a high proportion were still not prepared to park their cars an extra 50 metres away in order to achieve a better street environment⁴



Other urban streets such as high streets

The current situation is variable, with least problems on lightly trafficked or pedestrianised high streets. Most difficulties arise where a local shopping street also has a high movement function e.g. on arterial road where the desire for movement has traditionally been given priority over the use of the street as a local shopping centre and a place to visit.

Problems include:

- **lack of priority to pedestrians:** narrow pavements; difficult to cross; may be difficult to travel along (cross side roads)
- **parking and loading:** can cause congestion
- **road safety issues:** an over-cautious response can lead to many guardrails, which exacerbates the lack of pedestrian priority

This can result in the local shopping street being unattractive to users, leading them to travel elsewhere to shop



(1) Design Bulletin 32, (1977), (2). The Effect of Traffic Calming on Child Pedestrian Skills Development: TRL Report 600 (2004), (3) Matthews and Limb, (2000) (4) Department for Transport and the Office for National Statistics, (2004)

There is no integrated framework for managing local roads that takes into account both “movement” and “place” functions and there is limited guidance on managing conflicts

Policy

Roads and streets

Hierarchy

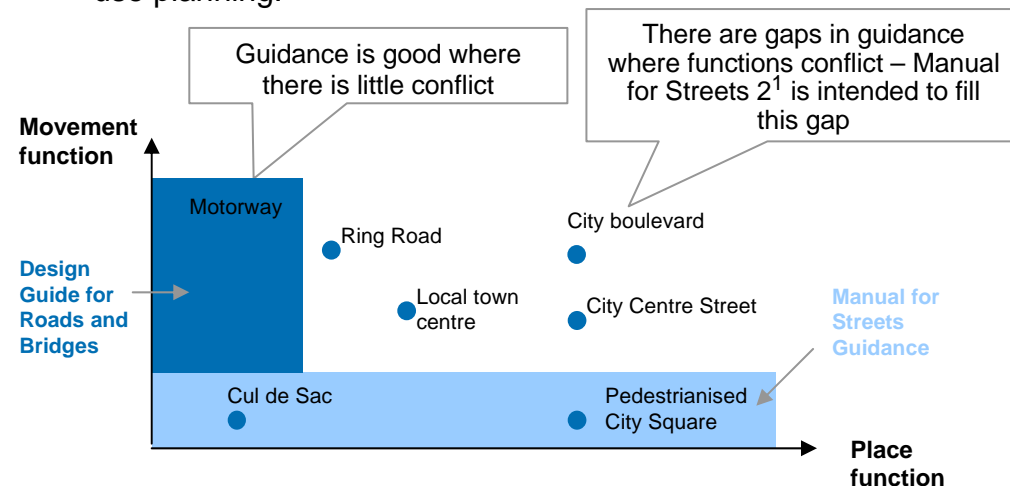
Current determination of the functions of roads and streets is often undertaken by two separate bodies

- The ‘movement’ function of roads and streets is largely determined by highways engineers, based on historical road designations without reference to the other functions a road performs:
 - DfT determines the network of strategic roads on which movement should be highly prioritised (the ‘Primary Route Network’)
 - the movement function of other roads are largely determined by their classification – ‘A’ roads and ‘B’ roads
 - every highway authority determines a Road Hierarchy with reference to the ‘movement’ functions a road performs
- The ‘place’ function of roads and streets is determined in a parallel process by urban planners
- This results in:
 - many conflicts between different functions of roads e.g. long-distance through-traffic encouraged to drive along urban high streets
 - a lack of challenge as to whether the “movement” functions a road is performing is appropriate given its other functions e.g. little consideration of re-routing important roads

Policy implication: more clarity on the movement and space functions of roads and streets has the potential to both improve quality of space and improve traffic flow

Gaps remain in the guidance offered to manage roads and streets

- Outside of London, all roads excluding motorways and trunk roads are managed by LAs who do not necessarily take into account city-wide cost and benefits in managing these roads
- The position of a road in the road hierarchy (i.e. the movement function it performs) has a strong influence on how it is managed and designed and for development control and land-use planning:



- Local authorities use their own judgement in determining how to manage the conflicts between different functions that arise on many streets

(1) Manual for Streets 2: wider application of the principles, forthcoming, DfT

1. Purpose

2. How and why we travel

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Modal shift

Spatial planning

Hierarchy

Street design

Congestion

5. Implementation

Governance

Leadership

Skills and capability

Appraisal and packaging

6. Conclusions and next steps

49. Good quality streets create enjoyable places for people and allow movement of traffic where and when necessary
50. Evidence shows “streetscape policies” can make streets more enjoyable when well implemented
51. But many previous recommendations to improve street design in the UK have not been fully implemented
52. Resulting in streetscape policies so far having a limited impact
53. Manual for Streets and the forthcoming Manual for High Streets are encouraging. However, there are currently no clear plans to ensure local authorities implement them
54. And good implementation is critical to the success of good street design, particularly leadership and interdisciplinary teams

Good quality streets create enjoyable places for people and allow movement of traffic where and when necessary

Characteristics of high quality streets include:

Residential streets



Parking should not be dominant

Designed primarily for people – pedestrians, cyclists and where possible children playing

Vehicular access, for private cars, deliveries and service vehicles

Good quality design can be used to reduce speeds, create areas for people to socialise, give pedestrians priority over motorised traffic, and encourage walking, cycling and use of public transport

High streets



Wide footways; places to sit; trees

Where possible, movement of traffic is subsidiary to movement of pedestrians

Safe, attractive and easy to access by pedestrians, cyclists and public transport

Easy to cross; easy to travel along: junctions give pedestrians priority and the streets are free from clutter

(*) Images from CABE

Evidence shows “streetscape policies” can make streets more enjoyable when well implemented

Streetscape policies take account of whether priority needs to be given to the “movement” or the “place” function of a street

Vehicles versus pedestrians: there is likely a trade off between people and vehicles, but studies show giving more space to pedestrians can bring about significant economic benefits for businesses, and vehicle trip times may not rise much^{1,2}



Speed reduction: reducing driver certainty by reducing sight lines can lower speeds without the need for signs or humps^{3,4}

Aesthetic quality: removing street clutter, including guardrails, can improve the attractiveness of the street without reducing safety (e.g. Kensington High Street⁵)

There is evidence that improving streetscape quality can attract more people to an area

Jan Gehl⁶ demonstrated that visitor numbers can be increased through improvements such as:

- improving the pedestrian network
- giving more priority to pedestrians
- providing attractive gathering places
- introducing more street trees

Pedestrian numbers after improvements	
Melbourne (city centre)	↑ 40% day ↑ 100% night
Copenhagen (city centre)	↑ 40%
Brighton (New Road)	↑ 62%

Ambience and enjoyment of space are not usually considered in scheme appraisal. Buchanan⁷ showed improved ambience can outweigh scheme costs (see table). Other schemes have ambience benefits that may significantly alter the scheme appraisal but on their own do not outweigh scheme costs

Street	Streetscape improvement	Ambience benefit/cost
Castle Street	Pedestrianisation: walking and cycling only. Improved paving, lighting, planting and seating	1.9
Hornsey Road	Shared space: wider pavement and narrower road at grade	0.5
Yerbury Road	Home Zone: includes shared space and parking layout designed to reduce speeds	0.2

(1) Goodwin (1998) Evidence on the effects of road capacity reduction on traffic levels, (2) Hass-Klau (1993) Impact of pedestrianization and traffic calming on retailing, (3) DfT (2005) Home Zones: Challenging the future of our streets, (4) DfT (2007) Manual for Streets, (5) RB Kensington & Chelsea (2005) Report on Road Safety in Kensington High Street, (6) Gehl Architects (2004) Towards a fine city for people, (7) Transport for London (2006) Valuing urban realm – business cases for public spaces

But many previous recommendations to improve street design in the UK have not been fully implemented

Streetscape refers to the design quality of streets and its visual effect, particularly the physical layout and its materials (blue text)

Delivery approaches embed enjoyment of space goals into the way transport and spatial planning is delivered, so that the benefits are widely realised (grey text)

Urban Task Force¹ (1999)

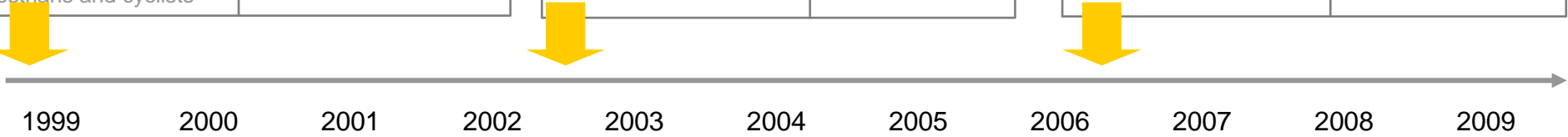
Recommendation	Progress
National programme of green pedestrian routes in urban areas	Guidance only. Existing routes are fragmented
Introduce Home Zones	68 schemes, believe limited further implementation but no data collected
Local authorities should prepare a public realm strategy	Not widely implemented
Funding and planning permission for development conditional on priority being given to pedestrians and cyclists	Encouraged in guidance only – no conditions set

Paving the Way² (2002)

Recommendation	Progress
Need strategies for improvement and maintenance of streetscapes	Good practice is localised
Need cross-sectoral management of streets	Good practice is localised
Urban design to form part of training for highways professionals	Individual efforts but no concerted inter-professional development

State of English Cities (SoEC)³ (2006)

Recommendation	Progress
Establish baseline for liveability in English cities	SoEC database covers only green spaces and brownfield sites
Develop local liveability audit tool for LAs	Not developed



(1) Urban Task Force (1999) Towards an urban renaissance, (2) CABE (2002), (3) DCLG (2006) State of the English Cities: Liveability

There are several initiatives to improve the quality of streets, but all are specific in application

Pedestrianisation

- Usually applied to town and city centre shopping streets
- May include provision for some public transport
- May be time specific e.g. daytime or weekends

Manual for Streets²

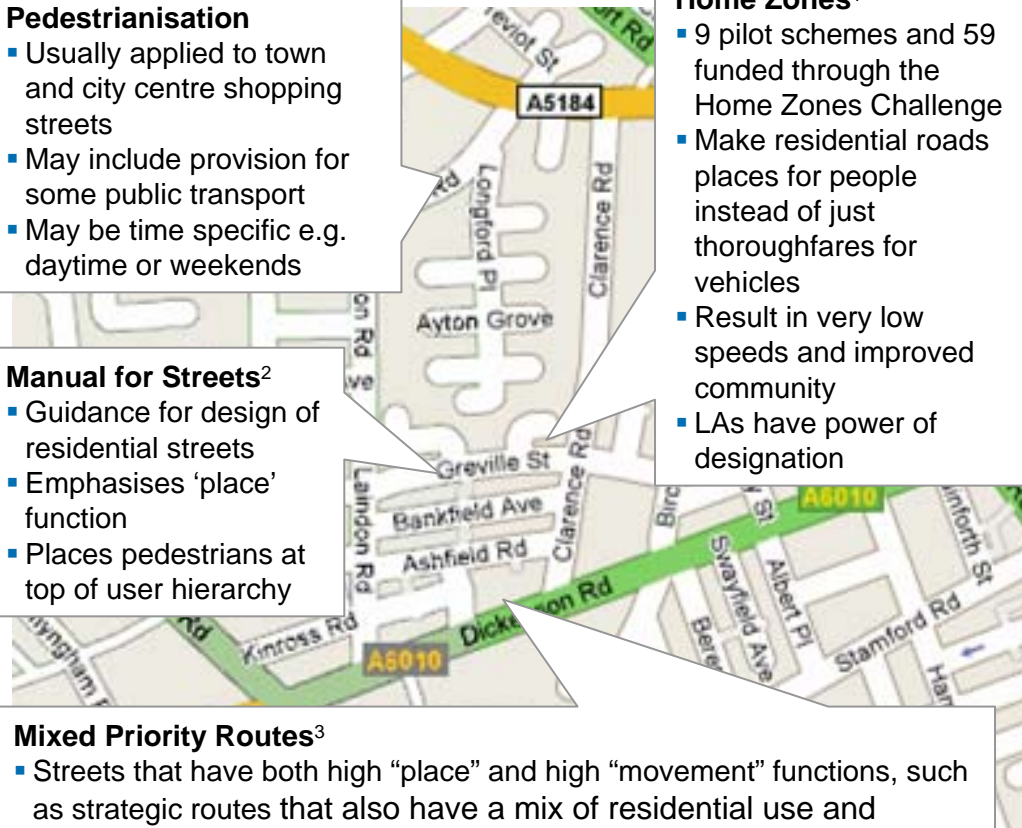
- Guidance for design of residential streets
- Emphasises 'place' function
- Places pedestrians at top of user hierarchy

Mixed Priority Routes³

- Streets that have both high "place" and high "movement" functions, such as strategic routes that also have a mix of residential use and commercial frontages
- Aim to give equal priority to all users: pedestrians, cyclists, public transport, and local and through traffic

Home Zones¹

- 9 pilot schemes and 59 funded through the Home Zones Challenge
- Make residential roads places for people instead of just thoroughfares for vehicles
- Result in very low speeds and improved community
- LAs have power of designation



This has led to two problems:

1. Piecemeal application

- Interventions are highly targeted and can be relatively high cost – often supported by challenge funding
- Success is frequently limited to one key route or a few residential streets, and rarely replicated across similar streets in the local authority

2. Gaps in guidance

- There is no single policy or guidance that applies to all types of urban street
- Fear of litigation can make street designers reluctant to divert from guidance
- DfT is working with IHT to develop guidance extending the principles in MfS to other streets. Care will be needed to ensure that definitions of streets do not appear to leave gaps

Policy implication: evidence shows that it is possible to increase the priority of place relative to movement but this will likely require making it part of mainstream design

Manual for Streets and the forthcoming Manual for High Streets are encouraging. However, there are currently no clear plans to ensure local authorities implement them

1. Manual for Streets - residential

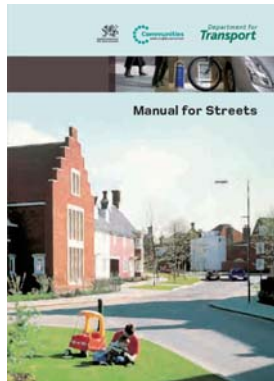
Manual for Streets (MfS) was primarily intended for new residential streets but can also apply to existing streets

MfS's policies accord with the vision for this project i.e. residential streets should prioritise 'place' over 'movement' and apply a user hierarchy; they should be interconnected to encourage walking, cycling and public transport. The policies

and guidance are backed up by evidence e.g. on the relationship between visibility and speed.

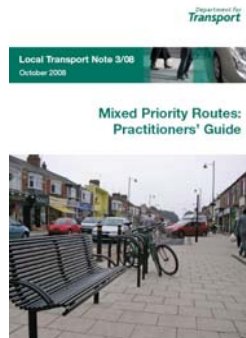
MfS was published in 2007, so it is a little early to judge whether it is being put to use. It is too early to say whether MfD is being put to wide use, but there have been calls for guidance on how to apply MfS principles more widely (MfS 2 should provide such guidance)

Immediately after publication, the Institution of Highways and Transportation hosted a number of seminars around the country to promote MfS and its principles. CABE was a key partner in the development of MfS and held a number of training events after its publication



2. Manual for High Streets

- 'Manual for Streets 2: a wider application of the principles' (MfS2) is intended to fill the guidance gap between residential streets (MfS, above) and the 'Design Manual for Roads and Bridges' (DMRB), which is the design standard for trunk roads but tends to be applied more widely
- The MfS2 contract is let and managed by Institution of Highways and Transportation, though DfT have part funded it and are on steering group
- The brief for the guidance states that it should cover, including:
 - analysis of the functions of busy urban streets and the tensions that exist between them
 - developing a strategic approach to classifying roads
 - design principles to help LAs develop policies that achieve better streets
 - striking a balance between different street functions
 - considering how a place works aesthetically, as well as functionally



3. Mixed priority routes

DfT provided £1m per scheme for 10 demonstration project on 'mixed priority routes' (streets with both movement and place function, like Walworth Road in Southwark). Followed up with good practice guidance. Not clear that there is any explicit policy to encourage more LAs to follow suit

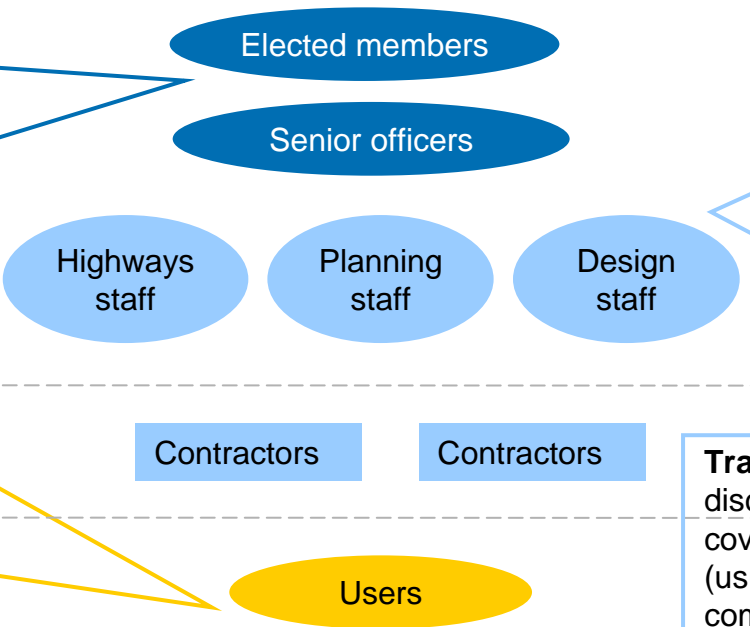
And good implementation is critical to the success of good street design, particularly leadership and interdisciplinary teams

Leadership
Successful places are usually championed at a senior level. This ensures local authority commitment to the project, including funding. It can be vital to ensure effective inter-disciplinary working. **Example:** Kensington High Street*

Community engagement
Keeping local communities informed and involved helps ensure a successful result for all users and can manage expectations. Engagement by participants can give them genuine ownership of developments, for example by voting on what changes should be made. **Example:** Walworth Rd, Southwark* and Sustrans' DIY streets

Data collection
There is a lack of evidence on economic impacts, traffic speeds, accident rates, pedestrian and cycle numbers, modal shift, and user perceptions. Publicising data from successful streets can help overcome lack of awareness elsewhere

Schematic hierarchy in typical unitary authority
In two-tier authorities highways staff are top tier, planning and design staff lower tier



Interdisciplinary working
Creating streets for all users requires close working and understanding between different professionals, particularly highways and design staff. Communication needs to be ongoing, from beginning to end, and across all levels. **Example:** Maid Marian Way, Nottingham*

Training routes pay little attention to other disciplines. Few engineering courses cover urban design, and if available (usually at masters level) it is rarely compulsory¹. Urban designers come from a range of disciplines, but also need some grasp of engineering principles

Policy implication: interdisciplinary working that integrates planning and decision-making of both “place” and “movement” function of a street can help reduce conflict between different users

(1) see SU (2009) Quality of Place: Improving the planning and design of the built environment

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6. Conclusions and next steps

56. There are six main types of intervention that can reduce the economic cost of congestion
57. Many areas have a poor understanding of the causes of their congestion and do not fully measure it. This makes the design of targets and the prioritisation of policies difficult
58. For many of these interventions, “induced demand” effects can reduce their congestion benefits in the absence of measures to lock in the benefit
59. Road pricing is likely to be a highly effective way of resolving congestion in major urban areas
60. “Smarter choices” policies have been effective where tried but are not widespread; more evidence on long-term effects is required
61. Supply-side policies to increase the efficiency with which road space is used can be successful, yet are not currently used to their full potential
62. While many cities are rolling out intelligent traffic management measures to improve traffic flow, more could be done
63. Parking may be an under-utilised policy tool to reduce congestion, though the economic impact of restricting parking is unclear and implementation could be difficult
64. The current design of the parking market skews decisions on modal choice and can be self-fulfilling
65. Freight and LGV journeys make up a significant proportion of total road traffic and delivery and collection of goods can often interrupt traffic movement

There are six main types of intervention that can reduce the economic cost of congestion

1. Increase private costs of car use

- road pricing
- fuel duty
- parking charges



Examples in bullets

2. Reduce demand for car travel including encouraging use of other modes

- modal shift to walking and cycling
- public transport supply, quality, cost and information
- Smarter Choices
- Freight delivery



3. Restrict traffic directly through regulation

- off-street parking restrictions
- restrict supply of driving licenses
- restrict supply of vehicles



4. Increase supply of roads or the effectiveness with which they are used through better network management

- on-street parking restrictions
- signal timings
- road widening
- re-allocation of road space



5. Minimise temporary reductions in road space and their impact

- roadwork management
- accident prevention and management
- Incident management



6. Improve information about journey times, costs and routes

- variable message signs
- real-time congestion information (e.g. radio, internet, satnav)



Many areas have a poor understanding of the causes of their congestion and do not fully measure it. This makes the design of targets and the prioritisation of policies difficult

Every major conurbation already has an action plan in place to tackle congestion, though it is unclear whether the causes of congestion are sufficiently understood

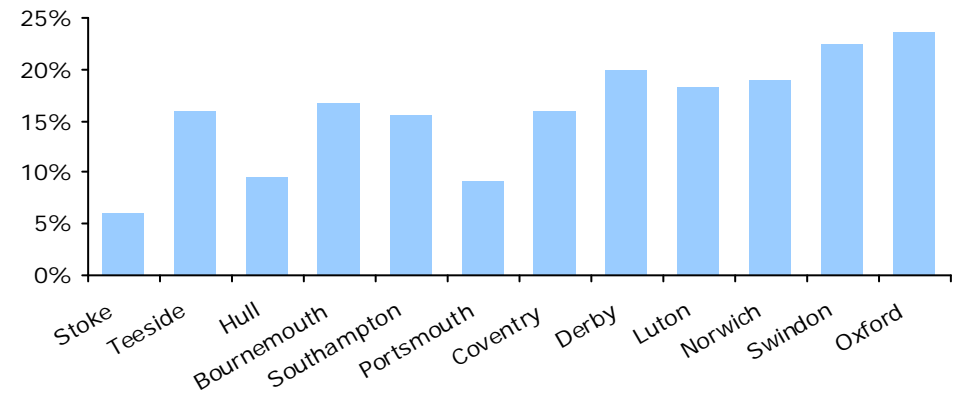
- The introduction of the Urban Congestion PSA Target has led to big improvements in the understanding of the causes of congestion and prioritisation of its reduction in large conurbations
- However, there is potential for further improvement in the utilisation and analysis of data to understand:
 - transport demand in the area
 - constraints of the network
 - patterns and causes of congestion
 - location of key congestion hotspots
 - impact different measures to tackle congestion could have on different parts of the network
- The scope of current congestion targets is limited:
 - congestion is only monitored on a few radial routes during the morning peak
 - there is no ‘reliability’ dimension to targets
 - current targets are unambitious – most targets allowed for increased congestion levels
 - little account is currently taken of other factors e.g. the impact of recession on transport demand making congestion targets easier to meet

Congestion is a problem in many smaller cities – some are not adequately analysing the causes of the problem and prioritising congestion reduction

- The Urban Congestion PSA target only applies to major conurbations*
- Congestion problems affect many smaller cities too, though the capacity to understand the causes of congestion, the priority given to its reduction and the plans put in place to tackle congestion are often less well developed than in the PSA areas

Many cities outside the PSA target areas experience significant congestion during peak periods

Per cent reduction in average speed on selected links during peak period compared to off-peak (1999/00, 2004)¹

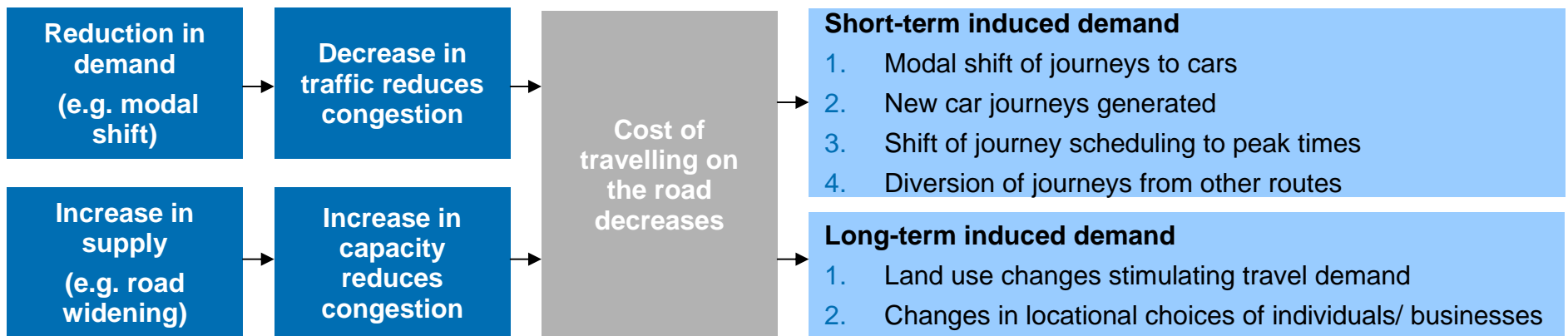


(1) Traffic Speeds in English Urban Areas – DfT (2005); data for Stoke, Teesside, Hull, Bournemouth, Southampton and Portsmouth is for 2004, other data is for 1999/00 when surveys in these areas ceased (*) London, Manchester, the West Midlands, Merseyside, Tyne and Wear, South Yorkshire, West Yorkshire, Nottingham, Leicester and Bristol

For many of these interventions, “induced demand” effects can reduce their congestion benefits in the absence of measures to lock in the benefit

- Reductions in journey time from policies that reduce congestion lead to a number of short and long-term responses. These can increase traffic as individuals and firms adjust their behaviour to the reduction in the cost of travelling by car:
 - a 20% decrease in travel time leads to an average ~10% increase in traffic in the short-term and a ~20% increase in traffic in the long term¹. This impact varies widely across different areas
 - “induced” modal shift towards the car could lead to public transport services being withdrawn as there is no longer the ‘critical mass’ to make services commercially viable, leading to further modal shift
- However, this does not mean that policies to reduce congestion are not effective in the absence of “lock-in”:
 - there will be some positive impact on congestion (at least in the short to medium term)
 - economic prosperity is still likely to be improved (through facilitating higher mobility)

This also occurs in reverse—e.g. taking road space away leads to negative ‘induced demand’ and a lower impact on congestion than anticipated²



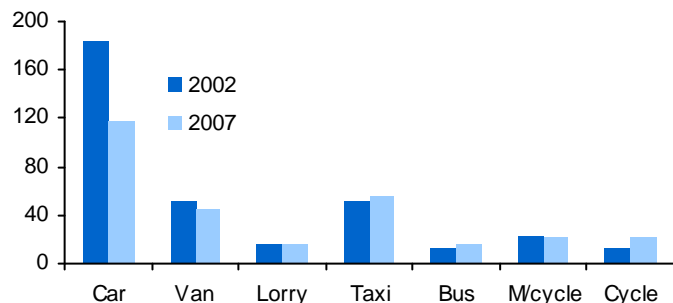
Policy implication: interventions which reduce demand or increase the effective supply of road space may not reduce congestion without measures to ‘lock-in’ the benefit and avoid induced demand

¹ Short-run elasticity with respect to travel time of -0.5 in the short-term and -1 in the long-term, cited in ‘Empirical evidence on induced traffic: a review and synthesis’ Phil Goodwin, Transportation 23:35-54 (1996); see also ‘Trunk roads and the generation of traffic’ Standing Advisory Commission on Trunk Road Assessment (1994); (2) See e.g. ‘Evidence on the Effects of Road Capacity Reductions on Traffic Levels’ – Goodwin, Hass-Klau and Cairns (1998) <http://www.worldcarfree.net/resources/freesources/Evide.htm>

Road pricing is likely to be a highly effective way of resolving congestion in major urban areas

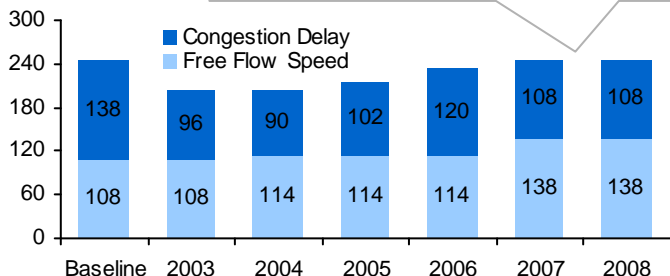
The London congestion charge was successful – the number of cars entering the zone fell 30% and there has been an enduring impact on congestion

Number of vehicles entering the central London congestion charging zone per day 2002-2007 (000s of vehicles)¹



Congestion in the central London charging zone during charging hours 2002-2007 (seconds travel time per km)¹

Free-flow travel time has increased by 30 seconds since 2002 – congestion is still ~14% lower than 2002



However, a number of constraints prevent the most effective road pricing policy from being implemented, though simple schemes are still likely to have a significant economic benefit

- Road pricing is, in theory, the most cost-effective mechanism for reducing congestion due to its flexibility to changing conditions (e.g. time, location)
- However, while the technology for ‘first-best’ flexible road pricing already exists, there is not yet confidence that a system built around it could be cheap enough to run and meet all user concerns on privacy, fairness and ease of use
- As a result, road pricing schemes are currently operated on a less effective cordon or area basis – charging vehicles if they enter a particular area²

Some road pricing schemes are expensive to operate, though there are technological solutions that would bring costs down significantly

- The London congestion charging scheme costs £109 million/year to operate (excluding capital costs) – over 50% of scheme revenues. This limits the BCR to a modest 1.5³
- However, there are technological options (e.g. in-vehicle units to automate charging process) and design choices (e.g. cordon pricing versus area-based pricing) that could reduce operational costs significantly
- For example, the costs of operating the Stockholm road pricing scheme were only 28% of revenues partly due to widespread use of in-vehicle units⁴

Policy implication: road pricing is likely to be a cost effective and high impact way of reducing congestion in major urban areas, provided its design features and the technology used allows operational costs to be minimised

(1) Central London Congestion Charging: Impacts Monitoring 6th Annual Report – TfL (2008), free-flow travel time estimates use night-time speed surveys from 2002, 2004 and 2007; (2) Feasibility Study of Road Pricing in the UK – DfT (2004) concluded that “(the benefits from) cordon charging are significantly more modest than (more sophisticated) charging methods”; (3) Central London Congestion Charging Scheme: Ex-post evaluation of the quantified impacts of the original scheme – TfL (June 2007); (4) Cost Benefit Analysis of the Stockholm Congestion Charging System – Eliasson

“Smarter choices” policies have been effective where tried but are not widespread; more evidence on long-term effects is required

“Smarter choices” refers to a range of measures aiming to reduce the demand for car travel¹

However, there is still a limited evidence base and a number of unanswered questions:

Measure (examples)	Potential reduction in congestion
Workplace travel planning	3-5% potential reduction in peak traffic with a 30-50% take-up of plans by employers
School travel planning	Unclear – take-up is already high, but unclear congestion impact. Many school travel plans have failed to decrease the use of the car for trips to school ²
Car sharing	Potential 4% reduction in peak traffic if with 10% take-up
Home working	Potential 2% lower peak traffic if 30% of people work 1 day a week at home
Night freight delivery	Pilot programme in Wandsworth reduced day-time traffic and congestion, and reduced costs and emissions, without adverse noise impacts ³

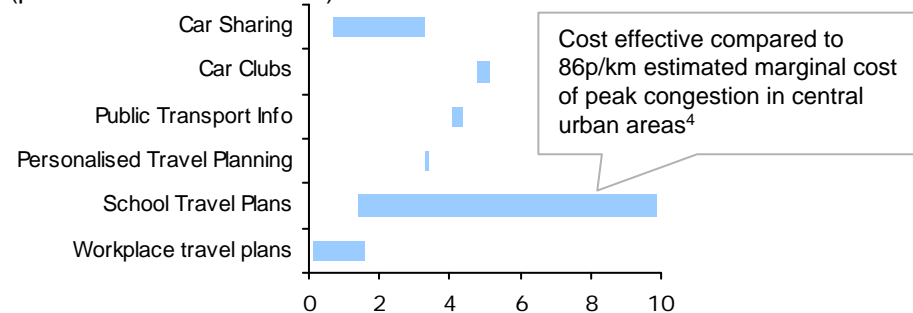
- Long-term impacts of measures (e.g. will there need to be ‘repeat doses’ to lock-in benefits?)
- Impact on congestion (rather than on general modal shift)
- Policy design (large variation – what features work?)
- How to prevent “induced demand” effects

Existing evidence suggests that these measures could be a cost effective way of reducing traffic and congestion

Further investigation of the case for significantly increasing funding for these measures is required

- The final evaluation of the Sustainable Travel Towns initiative expected in the autumn should provide more evidence³
- The greatest impact on congestion will likely be those measures affecting commuter and education-related travel which make up a large proportion of peak travel demand

Estimated range of cost effectiveness of Smarter Choices measures (pence/vehicle km reduced)¹



Policy implication: “smarter choice” measures can be successful in tackling congestion provided they are well targeted and the benefits can be locked in. They also have positive health and quality of space impacts. More evidence is required to decide how best to achieve modal shift

(1) Unless stated, evidence comes from SU analysis based on *Smarter Choices: Changing the Way We Travel* - Cairns et al (2004) and the National Travel Survey; (2) School Travel: Second Report of Session 2008/09 – House of Commons HC 321 (March 2009); (3) Cited in ‘Delivering a Sustainable Transport System: A Logistics Perspective’ – DfT (2008); (4) Evaluation of Sustainable Travel Towns Pilot is in progress, Cairns (Autumn 2009, forthcoming)

Supply-side policies to increase the efficiency with which road space is used can be successful, yet are not currently used to their full potential

There are a number of cost effective measures which could increase road capacity and reduce peak-time congestion

Measure	Potential increase in capacity
Optimise traffic signal timing (SCOOT ¹)	12-20% ² increase in capacity
Restrict on-street parking on strategic roads (Red Routes)	7-20% ³ increase in capacity
Road space prioritisation (e.g. pedestrian crossing timing)	Significant: 22% increase in the number of traffic lights in London contributed to a large congestion increase ⁴
Junction design	Can be significant
Traffic regulations and enforcement	Significant e.g. Islington parking enforcement pilot had large BCR ⁵

A number of measures would improve reliability by minimising the impact of temporary losses of road capacity

Measure	Impact
Accident prevention	~5% of serious congestion in London is due to accidents ⁶
Streetwork permits and management	~36% of serious congestion in London is due to streetworks ⁶
Incident management	Significant
Adverse weather strategies and road maintenance	Significant ~2% of trunk road delays 07/08 due to flooding on one day ⁷

While many of these measures are used in urban areas already, more could be done

- SCOOT is in use in 150 towns and cities, though further roll-out, updating and full use of its functions would increase road capacity²
- Red Routes are only in widespread use in London (they are currently being implemented in Birmingham)
- Unclear if congestion is sufficiently taken into account in determining pedestrian crossing provision, design and timings – London is currently exploring the impact of altering pedestrian crossing timings on car journey times
- Capacity at junctions could be enhanced by minor schemes⁸

There are some potential implementation barriers to supply-side measures

- Many measures require revenue funding
- Business/public resistance to red routes and traffic regulations
- Road maintenance and adverse weather budgets are relatively low priorities for local authorities with finance pressures
- Building cooperative relationships between local authorities and utility companies to allow effective management of streetworks
- Appropriate skills of local highways managers

Policy implication: policies that increase the effective supply of road space can reduce congestion significantly. However, there are trade-offs between some measures (e.g. reducing crossing times allowed on pedestrian crossings) and 'quality of space' and health objectives

(1) Split Cycle and Offset Optimisation Technology; (2) 'The SCOOT Urban Traffic Control System' (DfT); (3) See e.g. 'Red Route Initiative: A34 Stratford Road' – Solihull (2005), TfL (unknown); (4) Written Answer by Mayor to London Assembly Question 2063/2006 (September 2006); (5) <http://www.tfl.gov.uk/corporate/media/newscentre/archive/7607.aspx>; (6) 'Implementing the Traffic Management Act' – Presentation to NJUG by Peter Brown, Chief Operating Officer Streets, TfL (12 November 2004); (7) 'Road Statistics 2007: Traffic, Speeds and Congestion' DfT (2008); (8) Eddington (2005)

While many cities are rolling out intelligent traffic management measures to improve traffic flow, more could be done

Most ITA areas have programmes in place to increase the use of intelligent traffic management measures

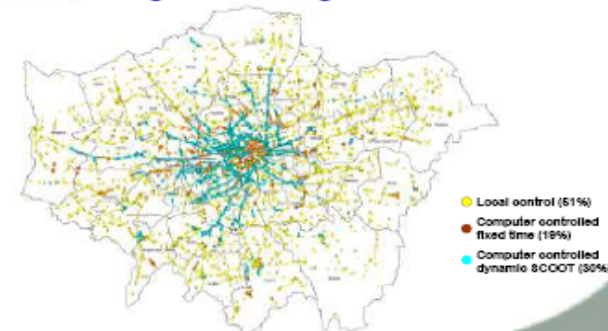
- The first permit scheme for streetworks has been approved (in Kent) and most ITAs are looking at developing their own schemes to reduce the disruption caused by roadworks
- Many LAs are investing in traffic management measures as part of their strategy to meet the Network Management Duty
- For example:
 - the West Midlands is currently developing an integrated urban traffic control centre (£27 million) and a Red Route network (£120 million for full scheme, £28 million of which is currently funded)¹
 - Greater London is implementing several traffic management measures with the aim of improving the flow of traffic around the city²
- Other ITAs have an on-going programme of work rolling out traffic management measures e.g. expanding the use of SCOOT to more traffic lights, integrating more information in their integrated traffic control centres

While intelligent traffic management measures are being increasingly utilised there is far more that could be done

- Some ITA areas still do not have integrated traffic management systems and/or policies (e.g. G Manchester) in place and no current plans to implement them. Only G London and W Midlands have Red Routes
- Even London, where use of intelligent traffic signals is most developed, has the potential to utilise the technology to a greater extent (see below)

Intelligent traffic signal technology in Greater London is mostly used on the key arterial routes in Inner London³

Traffic signal coverage



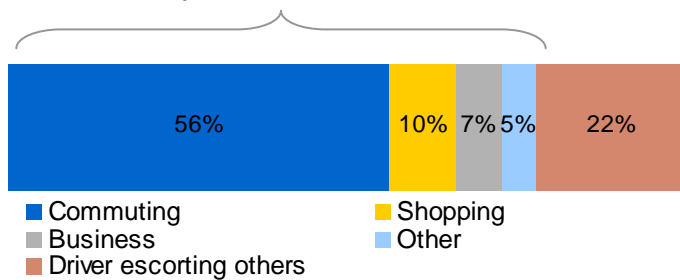
Policy implication: there is a lot of scope to use traffic signal technology, streetwork permits, red routes and other traffic management measures to reduce congestion

Parking may be an under-utilised policy tool to reduce congestion, though the economic impact of restricting parking is unclear and implementation could be difficult

Many peak time car journeys require parking to be available at the destination

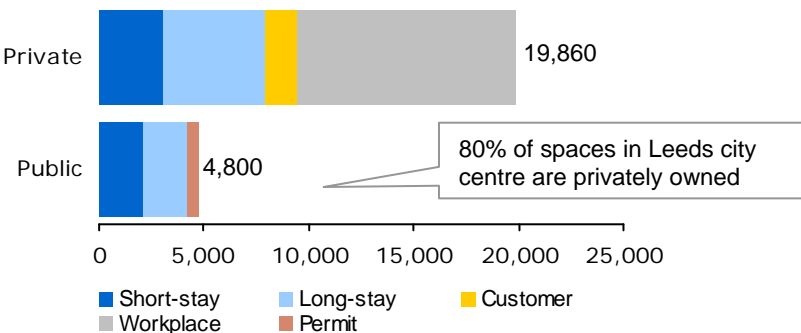
Personal car travel journeys during the weekday morning peak (7am-9am) by journey purpose¹

78% of am peak car journeys require parking to be provided at the destination



The majority of parking spaces in most urban areas are privately owned

Non-residential parking spaces in Leeds city centre by type²



Pricing parking more efficiently could reduce congestion. Nottingham's proposed Workplace Parking Levy is anticipated to have only limited impact

- £250/year Workplace Parking Levy in Nottingham is estimated to reduce peak-time car trips by 0.5-1.4%³ - half the impact of a £1 congestion charge
- There are three main reasons for this limited predicted impact:
 - businesses may not pass the levy onto their staff
 - through and non-parking traffic is unaffected
 - A high levy would be required to change behaviour

The economic impact of policies aimed at restricting parking supply is unclear. There are also a number of implementation difficulties

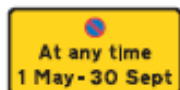
- Restricting parking supply could have a substantial impact on traffic – if there is nowhere to park many journeys by car could not occur⁴
- However, it may have a negative economic impact e.g. preventing trips, more search time spent finding a parking space increasing congestion
- Implementing such restrictions would also be difficult:
 - 76% of commuters use private workplace parking⁵ and most parking spaces are privately owned – few policy levers available to regulate existing private parking
 - they may have a negative economic impact e.g. preventing trips
 - public and business resistance to parking restraint, and adverse impact on local government finances (lower parking revenue)

Policy implication: parking restraint policies could have a large impact on congestion in urban areas, though the economic impacts are unclear and implementation could be difficult

The current design of the parking market skews decisions on modal choice and can be self-fulfilling

A significant proportion of urban land is used for parking to sustain current modal choices—this has a number of undesirable implications

- Current travel patterns require a lot of parking spaces to be provided around people's homes, public services and around workplaces (each space requires 11.5 m² of land)¹
- This adds to the land required for a given land use, with a significant opportunity and business costs
- In itself, the land required to sustain current patterns of travel can make high car use self-sustaining
 - every trip-generator requires large amounts of land for parking
 - this imposes constraints on the maximum density of urban areas – different buildings are further apart
 - this can make alternative modes less attractive – for example, walking and cycling are less feasible due to the longer distances involved



Modal choice is skewed by the provision of 'free' parking to car drivers—a subsidy from non-car drivers to car drivers

- A significant proportion of parking spaces are provided to car drivers for "free" or at heavily subsidised rates which do not take account of the opportunity cost of the land nor the maintenance costs of car parks, with costs bundled with the cost of other services (e.g. supermarkets) or as lower wages (workplace parking)
- The cost of this "free" parking is borne by those who choose alternative modes:
 - cost of free workplace parking reduces cash salary of every employee
 - cost of subsidised council parking increases council tax bills for every taxpayer
- This has a number of undesirable impacts:
 - skews modal choice towards solo car use particularly for short journeys (cost of parking not paid at the point of use and subsidised by non-drivers)
 - inequitable (those who drive – who tend to be more affluent - are subsidised by those who do not)
 - inefficient allocation of parking spaces (parking spaces not allocated to those who value them most)

Policy implication: free parking is in fact a cost paid by those who do not drive. This is economically inefficient and inequitable

(1) SU analysis of Update of London Parking Supply, MVA for TfL (July 2005)

Freight and LGV journeys make up a significant proportion of total road traffic and delivery and collection of goods can often interrupt traffic movement. More could be done to manage this

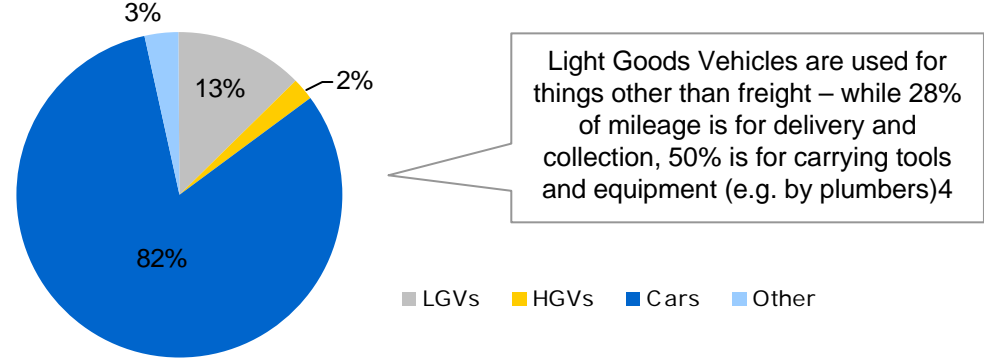
- Freight vehicles and light vans contribute significantly to urban traffic¹
 - 15% of all road traffic are freight vehicles or commercial vans (and over 20% on urban trunk roads)
 - 50% of urban traffic increases 1998-2008 were due to light vans

- Delivery and collection of goods can cause significant interruption to vehicle flows on important roads, particularly in town centres:
 - a significant proportion of deliveries to urban businesses are made on-street
 - this can seriously interrupt traffic flow in some areas if it causes a blockage or affects junctions

- There are several examples of good practice in reducing the negative impact road freight movement can have while benefiting business and the economy- but are not widespread, e.g:
 - night freight delivery
 - freight quality partnerships
 - freight consolidation centres
 - provision of convenient loading points to avoid on-street loading that interrupts traffic flow combined with loading restrictions and enforcement
 - local drop-off centres for home deliveries
 - better understanding of reasons behind rapid increase in LGV traffic

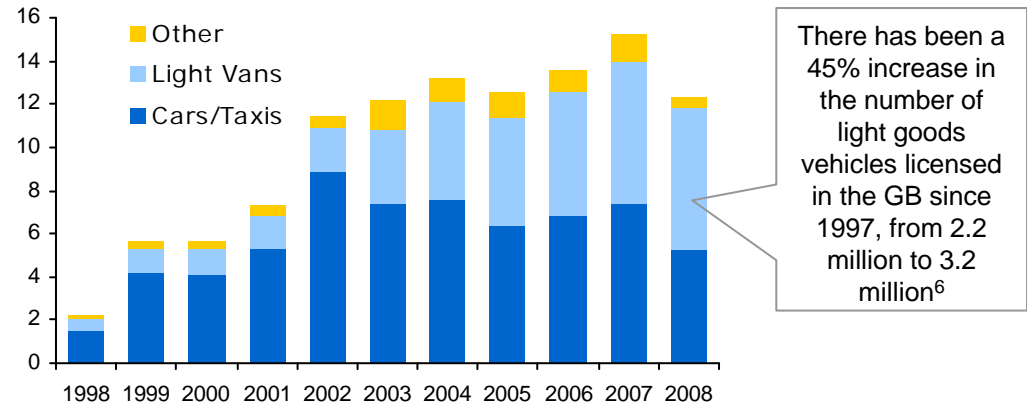
Freight vehicles account for 15% of motorised traffic in urban areas

Per cent of kms travelled on all urban roads by different motorised modes³



Light vans have accounted for approximately half of urban traffic growth between 1997 and 2008

Cumulative urban traffic growth since 1997 by type, billion vehicle km⁵



(1,2,3) Roads, Traffic and Congestion DfT (2008) , (4) Van Activity Baseline Survey, DfT (2008), (5) SU analysis of Road Traffic Statistics, DfT (various); (6) Vehicle Licensing Statistics, DfT (2006, 2008)

1. Purpose

2. How and why we travel

3. Transport's impact on urban success

Economy

Health

Space

4. Policy effectiveness

Roads and streets

Modal shift

Spatial planning

Active travel

Buses

5. Implementation

Governance

Leadership

Skills and capability

Appraisal and packaging

6. Conclusions and next steps

69. Pollutant emissions from transport have been falling since 1990. These trends have been driven by technological improvements resulting from the regulation of new vehicles

70. But despite overall reductions in pollutant emissions many of our cities still contain particulate levels above EU limits. Other policy interventions may therefore be needed in the short term

71. There has been a consistent reduction in road traffic accidents, Government recognises that policies should focus on lowering residential and urban speeds

72. Barriers exist that are limiting short journeys from being cycled or walked

73. Policy interventions have not yet delivered systematic increases in cycling and walking

74. And government itself is not as coordinated as it could be across departments all aiming to increase active transport levels

75. The benefits of and impacts to cycling and walking are not adequately measured in existing appraisal methods. This may be suppress investment in cycling and walking

76. But better methods for appraising walking and cycling exist, which could significantly improve funding decisions

77. Government has increased per capita investment in cycling in a selection of towns and cities. Initial data suggest this is leading to an increase in cycling levels

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Appraisal and packaging

6. Conclusions and next steps

78. Cycling Demonstration Towns and Cycling Cities and Towns have invested in infrastructure as well as schemes to provide the skills and information necessary to support behaviour change

79. Experience shows that improving the “walkability” of urban areas can considerably increase levels of walking

80. Recent approaches to change travel behaviour asked people to reassess their travel choices, motivations and attitudes. Habit and short cuts in decision-making make this difficult to do

81. Current sustainable travel interventions suggest that public and private sector employers have many opportunities to influence travel behaviour change in commuters

82. Experience from other policy areas suggests that to create long-term behaviour change, interventions need to target both the underlying attitudes and drivers which can modify behaviour

83. Some policies already seek to change attitudes towards cycling and walking. Interventions tend to be direct, interpersonal and target personal, community and organisational cultures

84. Other programmes seeking to modify behavioural drivers tackle the barriers limiting cycling and walking and develop incentives to make active modes more attractive

85. Lessons from other policy areas suggests that the most effective interventions are those targeted at particular segments of the population

86. Interventions should also be sustained over time to maximise the likelihood of eliciting behaviour change

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87. Internationally, different mixtures of 'hard' and 'soft' measures have been used to increase active travel: both appear necessary and neither alone is sufficient for widespread modal shift
88. Cycling modal share is much higher the Netherlands and Denmark than in Great Britain. Groningen is a Dutch city that has used spatial planning to increase cycle use
89. Copenhagen has a long history of cycle use. A comprehensive and growing segregated cycle network and widespread facilities has helped establish a strong cycling culture
90. In the US, Portland has made significant progress in increasing the modal share for cycling by investing in radial and neighbourhood networks, commuter facilities and promotion
91. In New York City public space is being returned to pedestrians through design policy statements and part-time street closures
92. Melbourne has undergone substantial rejuvenation over the last two decades to successfully increase levels of pedestrian traffic
93. Copenhagen pioneered car-free streets and public spaces to become a highly pedestrianised city. Denmark now boasts the second highest walking levels in the EU

Pollutant emissions from transport have been falling since 1990. These trends have been driven by technological improvements resulting from the regulation of new vehicles

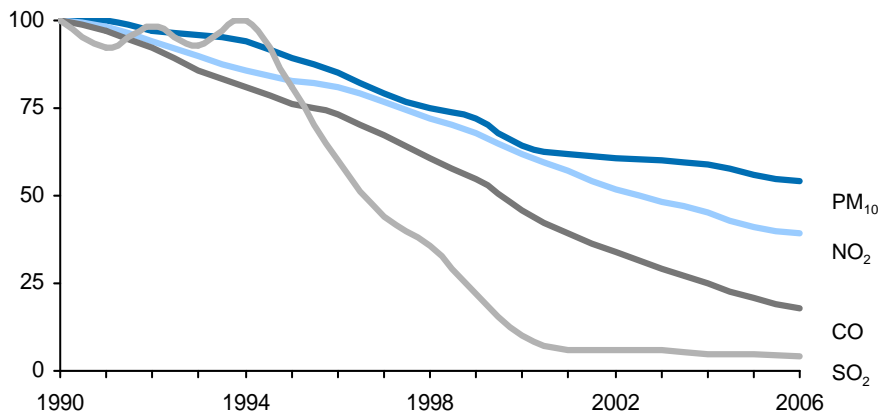
Policy

Modal shift

Active travel

Over the period from 1990 to 2006 emissions of harmful pollutants from road transport have been reduced

UK emissions from road transport (modelled), 1990-2006 (1990 = 100)¹



- Between 1990 and 2001 a marked reduction in concentrations of air pollutants was achieved. This is estimated to have had a positive health impact avoiding 4,200 premature deaths and 3,500 hospital admissions per year²
- An evaluation included within the latest Air Quality Strategy suggests that the policies implemented during the 1990-2001 period have generated approximately £68bn in benefits against an implementation cost of £6bn²

European standards regulating new vehicle emissions have been particularly important in delivering improvements in air quality in urban areas³

- The pollutant emissions from new road vehicles are regulated separately for light-duty vehicles (cars and light vans) and for heavy-duty vehicles (trucks and buses). Increasingly tougher standards have been implemented since 1993. The current standard in operation for light duty vehicles is Euro 4 and for heavy duty vehicles is Euro IV. In addition:
 - more stringent regulations have been agreed for light duty vehicles; Euro 5 and Euro 6 will become mandatory in 2009 and 2014 respectively (assuming most vehicles are replenished on a ten year cycle, the fleet could meet these more stringent emissions regulations by 2025); and
 - future Euro VI standards for HGVs are being finalised. This would put in place more stringent PM₁₀ requirements

There is a concern that compliance with these standards may incur a fuel penalty of 2-8% resulting in higher carbon emissions⁴

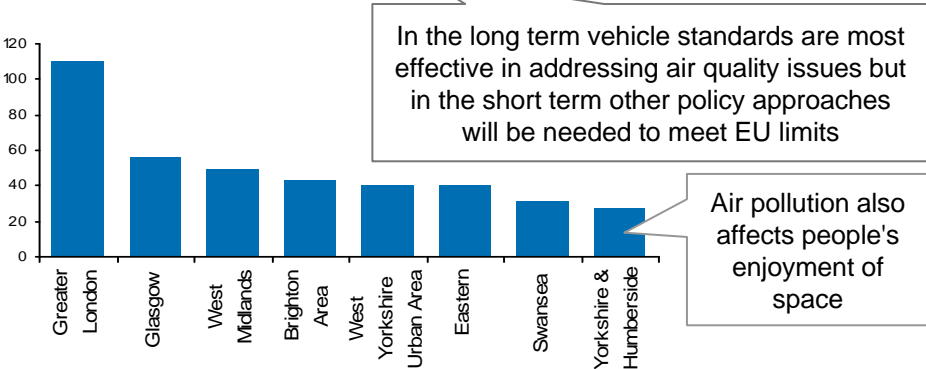
- Regulation of transport fuels has also supported air quality improvements. Petrol is now required to be unleaded, be low in sulphur content and comply with limits to other specified organic components

But despite overall reductions in pollutant emissions many of our cities still contain particulate levels above EU limits. Other policy interventions may therefore be needed in the short term

- Policy
- Modal shift
- Active travel

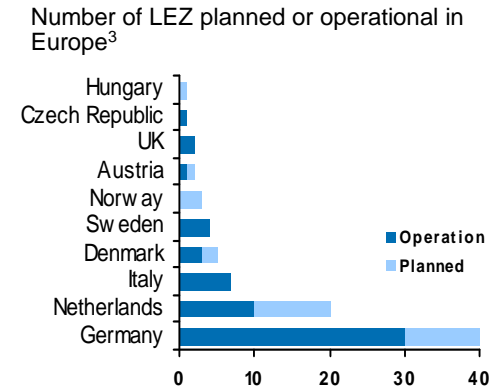
In many of the largest urban areas current levels of pollutants are still in excess of European limit values

Total number of days for which air quality in UK zones and agglomerations breached EU limit values¹



Low Emission Zones can be an effective short term measure for delivering air quality improvements. Eighty-five LEZs are planned or in operation across Europe

- Low Emission Zones (LEZs) are used to reduce traffic pollution in urban centres
- The number of days where air quality in Milan breached PM₁₀ limits was reduced by 44% (62 days) following the introduction of the 'Ecopass Zone'²



In addition to new vehicle standards, other national and local measures can be used to expedite the achievement of EU air quality objectives and limits

Examples of policy approaches to reduce demand for the use of polluting vehicles

	Limit access for heavy polluters	Encourage alternatives	Reduce travel
Examples	<ul style="list-style-type: none"> • Implement Low Emission Zones 	<ul style="list-style-type: none"> • Incentivise uptake of new vehicles • Make public transport attractive • Promote walking and cycling 	<ul style="list-style-type: none"> • Reduce the average distances travelled • Reduce the no. of unique trips

- London introduced an LEZ in February 2008 for heavy goods vehicles and buses. Cars, motorcycles and small vans were not included in the initial phases of the LEZ. The new Mayor has announced his intention to suspend the third phase of the LEZ, which was due to affect vans and minibuses in 2010
- Impact assessments were conducted to inform the initial decision about implementing an LEZ.⁴ Cost estimates to 2015 ranged from £360-480m and monetised health benefits ranged between £170-£670m*. Cost benefit ratios put forward to the Mayor ranged between 0.4 and 2.0

(1) PM10 Time Extension Notification – Defra (2009); (2) Communication from FCO; (3) <http://www.lowemissionzones.eu>; (4) Report to the Mayor – TfL (2007)

*Note: the range of health benefits is a composite of two methodologies. Using Defra/IGCB approaches the impact was estimated to be £170-240m but using EU/CAFE assumptions benefits are £250-420.

Recent updates to COMPEAP advice (Interim statement – COMPEAP (2006) suggest that the CAFE estimates are likely to be more representative of the real health benefits

There has been a consistent reduction in road traffic accidents, Government recognises that policies should focus on lowering residential and urban speeds

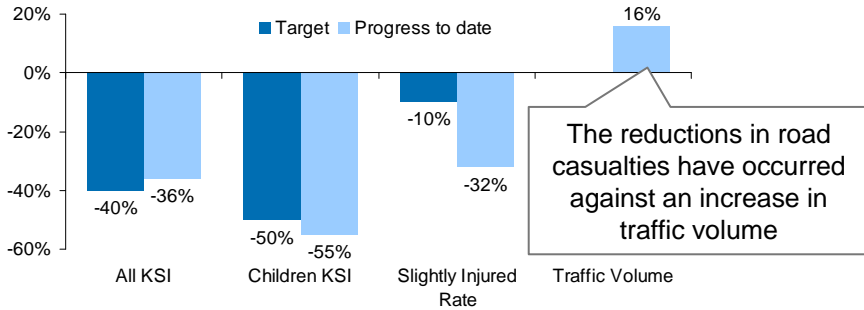
Policy

Modal shift

Active travel

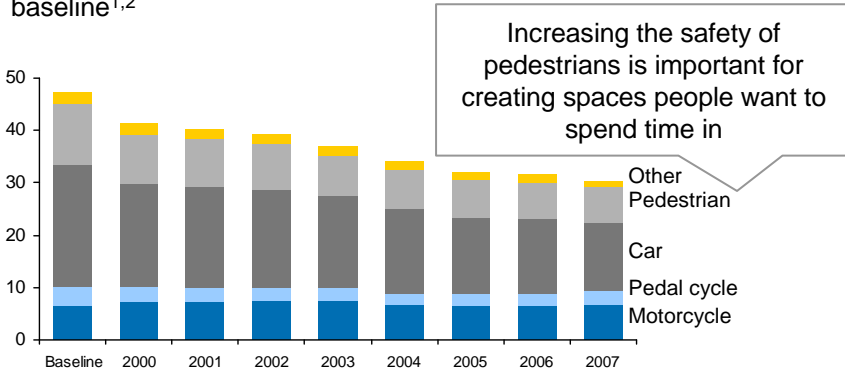
The number of killed and seriously injured (KSI) road casualties has fallen significantly during the period of the current road safety strategy^{1,2}

Percent change in a selection of metrics in comparison to 1994-98 baseline



There has also been a consistent reduction in the number of KSI casualties involving pedestrian and car users

Annual number of KSI casualties (000s) in comparison to 1994-98 baseline^{1,2}



Previous policy has addressed five factors to reduce the likelihood and mitigate the impact of road traffic accidents

- **Speed:** getting vehicles to move at a speed which is appropriate for road conditions (e.g. speed restrictions and road signs)
- **Fitness to drive:** making sure drivers are fit to operate a vehicle and focused doing so (e.g. reducing drink driving and mobile phone use)
- **Awareness of other road users:** making road users conscious of the presence and behaviour of other road users (E.g. media campaigns, information and road signs)
- **Vehicle design:** improving the safety of vehicles for car users and pedestrians (e.g. seat belts, air bags, and crumple zones)
- **Road design:** Improving the physical environment transport travels through (e.g. road layout and materials)

DfT's road safety strategy to 2030 focuses on four main areas to create a "deal for the road user"³



Policy implication: residential speed reduction can help increase people's enjoyment of space in urban areas, as well as reduce accidents

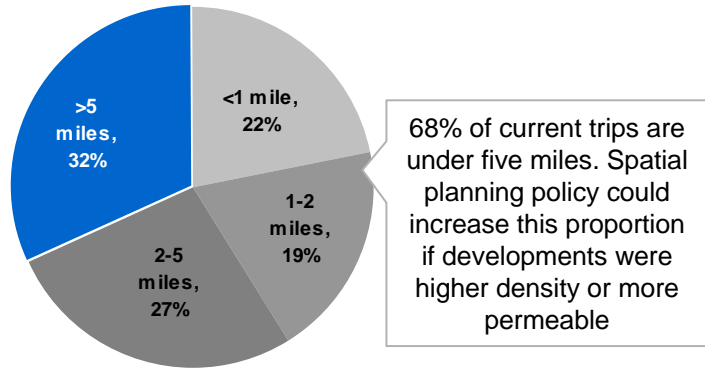
(1) Tomorrows Roads Safer for Everyone – DfT; (2) Road Casualties Great Britain: 2007 Annual Report – DfT (2008); (3) Draft Road Safety Consultation Document – DfT (2009)

Barriers exist that are limiting short journeys from being cycled or walked

- Policy
- Modal shift
- Active travel

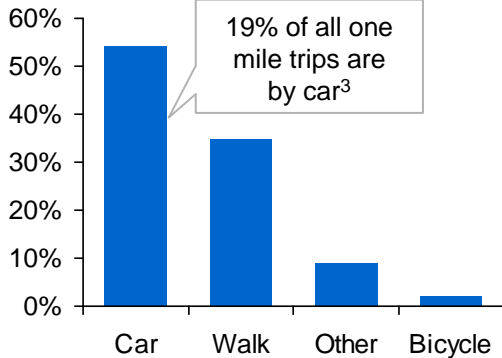
There is potential for more short trips to be made on foot or by bike. More than two-thirds of trips are less than five miles

Proportion of trips by distance¹



Half of trips under five miles are taken by car

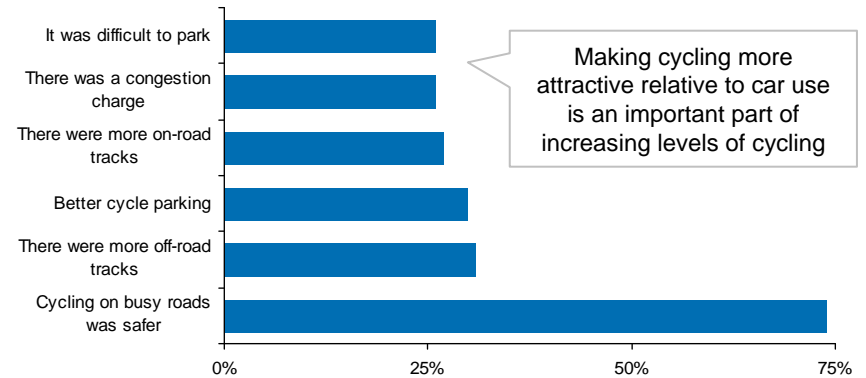
Modal split of trips <5 miles²



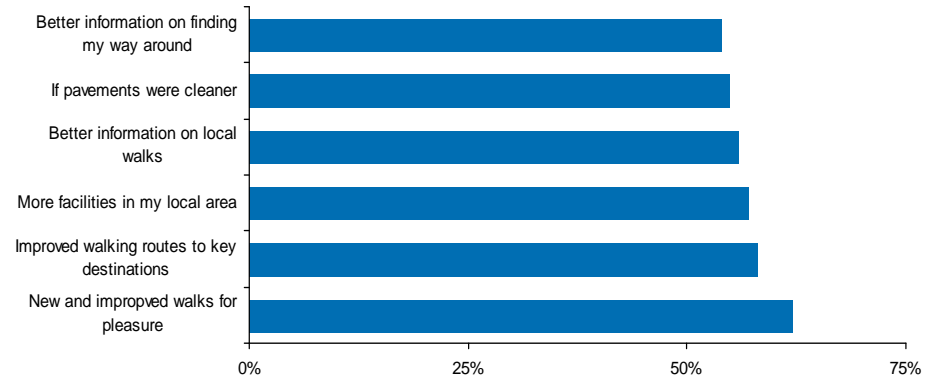
Not all of these journeys need to be by car: evidence suggests that four in five of these trips could be switched to other modes⁴

To increase the levels of cycling, a number of perceived and real barriers need to be addressed

Attitudinal research: percent agreeing that they would reduce their car use if...⁵



Attitudinal research: percent identifying what would motivate them to walk more⁶



(1, 2, 3) National Travel Survey – DfT (2006) / SU analysis (4) Mackett et al – Centre for Transport Studies, UCL (2000) (5) Cycling: Personal Travel Factsheet – DfT (2007) (6) Attitudes to walking – Synovate, prepared for TfL (2009)

Policy interventions have not yet delivered systematic increases in cycling and walking

Policy
Modal shift
Active travel

A range of planning tools and strategies acknowledge the benefit of increasing the level of walking and cycling and encourage consideration of measures to achieve this. However, data on outputs at local level suggests that, whilst some areas have had success, policy has not delivered systematic increases in walking or cycling



National Cycling Strategy	Local Transport Plans	Walking and Cycling: An Action Plan
<ul style="list-style-type: none"> ▪ The National Cycling Strategy was published in 1996 with an ambition to double cycling levels by 2002 and quadruple them by 2012 ▪ Progress against these was disappointing with little or no change in the numbers of trips or distances recorded¹ ▪ These targets were reviewed and eventually abandoned by DfT in 2004 	<ul style="list-style-type: none"> ▪ The latest LTP guidance encourages local authorities to deliver active travel initiatives³ ▪ Capital projects for cycling schemes have been funded through the £3.14 billion LTP Integrated Transport Capital fund. £190 million (6%) of this was invested in cycling in the 2001-2006 period⁴ ▪ An evaluation of the Local Transport Plan process highlighted active travel is an area where outcomes have been below targets and expectations⁵ ▪ The level of ambition for cycling has been low: in LTP2 40% of authorities aimed for an 11-20% increase in cycling, 25% aimed for 20-100% increase, and up to 15% had no targeted for cycle growth at all⁶ 	<ul style="list-style-type: none"> ▪ DfT published 'Walking and cycling: an action plan' in 2004 ▪ This set out 42 actions which covered land-use planning, transport planning, infrastructure improvements and actions to influence travel behaviour ▪ Whilst recognising the importance of outcome measure the actions were monitored on the basis of outputs ▪ Progress monitoring shows that most of the identified actions have now been achieved although NTS and other data show there has been little or no change in the numbers of trips or distances recorded on roads⁷

(1,2) Long-Term Process and Impact Evaluation of the Local Transport Plan Policy – Atkins et al (2006), (3) LTP Guidance, DfT (2009), (5) Atkins, PwC and Warwick business School (2007), Long Term Process and Impact Evaluation of the Local Transport Plan Policy, (4) Planning for Cycling – SQW for Cycling England (2008), (5,6) DfT Walking and Cycling: an action plan – progress update, (7) National Travel Survey DfT

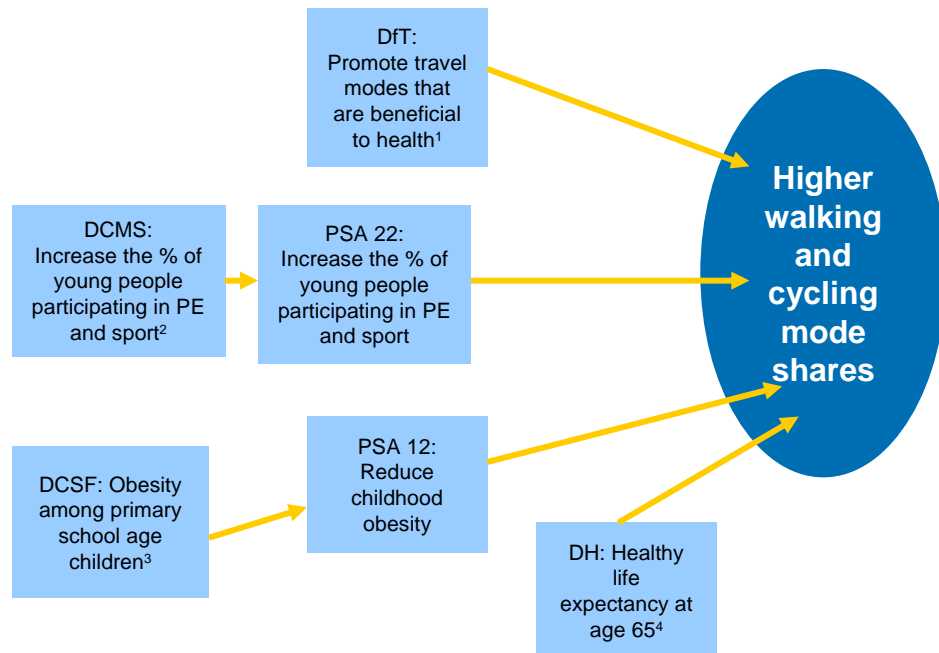
And government itself is not as coordinated as it could be across departments all aiming to increase active transport levels

Policy

Modal shift

Active travel

A number of government departments are seeking to increase active transport levels



Policy implication: unless the activities of departments to achieve these goals are aligned, resource inefficiencies and continuing decline in walking and cycling levels are likely to result

Active transport is not embedded as a priority in decision making, planning and policies

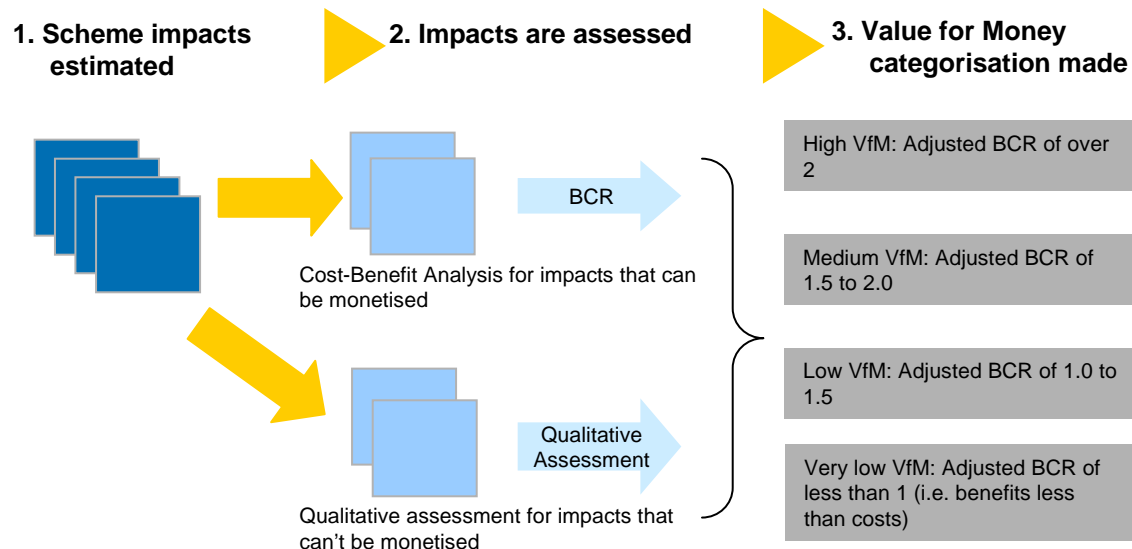
- There are countless successful projects with walking and cycling elements, such as travel plans, safe routes to school, walking school buses and walk to work day. However, there is a danger that these actions are separate and not coordinated, and inadequate to tackle the strong trend of decline⁵
- Walking and cycling are usually delivered as part of broader policies and projects, such as roads, streets, public transport, spatial planning, urban development, and national health policies
- However, there is often inadequate consideration of the implications of these policies on walking and cycling levels
- As well, walking and cycling policy making often occurs without broader consideration of the trade-offs required (e.g. disincentives to short car journeys to achieve a mode shift in walking and cycling)⁶
- There is a need for walking and cycling to be given greater priority at a higher level in transport, spatial planning and health institutions involved

The benefits of and impacts to cycling and walking are not adequately measured in existing appraisal methods. This may suppress investment in cycling and walking

NATA (New Approach to Transport Appraisal) is the framework DfT uses to help inform major decisions about regulations, policy and investment*

- Local authorities bidding for capital funding have to demonstrate the case for transport schemes against five criteria
- Value for money is the main criteria guiding scheme appraisal. Strategic fit; Financial; Commercial and Delivery criteria are also taken into account
- The refresh has incorporated an assessment from Health Economic Assessment Tool for cycling; a walking HEAT is in development by the WHO²

Judgements about value for money are informed by benefit cost ratios and qualitative evidence about the impact of a scheme



Most factors relating to walking and cycling are assessed qualitatively

- Carbon, physical fitness, noise, and accidents are quantitatively monetised. However, factors such as condition of walking and cycling environments, accessibility, severance, ambience and townscape are not included in BCRs
- Some of these factors are qualitatively assessed, and a judgement is made as to whether these are sufficiently large to change value for money rankings.
- However, authorities often find it more difficult to take account of qualitative factors in value for money assessments
- This means schemes which significantly benefit or impact walking and cycling are not equally prioritised compared to other schemes, skewing investment decisions

(1) Valuing urban realm: Business cases for public spaces - TfL (2006), (2) see http://www.euro.who.int/transport/policy/20070503_1

(*) It should be noted that NATA only applied for schemes in excess of £5m but the principles of NATA apply to smaller projects through the use of Transport Analysis Guidance (TAG)

But better methods for appraising walking and cycling exist, which could significantly improve funding decisions

There are available methods for appraising walking, but they need further development

- A range of tools exist which measure how well urban areas accommodate pedestrian travel, such as Living Streets' community street audits, walkability and pedestrian level of service audits, and to some extent, ENCAMS' Local Environment Quality surveys
- The Pedestrian Environment Review Scheme (PERS) is a fairly reliable method. It is more objective, systematic and comprehensive than other tools, and it measures environments from end users perspectives

- PERS consists of an on-street audit process, which can be applied on links, crossings, route, bus stops, interchange spaces and the public realm

PERS characteristics
Quality of environment
Personal security
Permeability
User conflict
Surface quality
Maintenance
Lighting
Legibility
Dropped kerbs
Obstructions
Effective width

30% of London's street network has been audited using PERS¹



PERS was recently used to measure the 'ambience' benefits of three street improvements in London²

Scheme	Intervention	Ambience BCR
Hornsey Road	Shared space	0.5
Castle Street	Pedestrianisation	1.9
Yerbury Road	Home zone	0.2

The ambience benefit alone (i.e. not including other benefits such as increased property values or improved local economic activity) could make a big difference in the overall appraisal of many schemes

Tools like PERS could have a number of applications:

- assessing and prioritising scheme design options and building business cases
- appraising the benefits and impacts of transport schemes to pedestrians and cyclists, and informing investment decisions
- comparing the walkability and bicyclability of different locations or urban areas, to inform policy development

Further development of PERS is probably required to ensure:

- confidence the PERS assessment will provide consistent results (e.g. when used by different people on the same street)
- that future benefits are borne out in reality (i.e. how physical improvements to street quality will affect the PERS score)
- converting a PERS score to a monetary value is robust

(1) PERS and valuing urban realm - Transport Research Laboratory (2009) (2) Valuing urban realm: Business cases for public spaces - Transport for London (2006)

Government has increased per capita investment in cycling in a selection of towns and cities. Initial data suggest this is leading to an increase in cycling levels

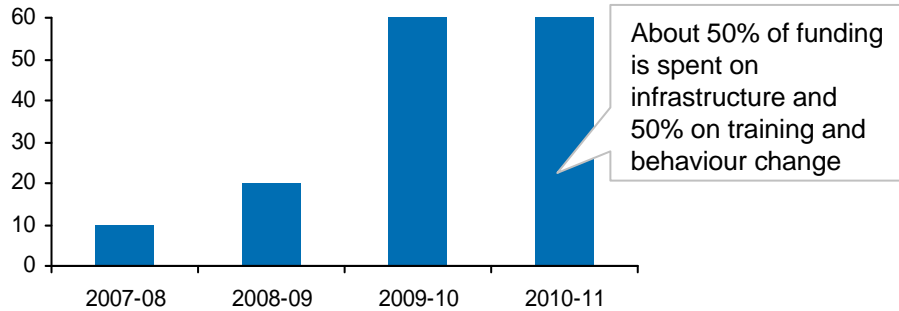
Policy

Modal shift

Active travel

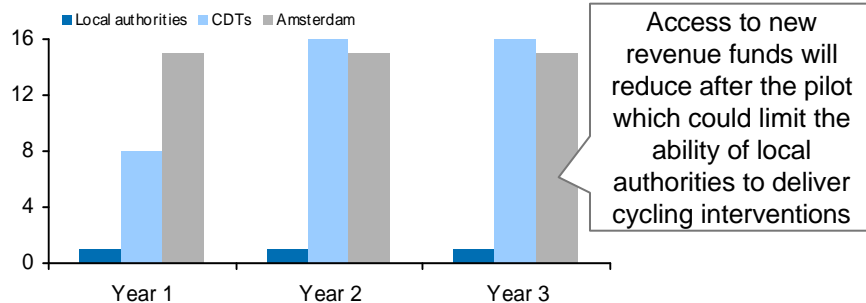
The three-year budget allocation for Cycling England has been increased from £30m to £140m. Of this £48m supports Cycling Cities and Towns*

Annual budget for Cycling England until 2010-11



CDTs have used match funding from Cycling England to increase per capita investment to the level of leading European cycling cities

Comparison of annual per capita spending (£) on cycling in different authorities across the three years of the CDT pilots²



Data from the initial six CDTs suggest that schemes had a positive impact on the levels of cycling³

Aylesbury: the number of people saying they are using a bike as one of their main modes of transport has risen from 3-14% over the course of the pilot

Brighton: a personal travel planning programme has led to an increase of 172,000 cycle trips per year in an area of 10,000 households

Darlington: the proportion of children cycling to school has risen from 1-4% over the course of the pilot

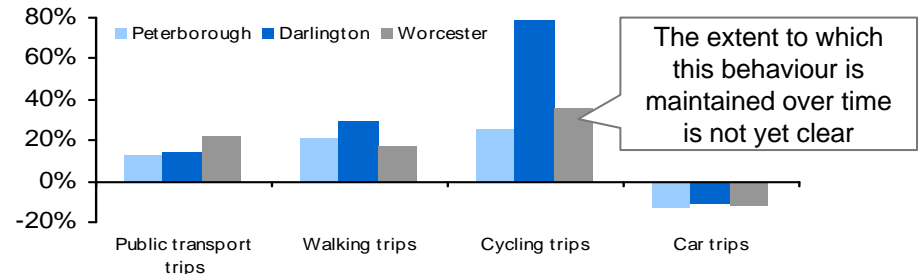
Derby: cycling has increased by 11% on the Pride Park riverside path since 2006, and by 38% since 1998

Exeter: 72% of people think that it is now easier to cycle than it was at the beginning of the pilot

Lancaster: the number of parked cycles counted in the city has increased by 48% since the beginning of the pilot

Emerging data also suggest that Sustainable Transport Demonstration Towns have had success in encouraging more cycling and walking trips

Percent change in number of trips by mode in the three demonstration towns⁴



(1) A Sustainable Future for Cycling – DfT (2008); (4) Letter from DfT Under Secretary of State to Chief Executives of participating towns – DfT (2007)

*Note: The Cycling Demonstrations Towns and Cycling Cities and Towns are: Aylesbury, Brighton & Hove, Darlington, Derby, Exeter, Lancaster and Morecambe, Bristol, Blackpool, Cambridge, Chester, Colchester, Leighton, Shrewsbury, Southport, Southend, Stoke, Woking and York

Cycling Demonstration Towns and Cycling Cities and Towns have invested in infrastructure as well as schemes to provide the skills and information necessary to support behaviour change

Policy
Modal shift
Active travel

Conventional cycling interventions have focussed on delivering infrastructure. Through LTP1 funding (2001-2006) £175m was made available for capital investment in cycling in England (excluding London)¹ but outcomes were below targets and expectations.² More recent work through Cycling Cities and Towns (CCT) takes a holistic view, improving skills, providing information and creating infrastructure to change behaviour. Evaluation of these interventions suggest that they are cost-effective: for individual interventions cost-benefit ratios of 1:7 have been estimated.^{3,4} and across a range of interventions cycling schemes return more than £3 for every £1 spent¹

	Behaviour change requires skills, information and infrastructure	Different interventions will target different users for different purposes	These interventions deliver benefits which are in excess of their costs
Skills	Schemes like Bikeability exist to provide more and better cycle training for children and adults	<ul style="list-style-type: none"> Focussing on young children and adolescents may limit the short-term health impact of increasing cycling 	<ul style="list-style-type: none"> Schemes of this sort return £7 for every £1 spent⁴ but delivery of these schemes requires sustained revenue funding
Information	Interventions can be made at individual and community level through GPs, leaflets and mass media campaigns. This can range from detailing health benefits to travel planning	<ul style="list-style-type: none"> Different sub-groups are motivated by different things and require information through different channels. Using customer insights and segmentation allows information to be targeted 	<ul style="list-style-type: none"> Evaluation of the effectiveness of Bike It officers – who work in schools to provide cycling and health information – is small but positive (1:1.4)⁴
Infrastructure	The connectivity, safety and quality of cycling and walking networks is likely to influence whether people view these modes as credible alternatives to car travel	<ul style="list-style-type: none"> Different infrastructures are likely to attract particular types of cyclist so interventions need to be clearly targeted at achieving a particular outcome with a particular user group 	<ul style="list-style-type: none"> The London Cycle Network has focussed on high density commuter routes. Analysis showed a return of approximately £4 for every £1 spent³

In Copenhagen 54% of cyclists cite speed and convenience as their main reasons for cycling⁵

Policy implication: increasing active transport will require significant behaviour change. There is an opportunity to use lessons from demonstration pilots to make delivery of cycling and walking interventions more effective, widespread and systematic

(1) A Sustainable Future for Cycling – DfT (2008), (2) Atkins (2007), (3) An Economic Analysis of Environmental Interventions to Promote Physical Activity – York Health Economics (2007), (4)Valuing the Benefits of Cycling – Cycling England/SQW; (5) Copenhagen Bicycle Account (2006)

Experience shows that improving the “walkability” of urban areas can considerably increase levels of walking

Policy

Modal shift

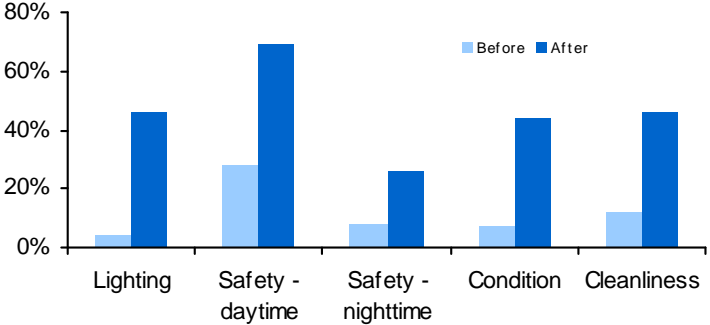
Active travel

A range of pedestrian improvement schemes in London have shown positive results for both pedestrian volumes and walking quality

	Scheme description ¹	Evidence ²
Old Street	The Old Street Promenade of Light scheme (Islington) upgraded a roadside open space, with footpath resurfacing, tree planting, new seating and better lighting	Pedestrian flows increased by 31%, though a more modest 10-15% increase may be more accurate due to adjacent refurbishments. Proportions of females, children, youths and the elderly all increased, indicating a more welcoming space
Castle Street	Along Castle Street (Kingston), a restricted vehicle access scheme was coupled with pedestrianisation and street remodelling to establish a well used pedestrian space	This area experienced a 12% increase in pedestrian flows and a disappearance of pedestrian congestion due to the increased amount of space
Abbey Road	On Abbey Road (Newham), a new crossing refuge was installed in response to high pedestrian volumes at a particularly dangerous crossing point, accompanied by road markings to encourage drivers to slow down	A new crossing resulted in a consolidation of crossings at the safe point. 50% less pedestrians crossed at a particularly dangerous bend
Dolben Street	The Dolben Street and Burrell Street Light at the End of the Tunnel scheme (Southwark) aimed to reduce the impact of railway viaducts by improving lighting, footpaths, cleanliness and the general appearance of the public realm, and creating new business units from the space	Pedestrian activity increased by 14% and 30% respectively, and there was a rise in all tested indicators for site quality

All aspects of Burrell tunnel assessed by the public were regarded more positively after refurbishment

Percentage of respondents that selected very well lit, very safe, very good condition, very clean etc. when asked to select from a range of responses before and after improvements on Burrell Street in LB Southwark³



(1), (2), (3) Colin Buchanan (2007) BSP 05/06 Walking Outcome Monitoring

Recent approaches to change travel behaviour asked people to reassess their travel choices, motivations and attitudes. Habit and short cuts in decision-making make this difficult to do

Policy
Modal shift
Active travel

What are travel choices?¹

- Work from studies of behaviour change in transport suggests that travel decisions are many and varied. A selection of travel choices is set out in the table below

Journey reason	Choice of origin and destination
<ul style="list-style-type: none"> What activities to do? <ul style="list-style-type: none"> – work, school, shopping, recreational, social, care/escort etc. How frequently to make certain journeys? Whether to link journeys? 	<ul style="list-style-type: none"> Which route to take? Where to park? Where to live? Where to work?
Choice of time to travel	Choice of mode
<ul style="list-style-type: none"> What time of the day to travel <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Different categories of travel choices are likely to interact with one another to determine actual travel behaviour </div>	<ul style="list-style-type: none"> Which mode to use / whether to interchange modes? Whether to car pool/share? What driving style to use? The number and type of vehicles to have at one's disposal and the form of vehicle payment? Whether to get a driving license / whether to get car insurance?

- Some choices are stable over time whilst others are highly variable. The variability of travel choices is likely to be different across the population and even within an individual across time

Changing motivations and attitudes²

- Travel choices are influenced by a range of motivations; orthodox methods have often focussed on monetary cost and time cost. In addition, reliability, comfort (psychological and physical), convenience and status, also play a role in determining why, where, when and how people travel
- Reasons for having (or changing) particular travel motivations are a consequence not only of personal preferences but also of the views of others

Changing habit and churn³

- Evidence suggests that people take 'short-cuts' in the decision-making process. This results from using heuristics (rules-of-thumb) in assessing options and also in assuming that once a decision has been made it is applicable to similar future scenarios.
 - research in Darlington suggests that, whilst 40% of people have at some point given serious thought to their regular journeys, for the last journey 90% had given no thought at all⁴
- The existence of habit is problematic for interventions to change behaviour. Habit suggests an inelasticity in why, where, when and how people travel: even if the relative cost, reliability, comfort and convenience of a person's choices change, it takes time for those changes to lead to different travel behaviour

Policy implication: habits are more likely to be challenged when people are in the process of changing other aspects of their lives such as moving home, job or school. Targeting interventions at people with a greater propensity to change travel behaviour will make interventions more efficient and cost-effective

(1, 2, 3) Enhancing The Effectiveness of Urban Transport by Better Understanding of Travel Choices – Phil Goodwin (2009) (4) Steer Davies Gleave

Current sustainable travel interventions suggest that public and private sector employers have many opportunities to influence travel behaviour change in commuters

Policy

Modal shift

Active travel

Work is underway to enable the public sector to lead by example¹

- Cycling England has funded a series of demonstration projects in the north east and south west of England with the aim to bring about a significant change in the proportion of journeys to work undertaken by bicycle across these sites
- In the North East four hospital sites are being proposed (Newcastle, South Tees, Sunderland, and Durham and Darlington)
- The estimated impact is likely to be a minimum increase in daily cycle to work journeys totalling around 600 across the four trusts. An increase of this size (roughly 50% or a modal increase of 1.75% of all journeys) would be considered a success for the project

Healthy Urban Development Unit²

- The NHS HUDU is one model that has been used to support improved capacity amongst primary health care trusts in London, and joint working with local planning authorities
- The HUDU provides support and assistance to PCTs and local authorities. It has developed guidance, toolkits and checklists to assist local knowledge, awareness and improve decision making

The private sector has shown it is possible to deliver cycling increases³

- GlaxoSmithKline sees a good business case for investment in cycling. Each car parking space at its main site costs £2000 a year and without cyclist commuters the company could not use this building to capacity incurring a cost of £10,000 for each unfilled desk
- Car parking has been replaced by high-quality cycle facilities which include: well located cycle parking; hundred of lockers; a drying room with vented hanging and heating; showers with shampoo, towels and hair dryers provided; and irons, ironing boards and shoe racks
- Cyclists are registered on a 'bike miles' scheme where daily tokens are collected and then redeemed for cycling equipment or new bikes
- The company also pays the labour charge for a bike mechanic who visits the site once a week offering service and repair, so staff only pay the cost of any parts
- GSK has 130 staff who cycle to work each day (5% of staff trips to work) and over 300 registered cyclists. Some 40% are women, proof of cycling's broad appeal when appropriate facilities are made available. The average mileage is seven miles each way

(1) Cycling England, (2) <http://www.healthyurbandevlopment.nhs.uk>, (3) DfT

Experience from other policy areas suggests that to create long-term behaviour change, interventions need to target both the underlying attitudes and drivers which can modify behaviour

Policy

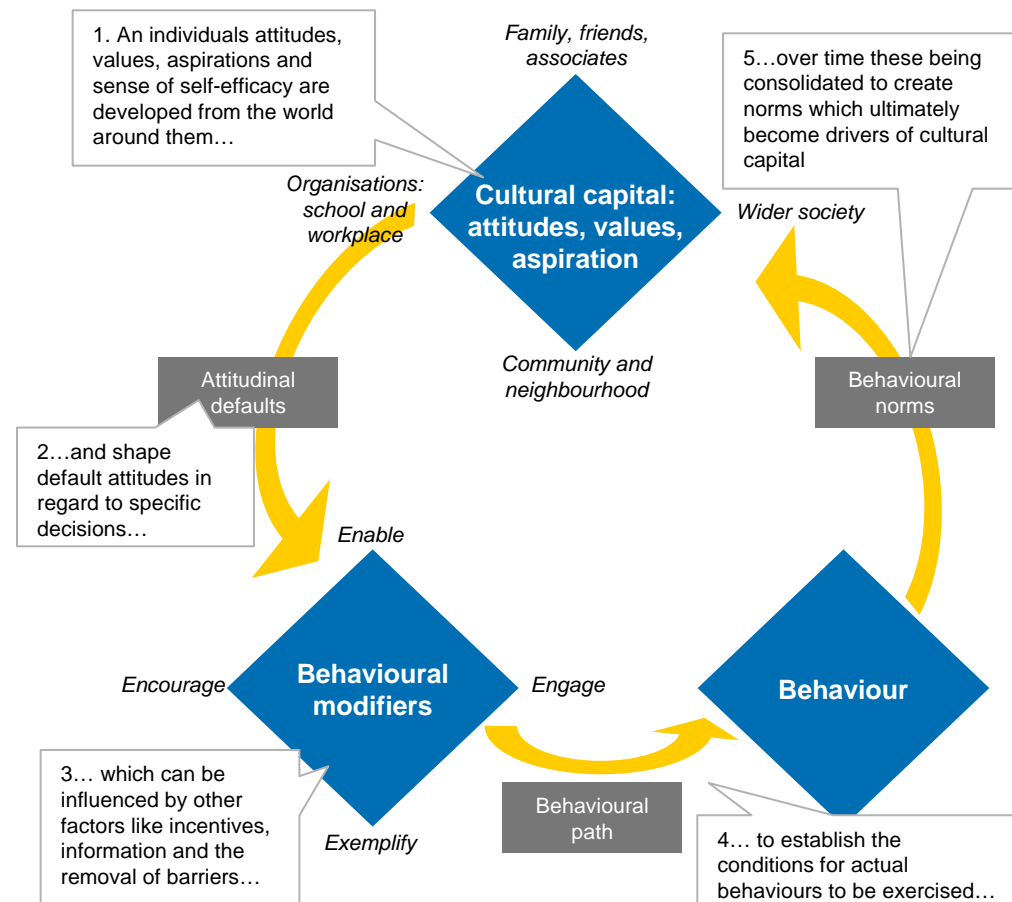
Modal shift

Active travel

- Experiences from behavioural change interventions in other policy areas can help inform the development of interventions to increase the levels of walking and cycling. The cultural capital framework¹ is a synthesis of these lessons with the academic literature on decision-making and behaviour change
- This framework suggests that interventions to encourage walking and cycling need to be considered holistically: there is no single intervention type. A mixture of smarter choices and infrastructure development is required which deliver demand and supply-side interventions within different parts of an individual's cultural decision-making framework
- The cultural capital framework describes the drivers and modifiers which interact to inform the decision-making process and which help develop habit-forming behaviour:
 - cultural capital is shaped by the personal environment and individual acts and it is informed by personal relationships, organisational and community cultures, and wider social and political narratives and norms
 - resulting attitudes can be modified through a range of levers to build skills, remove barriers, show what is possible and to incentivise particular types of behaviours
- To be successful, packages of interventions need to develop positive attitudes to walking and cycling which are then supported by other signals that encourage and enable people to incorporate active modes of travel into their daily lives

Long-term behaviour change is complex and self-reinforcing

The cultural capital framework of cultural change²



(1), (2) Amended from Achieving Cultural Change: A Policy Framework – Strategy Unit (2008)

Some policies already seek to change attitudes towards cycling and walking. Interventions tend to be direct, interpersonal and target personal, community and organisational cultures

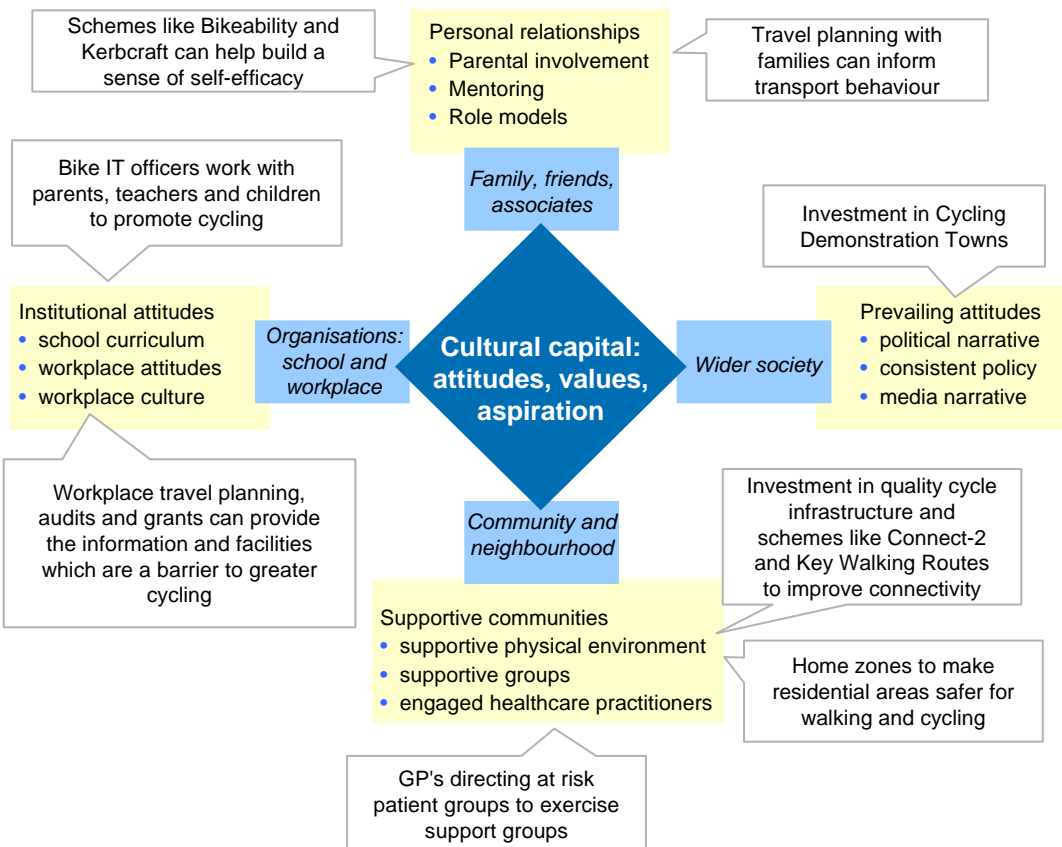
Policy

Modal shift

Active travel

Several 'hard' and 'soft' interventions attempt to encourage cycling and walking by targeting an individual's cultural capital

Examples of cycling schemes which change behaviour through affecting cultural capital¹



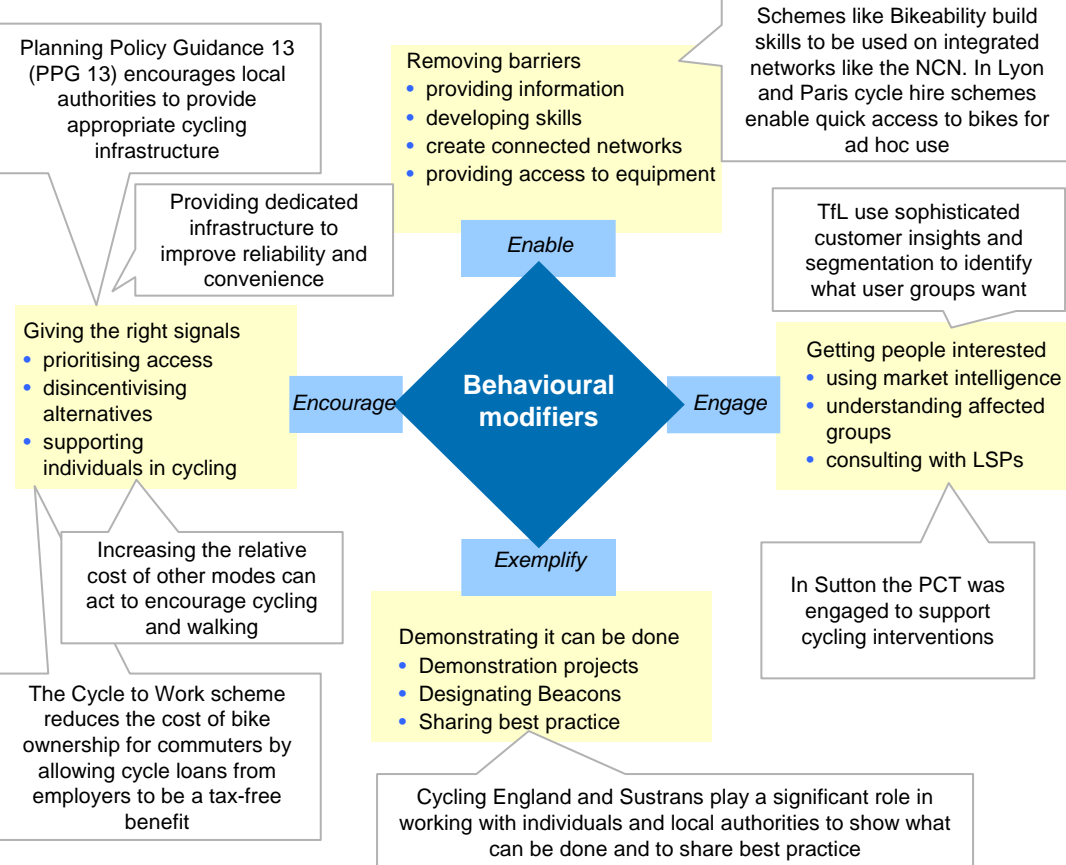
- A consistent political narrative is required to establish broad social attitudes towards the use of active modes of travel. This needs to be consistent with investment in cycling and walking
- In the 18 Cycling Demonstration Towns local authorities are building strong and consistent messages about the importance of cycling and this is supported by investment of £140m of revenue and capital over three years
- Recognising the importance of family and school in developing positive attitudes towards walking and cycling, interventions like Bike IT, Bikeability and Kerbcraft engage parents, teachers and children in the value of active travel and develop confidence
 - **Bike IT:** the scheme funds 70 dedicated school cycling officers to support travel planning, cycling to school and parental engagement. Data from Sustrans suggests the numbers of children cycling to their target schools has quadrupled as a result of the scheme²
 - **Bikeability:** the scheme exist to provide more and better cycle training to children and adults. By 2012, half a million children are expected to have taken part in Bikeability training³
- The connectivity, safety and quality of the cycling and walking networks is also likely to influence whether people view these modes as credible alternatives to car travel
 - **Links to Schools:** a £26m Sustrans project, with £10m from DfT. The scheme created 147 cycle links connecting over 300 schools to their communities, and enabling up to 200,000 children to walk or cycle to school⁴

(1) Amended from Achieving Cultural Change: A Policy Framework – Strategy Unit (2008), (2,3,4) DfT

Other programmes seeking to modify behavioural drivers tackle the barriers limiting cycling and walking and develop incentives to make active modes more attractive

Interventions attempt to encourage cycling and walking by modifying individuals' default attitudes

Examples of behavioural modifiers to encourage cycling



- To be successful cycling and walking interventions need to be targeted. Using customer insights and segmentation is a way of engaging population sub-groups and understanding their needs
- Several interventions to enabling cycling and walking focus on removing barriers and as such focus on improving skills, providing information and delivering infrastructure:
 - skills:** cost-benefit analysis of training schemes suggests that returns are of the order of 1:7.¹ Delivery of these services may be challenging because of a reliance on revenue funding and the need for sustained intervention
 - information:** evaluation of the effectiveness of Bike It officers – who work in schools to provide cycling and health information – is small but positive (1:1.4)¹ but this reflects uncertainty about the health impacts of targeting children
 - infrastructure:** the London Cycle Network has focussed on high density commuter routes and is likely to lead to health, congestion and air quality benefits. A recent cost-benefit analysis showed a return of approximately 1:4 for this type of infrastructure investment¹

Policy implication: cycling and walking can be encouraged through: creating networks that make cycling and walking relatively reliable and quick, and making the cost of cycling relatively lower than other options

(1)Valuing the Benefits of Cycling – Cycling England/SQW; (2) Copenhagen Bicycle Account (2006)

Lessons from other policy areas suggests that the most effective interventions are those targeted at particular segments of the population

Policy

Modal shift

Active travel

- Previous analysis of how policy can achieve cultural change suggests that interventions need to be focussed on particular segments of target populations¹
- Work by the Department of Health to develop the Government's cross-cutting obesity strategy is a good example of this approach². The work included detailed market research, quantitative analysis, and qualitative research using psychological profiling techniques
- The segmentation analysis focussed on three layers: first, the health status and behaviour of different groups; second, their capacity to change; and third, their willingness to change (see table)
- Another good example is the Promoting Physical Activity toolkit⁴

Segmentation of different family health behaviours³

	Struggling: Cluster 1	Uninterested: Cluster 2	Complacent: Cluster 3	Engaged: Cluster 4	Traditional: Cluster 5	Active: Cluster 6
Description	Struggling parents who lack confidence, knowledge, time and money.	Young parents who lack the knowledge and parenting skills to implement a healthy lifestyle.	Affluent families, who enjoy indulging in food.	Already living a healthy lifestyle.	Strong family values and parenting skills but need to make changes to their diet and activity levels.	Plenty of exercise but potentially too many bad foods.
Family diet	Seek convenience, eat for comfort, struggle to cook healthily from scratch.	Children fussy eaters, rely on convenience foods.	Enjoy food, heavy snackers, parents watching weight.	Strong interest in healthy diet.	Strong parental control but diet rich in energy-dense foods and portion size an issue.	Eating motivated by taste, diet includes both healthy and unhealthy foods.
Physical activity	Seen as costly, time-consuming and not enjoyable. High levels of sedentary behaviour.	No interest in increasing activity levels because parents perceive children to be active.	Believe family is active, no barriers to child's activity except confidence.	Family active although believe children not confident doing exercise.	Know they need to do more: time, money, self-confidence seen as barriers.	Activity levels are high, particularly among mothers.
Weight status	Mothers obese and overweight.	Families obese and overweight. Fail to recognise children's weight status.	Families obese and overweight. Low recognition of children's weight status.	Below average levels of obesity and overweight.	Parental obesity levels above average, children below.	Low family obesity levels but child overweight levels are a concern.
Demographic	Low income, likely to be single parents.	Young, single parents, low income.	Affluent parents of all ages, households vary in size.	Affluent older parents, larger families.	Range of parental ages, single parent families.	Average incomes, younger mothers, households vary in size.
Intent to change	High, but fear of being judged and lack of confidence are powerful barriers.	Currently low due to lack of knowledge, but willing to accept help once alerted to risks.	Low intent to change and likely to deny that problems exist.	Low intent to change but already leading a healthy lifestyle.	Low intent on diet but significant intent to change on physical activity.	Highest among the clusters for both diet and physical activity, so influencing them is not a priority.
Potential task	Build confidence, increase knowledge and provide cheap convenient diet solutions.	Increase understanding of risks of current lifestyle and develop parenting skills.	Encourage recognition of problem and awareness of true exercise and snacking levels.	Learn from successful techniques used by cluster.	Focus on increasing activity levels and educate on portion size.	Focus on providing cheap, convenient, healthy high-energy foods to fuel active lifestyle.

Policy implication: to be effective active travel interventions should be targeted on the basis of health needs and behavioural intention to become active. The activities used to promote active travel should be specific to particular groups

Interventions should also be sustained over time to maximise the likelihood of eliciting behaviour change

Policy

Modal shift

Active travel

Travel Actively: Get Walking Keep Walking' initiative¹ shows how sustaining interventions is important to success

- This scheme, run by the Ramblers, helps people in deprived areas cities improve their health and well-being by walking regularly and independently from their doorsteps
- A 12-week walking plan is supported by free locally based walking programmes combining information and motivation with led walks and other activities to encourage participants who are not currently active enough to walk as part of their everyday lives, for leisure and exercise but also to shops, school or work
- The programme works within pre-existing community groups and projects, drawing participants from their members, or at NHS venues, with participants both self-referred through publicity and directly referred by their GP. Public programmes are also running at local venues such as libraries and leisure centres. Public information puts the emphasis on general well-being, stress relief and other benefits of walking such as discovering the local area and socialising with companions, as well as physical health

- The course begins with an introductory Welcome to Walking session – an informal workshop facilitated by staff about the health and other benefits of regular walking. Participants receive a pack with a walking plan and logbook to help them set goals and keep track of their progress, a step counter and information about walking opportunities locally. This is followed by the first led walk from the venue; a 30 minute circular walk. There are three further weekly 60-minute walks using different routes from the same venue. Participants are then left to walk independently, and recalled in the 12th week for a celebration event



Walking for health is another initiative that aims to permanently increase walking levels²

- DH is enabling 120,000 people to walk each week with each individual participating on average three times a week
- Natural England provides accreditation, training and assurance for local walk schemes

Policy implication: policies to change behaviour should be sustained over time as habits are hard to break with

(1) <http://www.travelactively.org.uk/> including images, (2) www.whi.org and DH

Internationally, different mixtures of 'hard' and 'soft' measures have been used to increase active travel: both appear necessary and neither alone is sufficient for widespread modal shift

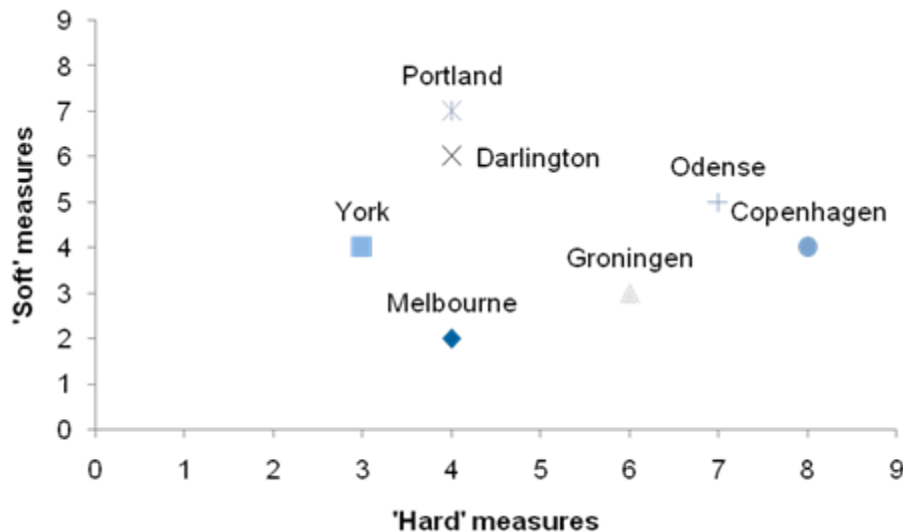
Policy

Modal shift

Active travel

There is variation in the balance of infrastructure and promotional interventions used to encourage cycling in different urban areas

A schematic representation showing how a range of cities have balanced cycling infrastructure (hard) interventions with marketing and promotional (soft) activities aimed at changing behaviour¹



- The Dutch and Danish cities have the heaviest reliance on engineering-based measures and have the highest levels of cycling of the cities shown (modal share >15%)
- The other areas have a less extensive cycling infrastructure and cycling has a comparatively low mode share in these places (modal share <5%)
- But there is considerable variation in the mode share of cycling across the examples, suggesting infrastructure alone is necessary but not sufficient for generating a high level of cycling. Cycling levels are highest in the Dutch and Danish examples, arguably the result of a cycling culture that has developed in those cities for decades.
 - in the Dutch and Danish cities, the fact that cycling has been a part of the built environment and national consciousness since the interwar period is likely to account for the high levels of cycling seen in those cities today

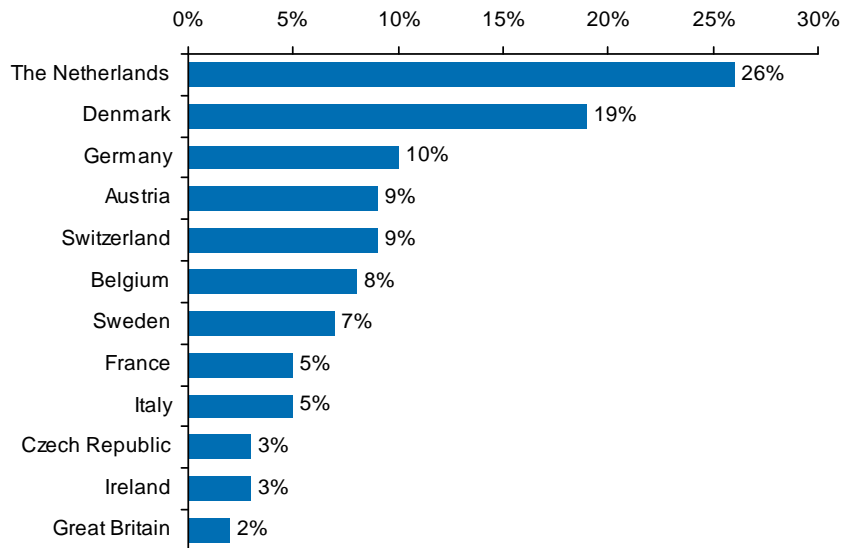
Policy implication: a wide range of interventions is available to encourage cycling. In those cities which have been successful in increasing the modal share for cycling both 'hard' infrastructure and 'soft' promotional activities have been used although the balance between the two is place specific

(1) Based on Figure 4.4 from CAPS Public and Stakeholder Consultation Facilitation – Steer Davies Gleave for Cycling Scotland (2008)

Cycling modal share is much higher the Netherlands and Denmark than in Great Britain. Groningen is a Dutch city that has used spatial planning to increase cycle use

In comparison to Great Britain some other European countries have a much higher proportion of trips made by bicycle

Estimated share of journeys (trips) made by bicycle¹



In parts of the Netherlands up to 40% of trips are by bicycle

- In the Netherlands bicycle policy is the responsibility of the municipalities with funding supplied by national government and external sources. The city of Groningen is the top-ranking amongst Dutch cities in terms of cycling use with an estimated 40% of trips
- Spatial planning in Groningen has focussed on creating a compact city allowing many activities to be easily accessed by bicycle. This has created a city where 78% of the inhabitants live, and 90% of all jobs are located, within a radius of 3 km from the city centre – almost all major buildings are within a 5 km radius of the city centre. Through the planning system the municipal authorities have, over time, created a low-scale inner city as a central point for a mixture of residential, retail and employment activities
- In addition, the municipality has integrated its cycling policy as part of a broader approach to traffic and transport policy which has designated a user hierarchy in favour of pedestrians, cyclists and public transport. Since 1977 a traffic circulation plan has divided the inner city into four sectors. It is not possible to travel between sectors by car, but it was possible by bicycle and bus. Passing car traffic is kept outside the inner city and motorists whose destinations are in the inner city are led via the shortest route to parking areas close to the centre



(1) Cycling in the Netherlands – Ministerie van Verkeer en Waterstaat (2009) including images

Copenhagen has a long history of cycle use. A comprehensive and growing segregated cycle network and widespread facilities has helped establish a strong cycling culture

Policy

Modal shift

Active travel

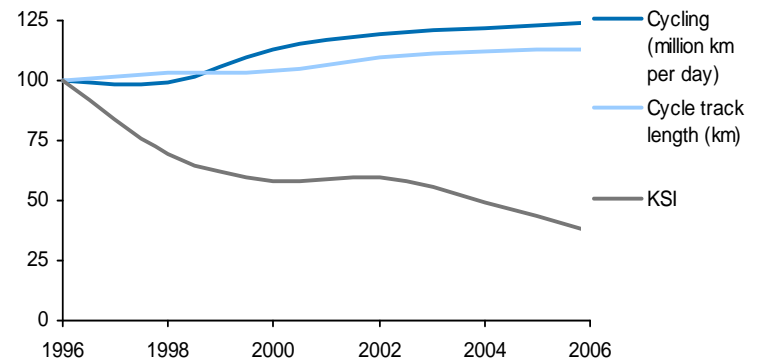


- In 2006, 36% of commuters cycled to work, and a target has been set to be the world's top cycling city by achieving at least 50% of people to commute to work or school by bicycle by 2050
- The abundance of cycle infrastructure is often cited anecdotally as the reason for the high level of cycling in the city. In the main the network is made up of segregated cycle paths separated from the carriageway by a physical barrier or grade-separation.
 - these have been used in preference to cycle lanes because it is thought to create a feeling of greater safety for cycle uses. Plans are to build a further 51km of cycle tracks by 2016
- In addition to the construction of cycle routes, current cycling policy in Copenhagen advocates maintenance and cleaning of infrastructure to improve the comfort of cycle journeys
- In addition, integration with public transport is also cited as important and feedback collected as part of the Bicycle Account identifies the need for improved cycle parking at railway stations

- Copenhagen has increased investment in infrastructure and facilities: over the last two budget periods DKK 110m (£13m) has been committed to improve the network and parking facilities
- Since 1995 the city has collected data on cycling which is used as to create the Bicycle Account. This report contains metrics on the state of the network, the use of the network and attitudinal data about the reasons for, and barriers to, cycling

In Copenhagen the number of kilometres cycled has increased by a quarter whilst the number of cyclists killed and seriously injured has more than halved

Changes in key cycling metrics in Copenhagen¹: 1996 = 100



(1) Bicycle Account – City of Copenhagen (2007)

In the US, Portland has made significant progress in increasing the modal share for cycling by investing in radial and neighbourhood networks, commuter facilities and promotion

Policy

Modal shift

Active travel

- By 1996 the cycling modal share for commuting was 4.4% compared to a US average of 0.5%
- Portland has taken a long-term approach to increasing levels of cycling. In 1972, the City organized a Bicycle Path Task Force, which produced the 1973 Bicycle Master Plan. Since then development of cycling provision has been a consistent focus
- In 1996 a new Bicycle Master Plan was created which sets the vision, ambition and objectives for cycling over five, ten and twenty year periods. Portland has set a target so that by 2016 cycling will represent a ten percent modal share at a city-wide level and a fifteen percent modal share at the inner-city scale.
 - this is to be delivered by a combination of capital and revenue based activities including the provision of: 630 mile integrated cycle network (radial and neighbourhood); 8,600 short-term and 23,134 long-term spaces; showering facilities for any cycling commuters needing them; several annual city-wide events; and a commitment to provide cycle training to 90% of school children
- The initial focus in Portland was on the provision of well connected infrastructure. In 1982, the city identified 22 bicycle “corridors” based on census data and travel use patterns and began an implementation process for improvements along these corridors. This activity was an attempt to target commuting journeys to the city centre. However, this process proved time consuming and difficult and, in 1988, the Bicycle Program moved towards a more flexible process to make improvements on a district-by-district basis. This approach produced additional neighbourhood networks to complement the existing corridor routes
- In 1991, the Bicycle Program reinitiated bicycle parking installation and added about 900 sidewalk bicycle racks to bring the city total to 1400 racks. The Program also manages 156 bicycle lockers and is developing, in conjunction with health clubs, combined parking, locker and shower facilities for 475 central city commuters
- Capital investment has been augmented by information and training initiatives. Promotional and educational events have included map production, leisure cycle rides for families, bike-to-work days and cycle festivals, and training (focussed mainly on school children)

“The Bicycle Program’s focus has evolved from corridors to districts, to – through this Bicycle Master Plan – a comprehensive, city-wide approach. This evolution has followed the increase in public and government support, funding availability, and technical knowledge.”¹



In New York City public space is being returned to pedestrians through design policy statements and part-time street closures

Policy

Modal shift

Active travel

Policy in New York aims to increase walking by developing high quality and safe walking infrastructure supported by improvements to the public realm¹

Strategic and safe walking routes

- The Safe Routes to Schools initiative was introduced to focus safety improvements at city schools with the highest accident rates. New traffic and pedestrian signals, speed bumps, high visibility crosswalks and new parking regulations have been installed at 135 schools
- Safe Streets for Seniors champions improvements in pedestrian safety through infrastructure modifications, such as pavement widening, ramp and sign repairs and increased crossing times
- The Safe Routes To Transit Programme improves pedestrian and driver safety at bus stops beneath elevated subway structures and pedestrian access around subway stations and bus stops
- The New York City Street Design Manual, released in May 2009, provides policies and design standards to promote higher quality street design and good project implementation

Pedestrian friendly public realm

- PlaNYC set the goal of creating or enhancing a landscaped open public space in every community - NYCDOT and partners have developed or are currently constructing 21 such areas. In addition, NYCDOT established the NYC Plaza Program which gives local communities the opportunity to compete for new sites
- Through the Urban Art programme NYCDOT partners with community-based groups, who may apply for a grant of \$5,000, to invigorate streetscapes with temporary art installations

Through the Broadway Boulevard Project, areas of Broadway have been pedestrianised. Protected bike lanes and local traffic-only areas have also been formed

Broadway open to traffic



Proposed pedestrianisation of Broadway



- Similar improvements last year led to a 50% reduction in traffic related injuries²
- The Summer Streets programme is another initiative to turn congested roadways into open, safe public spaces conducive to walking, cycling and stationary activities

(1) World Class Streets – NYC DOT (2008) including images (2) US Department of Transport

Melbourne has undergone substantial rejuvenation over the last two decades to successfully increase levels of pedestrian traffic

Policy

Modal shift

Active travel

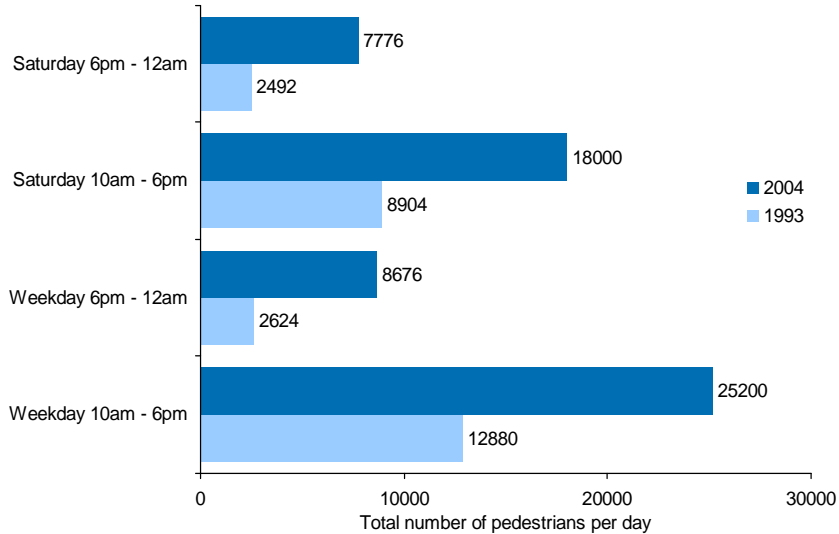
A program of streetscape improvement works has led to significant improvement of the walking environment in Melbourne

- The redevelopment of 230 streets, and integration of these routes into the walking network has improved the walking environment in Melbourne leading to a subsequent leap in pedestrian volumes
- The introduction of new squares and the rejuvenation of existing squares in intensively used pedestrian areas, has contributed to the observed increase in the number of stationary activities taking place within the city
- The Active Edges Policy ensures attractive street fronts add to the aesthetic quality of the area and increase perceived safety and the quality of the walking experience
- Through Postcode 3000, a strategic initiative to increase the number of residents in the centre, the resident population grew by 830%, facilitating increased levels of activity, higher perceived pedestrian safety and greater pedestrian volumes¹

Sustained infrastructure improvements led to significant increases in pedestrian volumes throughout the day and evening²

- The level of pedestrian traffic in the city has increased by 39% during the daytime, and 98% during evening hours, from 1993 to 2004³
- Despite Melbourne’s population being significantly smaller than that of London, Bourke Street Mall and Swanston St in Melbourne now both carry significantly more pedestrians than London’s Regent Street⁴

Total number of pedestrians on Swanston Street in 1993 and 2004 ⁵



Melbourne:
1987 2004



The redevelopment of 230 laneways in Melbourne has attracted new cafes, bars and restaurants in the inner city, and increased the vibrancy, safety and attractiveness of the walking environment

(1, 2, 3, 4, 5) Places for People, Melbourne – Gehl (2004)

Copenhagen pioneered car-free streets and public spaces to become a highly pedestrianised city

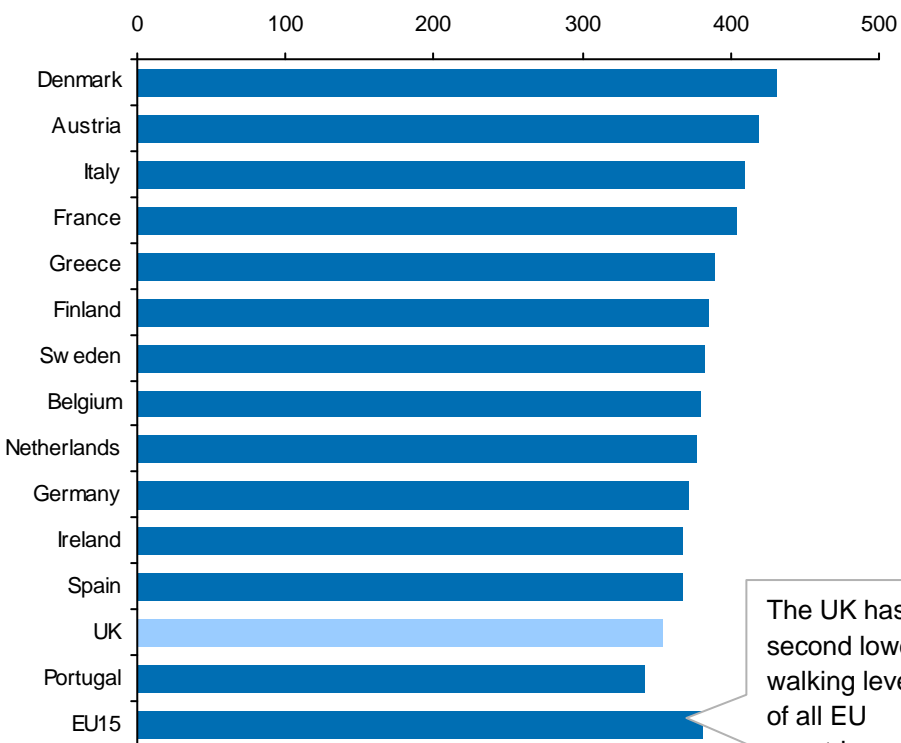
Policy

Modal shift

Active travel

Denmark has the second highest levels of walking of all EU 15 countries

Kilometres walked per person per year (2000) ¹



The UK has the second lowest walking levels of all EU countries

Since the first street pedestrianisation in 1962, Copenhagen has pioneered city space improvements

- Copenhagen introduced its first pedestrianisation scheme in 1962. Since then it has employed a range of measures to develop an urban realm that is supportive of walking, including:
 - the introduction of car-free zones and the development of public spaces, such as public squares and urban strollways
 - the redesign of older areas to facilitate increased use, including a programme of courtyard renewal
 - the reallocation of parking areas to cycle lanes, wider pavements and pedestrian space. The total number of public parking spaces in the inner city decreased by 12% from 1995 to 2005, despite a significant increase in car ownership (11% from 1999 to 2004)³
- In addition to changes in the physical environment, simple measures have been taken to encourage the use of streets throughout the day and evening: for example, shop fronts remain visible beyond opening hours so that streets don't 'close down' when shops finish trading

Between 1995 and 2005 there has been a 78% increase in the number of pedestrians in the city centre⁴



1. Purpose

2. How and why we travel

3. Transport's impact on urban success

Economy

Health

Space

4. Policy effectiveness

Roads and streets

Modal shift

Spatial planning

Active travel

Buses

5. Implementation

Governance

Leadership

Skills and capability

Appraisal and packaging

6. Conclusions and next steps

96. Government has taken a number of actions over the last three years to sharpen incentives and promote integration of bus services
97. These changes have improved buses but several problems remain
98. The relatively high level of public investment in buses reflects their potential social benefits
99. This support represents a high proportion of the bus industry's revenue
100. Government support comes from a variety of sources
101. Lower fares and more frequent and reliable journeys are the improvements most likely to increase bus use but many people will only move from cars if journeys are made more difficult
102. Bus use will likely continue to decline in metropolitan areas without further intervention
103. The quality of the bus service people receive depends on how well different parties interact and co-ordinate
104. Bus use is influenced by a number of factors—these not only relate to the bus service itself, but the supporting infrastructure and the attractiveness of other modes
105. Evidence clearly shows the speed and reliability of services can be improved through bus priority measures

1. Purpose

2. How and why we travel

3. Transport's impact on urban success

Economy

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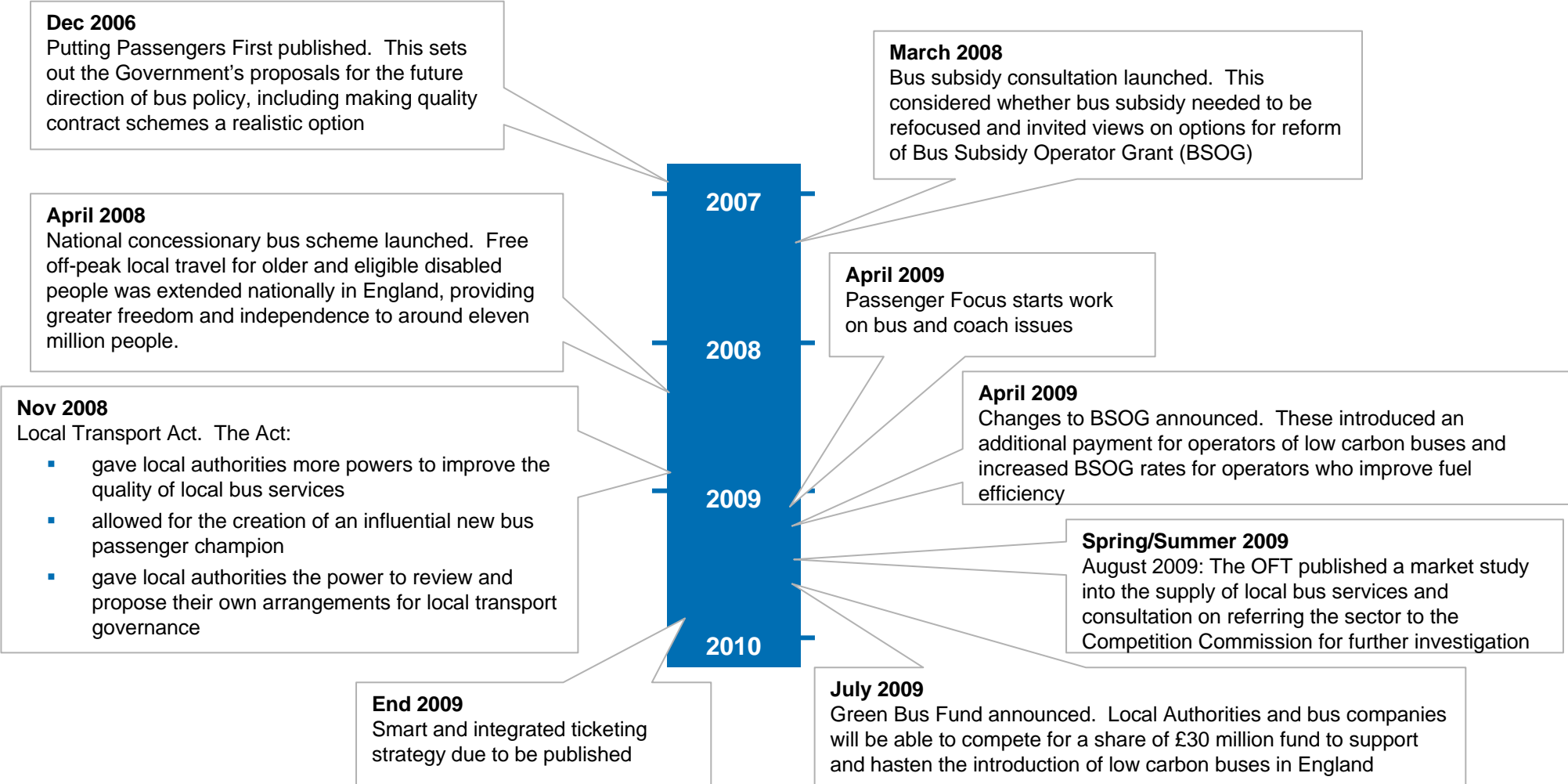
Appraisal and packaging

6. Conclusions and next steps

106. The Oyster card in London shows that smart and integrated ticketing can be delivered
107. Information is highly valued by passengers but it has been difficult to establish whether provision results in significant increases in demand
108. Bus use can dramatically increase when a package of measures is implemented
109. Coordination of services can be achieved by partnership working or suspension of the deregulated bus market – no Local Authority has yet used power to regulate local services
110. Voluntary and statutory partnerships can be used to improve services although they can face barriers in certain areas
111. The costs of implementing Quality Contracts will be dependant on scheme design and the reaction of existing operators

Government has taken a number of actions over the last three years to sharpen incentives and promote integration of bus services

Policy
Modal shift
Buses



These changes have improved buses but several problems remain

The Audit Commission/NAO¹ assessed the performance of the delivery chain for buses outside London in 2005

Factor	Issues raised in 2005	Progress since 2005
Commitment to achieving growth in bus use	Local authority commitment to increase bus use is growing but uneven across the country	It is not clear that there has been a significant improvement in the level of commitment to achieving bus use: <ul style="list-style-type: none"> – two of the LAA indicators relate directly to buses (NI 177: bus passenger journeys originating in the authorities area & NI178: bus services running on time) – no district in an ITA area has these indicators as part of their LAA set
Investment in a package of measures to increase demand for bus services	Bus priority measures are relatively limited with few authorities having restrained car use	Transport authorities have been investing in bus priority measures. Very few authorities have yet introduced congestion charging or workplace parking levies and restraints on parking are limited in a number of ITAs by the high level of private car spaces
Partnership working between the local authorities and bus operators and strategic procurement of local bus services	Limited systematic review by authorities of the bus network, patchy progress in establishing meaningful partnerships with operators	A number of voluntary partnerships have been established and one Statutory Quality Partnership has been implemented (Sheffield). The scope and ambition of these partnerships do vary and there have been instances of disagreements between operators and the relevant transport authority
The provision and administration of concessionary fares	Wide variety of schemes which are complex and confuse the public	The introduction of the National Concessionary Fare scheme has simplified the system for users although some differences in eligibility and concessions exist in local authorities. DfT currently considering whether to move reimbursement to upper tier authorities which should reduce administrative costs
Regulation and monitoring of bus services	Little formal monitoring of, or accountability for, the quality of commercial bus services in the deregulated market, on behalf of local people	The role of the Traffic Commissioner was strengthened by the Local Transport Act 2008 but there are concerns about whether Traffic Commissioners will need significant resources to make full and effective use of their powers

Note: some improvements in bus services may have led to declining performance in other respects e.g. BSOG returns to DfT suggest that fuel efficiency has fallen by around a fifth since 1997/98. Possible explanations include heavier buses (e.g. from air conditioning units) and the impact of EURO air quality standards

(1) Audit Commission/NAO (2005) Delivery Chain Analysis for Bus Services in England;

The relatively high level of public investment in buses reflects their potential social benefits

Policy

Modal shift

Buses

Buses can contribute to a number of government objectives through its impact on the economy, environment/health and accessibility. This is reflected in existing policy towards the industry

Economy	Environment/health	Social
<ul style="list-style-type: none"> Buses can increase the capacity of existing road networks. A double-decker bus operating a five minute headway can carry up to 1,260 passengers in each direction¹. A single carriage road in an urban area can typically move 1,600 to 2,500 people by car². Allowing more people to access the same area (e.g. business district) can help deliver agglomeration benefits Bus services can help reduce congestion through modal shift <ul style="list-style-type: none"> Diverting a five mile journey from car to bus will deliver average decongestion benefits of £5.50 in urban areas³ – this is equivalent to benefits of around £2,350 per annum if this represents a commuting trip 	<ul style="list-style-type: none"> Modal shift can help reduce CO₂ emissions and other local air pollutants which contribute to poor health outcomes but the overall impact on emissions depends on load factors, the level of modal shift and the type of buses operated Environmental/health outcomes can also be improved though investment in new buses to replace old buses. This may not necessarily lead to increased modal shift but can improve environmental outcomes: Accident rates are significantly lower for bus journeys⁴: <ul style="list-style-type: none"> there were ten passengers killed or seriously injured per billion bus passenger km between 1997 and 2006 – the equivalent figure for car is 29 	<ul style="list-style-type: none"> The poorest households make greatest use of the bus network – 44% of the poorest households use buses at least once a week compared to 28% of the overall population The relatively high level of bus use amongst the poorest households reflects poor accessibility to other modes – just over half the poorest households do not have access to a car Previous reports have demonstrated how poor transport can act as a significant barrier to employment and is linked to low participation in post-16 education⁶ Improvements in bus services can provide greater access to work opportunities, health services, and education establishments
<p>Local Authorities can fund infrastructure improvements through block funding or Major Scheme Business Cases – this can also be used to encourage service improvements through partnership agreements with bus operators</p>	<p>The 2009 BSOG reforms introduced an incentive for operators to increase fuel efficiency and use low carbon buses</p> <p>Historically most effort has been put into regulatory approaches e.g. EURO standards</p>	<p>The National Concessionary Bus Scheme and Tendered Bus Services are examples of interventions whose primary aim is to improve social outcomes</p>

(1) Based on calculations in: Brand & Preston (2003) The Supply of Public Transport: A Manual of Advice; (2) Based on: Design Manual for Roads and Bridges (1999) and WebTAG unit 3.5.6; (3) SU analysis of WebTAG 3.9.5 – 2010 prices and values; (4) DfT – Road Casualties Great Britain: 2007 Annual Report; (5) DfT – National Travel Survey 2007; (6) SEU (2003) Making the Connections

This support represents a high proportion of the bus industry's revenue

Policy

Modal shift

Buses

Around £6 billion is spent on local bus services in England – just under half comes from government

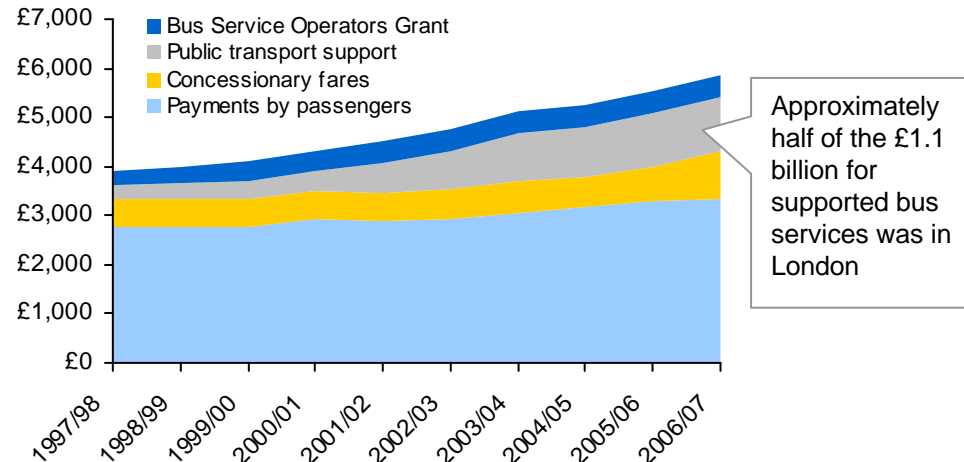
Expenditure of local bus services, 2006/07 (£ million, cash prices)^{1,2,3,4}

Item	Value (billions)
Farebox	£2.9
Concessionary fares	£0.7
Support for local services	£1.0
Bus Service Operator Grant	£0.4
School transport	Up to £0.5
Capital	£0.2
Total public sector support	£2.3-2.7
TOTAL EXPENDITURE ON BUSES	£5.2-5.7

These are detailed on the next page

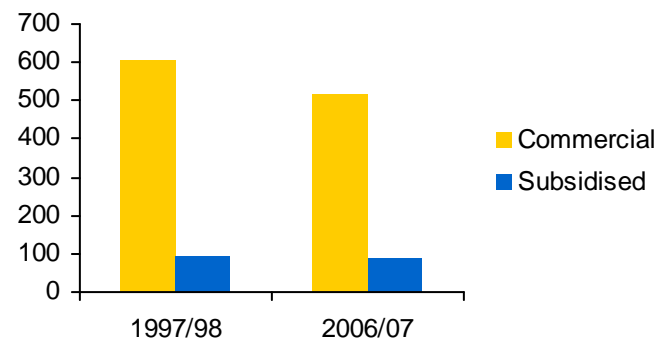
The growth in support for local bus services in Great Britain has mainly been concentrated in London¹

Revenue and financial support for local bus services in Great Britain (£ million at 2007/08 prices)¹



Subsidised services in English PTE areas have remained stable

Commercial and subsidised services by vehicle kilometres (millions), English PTE areas¹



(1) DfT (2008) Transport Statistics Great Britain; (2) Capital expenditure taken from CLG data based on local authority returns; (3) Local Authorities spent £912 million on school transport in 2007 although about half of this is thought to relate to transport for children with Special Educational Needs. Some of the remaining funding will be used to pay for the carriage of pupils on local buses; (4) BSOG figures based on DfT analysis and refer to 2005/06

Government support comes from a variety of sources

Policy

Modal shift

Buses

Bus Subsidy Operators Grant

£380m (England)¹
£106m (PTE areas)¹

BSOG helps support a larger network and lower fares than would otherwise be the case and is high value for money⁴

- Bus operators who operate local registered bus services are entitled to a grant to reimburse the major part of the excise duty paid on the fuel used in operating local services
- Recent amendments to the scheme will mean that higher rates are paid to operators that have improved their fuel efficiency and/or use low carbon buses. Further incentive on smart cards and GPS are planned

Concessionary Fares

£712m (England)²
£257m (PTE areas)¹

Concessionary fares helps promote social inclusion

- Compensation paid to bus operators for loss of revenue and costs of carrying additional passengers
- Reimbursement rate (percentage of adult full fare which is paid for each concessionaire) is set by Local Authority although operators can appeal
- Funding is currently included as part of Revenue Support Grant³ to lower tier authorities who administer the scheme

Local support

£1,007m (England)²
£128m (PTE areas)¹

Local support is used to secure additional services which improve accessibility particularly for those in remote areas and without access to a car

- Local authorities are able to secure the provision of additional local bus services by offering a contract for the provision of services
- This allows Local Authorities to provide services which would not be commercial e.g. to deprived or remote areas with no alternative public transport provision, at times of low demand (e.g. weekends, early morning and late at night)

Other (e.g. Kickstart, Low Carbon Buses)

There are a number of small grants available to support environmentally friendly buses and innovate schemes

- Low Carbon Bus Fund (£30 million): operators and local authorities can bid for funding to cover the additional costs of purchasing a Low Carbon Emission Bus
- Kickstart (£25million between 2009/10 and 2011/12): initial for new bus services or bus service enhancements targeted at services which have the potential to be commercial but require financial support in the early years

(1) DfT analysis; (2) DfT (2009) Public Transport Statistics Bulletin GB: 2008 Edition; (3) A proportion of this funding is currently paid as a specific grant although it is planned for this to be transferred into RSG in the 2011/12 settlement; (4) DfT analysis and LEK have found that BSOG has a BCR of between 3 and 5

Lower fares and more frequent and reliable journeys are the improvements most likely to increase bus use but car journeys will likely need to be more difficult for people to shift modes

Policy

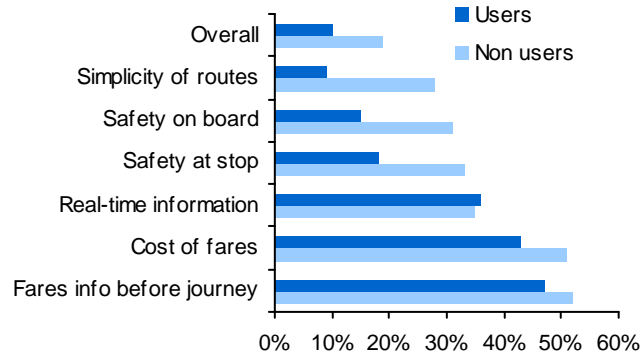
Modal shift

Buses

The frequency of existing services is highly rated but is a top priority for improvement along with fares. On board comfort, bus stops and reliable services are more important for regular bus users whereas infrequent users prioritise convenient services which serve places they want to go. Amongst infrequent users car restraint policies will be more effective than any one service improvement

Non-users generally have worse perceptions about buses than users particularly on safety and simplicity of routes

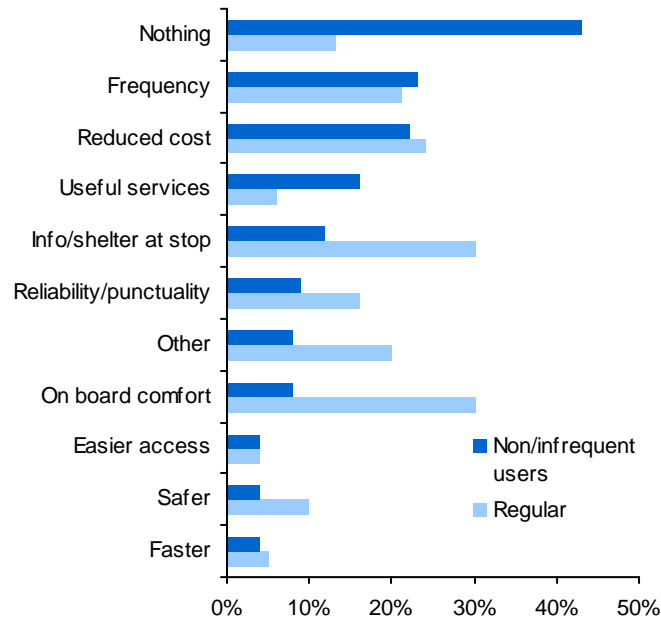
Rating of local bus services as very or fairly poor¹



- The number of destinations served, frequency of services and reliability/punctuality received the highest ratings for both users and non users
- Most users base their opinions about local bus services on personal experience (80%), for non-users the most important source of information about services is friends/family/colleagues (62%)

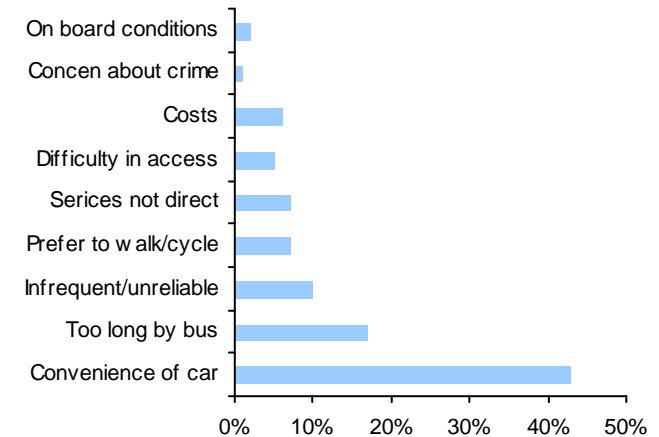
Low fares and frequent/reliable services are important to both bus users and non/infrequent users

Features of bus services that people want most improved (up to three answers given)¹



Large scale modal shift from cars is most likely to take place if the car becomes less convenient

Percentage of respondents reporting main reason for not using local bus services (more often)¹



- 25% if non-users said they could make many of their journeys as easily by bus
- Non/infrequent bus users report that they are more likely to increase bus use if car parking is restrained than if buses were cheaper, quicker or more frequent
- These results are consistent with the experience of cities like Oxford and Cambridge

(1) DfT (2009) Public experiences of and attitudes towards bus travel

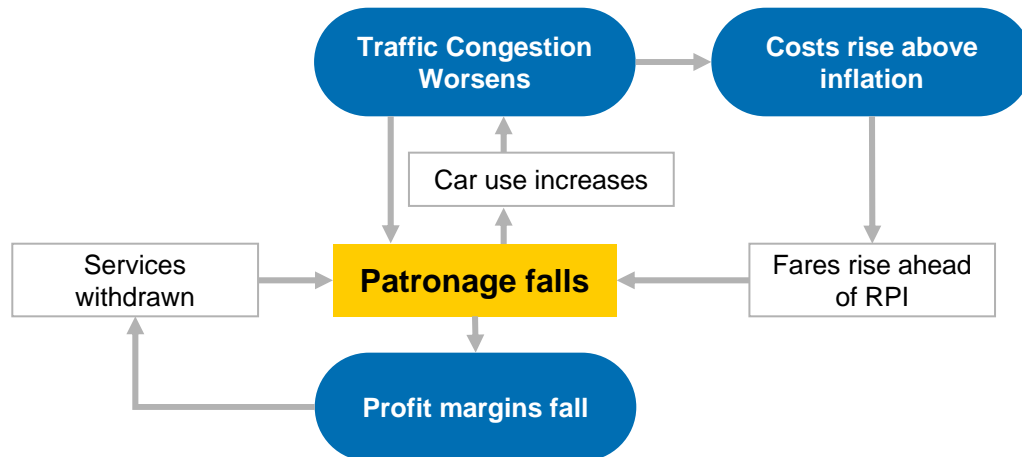
Bus use will likely continue to decline in metropolitan areas without further intervention

National forecasts of bus demand are based on fairly rudimentary models but they indicate that demand is unlikely to grow

- In the absence of any major changes in policy, NERA¹ forecast that for ITA areas between 2004/05 and 2005/15 fares will rise by 20% and service levels will fall 20%, contributing to a 20% fall in patronage
- CfIT² estimate that if operators increase commercial deregistration to maintain operating profits then passenger journeys would fall in PTE areas by around 4% in the eight years to 2016, but if there is investment in the network to reduce journey times, patronage could rise by around 4%

These forecasts all appear to suggest a vicious circle in which operators offset lower patronage by reducing services

Basic model of primary drivers in the status quo⁷



Analysis of underlying drivers of demand confirms that bus use is likely to decline unless there is further intervention

- **Cost of services:** increases in pension costs, shorter working hours and traffic congestion may increase the cost of service provision⁶. Operators are likely to respond to rising costs by cutting services, cutting service quality and/or increasing fares
- **Cost of tendered services:** the price of tendered services in PTE areas rose on a like-for-like basis at an average rate of 9.9% between 2000 and 2007³. The current fiscal position suggests that Local Authorities will struggle to maintain the current level of supported services if prices continue to rise at above inflation
- **Car ownership levels**
- **Increases in congestion:** the extent to which this is a negative trend will depend on whether buses are given priority over other road users

The impact of these drivers will be partly offset by some positive trends:

- **Concessionary fares:** introduction of the free fare scheme was forecast to increase bus use by 5% in PTE areas⁴. Growth in the over-60 population in England (+1.9 million people over the next 10 years⁵) is likely to fuel further increases in demand

The quality of the bus service people receive depends on how well different parties interact and co-ordinate

Policy

Modal shift

Buses

District council is responsible for the bus shelter and its location although these are increasingly owned and maintained by advertising companies

PTEs can encourage joint ticketing and smartcards in partnership with operators

The Office of Fair Trading ensures that arrangements between bus operators and/or transport authorities are consistent with competition law and other legislation

ITAs (through PTEs) are responsible for compiling and publishing information about routes and timetables

ITAs may also provide Real Time Information at the bus stop in partnership with the bus company



85% of buses in PTE areas are run commercially although all operators benefit from the BSOG administered by DfT¹

The European Union sets emissions standards for new buses

Passengers pay fares although the over-60s and disabled are eligible for free travel under the national concessionary fares scheme

District council is responsible for the ambience around the bus stop e.g. signing, pavements, lighting

Highway improvements requiring powers (e.g. bus lanes) must be agreed by district who are also responsible for enforcement (e.g. clearways) and traffic management (e.g. priority at traffic lights)

Traffic Commissioners ensure that the operator holds a valid license and that they conform to published timetable

Bus use is influenced by a number of factors—these not only relate to the bus service itself, but the supporting infrastructure and the attractiveness of other modes

Attribute	Evidence of impact ¹
Fares	<ul style="list-style-type: none"> Bus fare elasticities average -0.4 in the short-run to -1.0 in the long run (i.e. a 10% rise in fares will lead to a 10% fall in patronage in the long run) – responsiveness of demand to fare changes is less sensitive in the peak
Journey time	<ul style="list-style-type: none"> The elasticity of bus demand to in-vehicle time for urban buses has been estimated to be roughly in the range of -0.4 to -0.6
Service levels	<ul style="list-style-type: none"> The elasticity of bus demand to vehicle kilometres is approximately +0.4 in the short-run and +0.7 in the long run
Ride quality	<ul style="list-style-type: none"> Studies in London have indicated that a smooth vehicle motion is worth 10.5p per passenger (1996 prices and values)
Real-time information	<ul style="list-style-type: none"> Passengers in London valued countdown boards at 9.0p per trip (1996 prices and values)
Safety	<ul style="list-style-type: none"> Bus users value CCTV at stops and on the bus at 16.6p and 5.8p respectively (2001 prices and values)
Waiting environment	<ul style="list-style-type: none"> The provision of information at bus stops has been valued at 4-10p per passenger
Interchange	<ul style="list-style-type: none"> Passengers dislike having to interchange – the ‘penalty’ associated with the need to interchange is equivalent to 5 minute journey time even before waiting time and the cost of an additional fare is factored in
Car costs	<ul style="list-style-type: none"> Bus use is sensitive to changes in the costs of fuel. A 10% fall in petrol costs for motorists is estimated to reduce bus demand by 21%
Income	<ul style="list-style-type: none"> Each 10% increase in income reduces bus use by 5%-10%, this includes the impact of higher car ownership

Policy implication: there are a number of ways to influence the level of bus demand – the list above is not exclusive; and these interventions do not just relate to bus service attributes—interventions off the bus, such as an improved waiting environment and better information, can have a significant impact on demand

(1) TRL (2004) The demand for public transport: a practical guide

Evidence clearly shows the speed and reliability of services can be improved through bus priority measures

Policy

Modal shift

Buses

There a wide variety of measures that can improve bus journey times and reliability although there impacts will depend on the specific characteristics of the area under consideration

Type of bus priority	Description	Impact from case studies ¹
With-flow and contra-flow bus lanes	<ul style="list-style-type: none"> The measures mark out a lane of the carriageway for use by buses 	<ul style="list-style-type: none"> 22% reduction in journey times (A47 Hinckley Road, Leicester) Improvements in bus reliability (Corporation Street, Rotherham)
High Occupancy Vehicle (HOV) or no car lanes	<ul style="list-style-type: none"> Priority is also given to other vehicles (e.g. lorries) under these measures and may be appropriate where the frequency of buses is insufficient to justify a dedicated bus lane 	<ul style="list-style-type: none"> Reduction in inbound journey times for buses and other high vehicle occupancy vehicles of four minutes in the morning peak (A647 Stanningley Road, Leeds)
Guided busways	<ul style="list-style-type: none"> Used to deliver complete physical segregation and usually delivers higher speeds 	<ul style="list-style-type: none"> One minute reduction in bus journey times in the AM peak, two minute reduction in the PM peak – buses journey times now quicker for buses in the AM peak (Bradford)
Bus gates and rising bollards	<ul style="list-style-type: none"> Used to restrict access to a street to buses. This can take the form of signs or signals or a physical barrier (e.g. rising bollards) 	<ul style="list-style-type: none"> Reduced journey times, increased reliability and reduced traffic levels (Northgate, Bath) 85% reduction in traffic in affected area (Bridge Street, Cambridge)
Pre signals and bus advance areas	<ul style="list-style-type: none"> Signals or short bus lanes are used to promote the bus to the front of the queue 	<ul style="list-style-type: none"> Reduction in average delay to buses in the off-peak by 32 seconds (East Leeds Quality Bus Initiative)
Selective vehicle detection, MOVA, Bus SCOOT and Automatic Vehicle Location	<ul style="list-style-type: none"> These measures use various methods of communication to detect the presence of buses and activate traffic lights to give priority to buses at junctions 	<ul style="list-style-type: none"> Up to 24 seconds journey time reduction at a single junction equipped with MOVA (Winchester Bar End Road, Hampshire) A trial of SCOOT delivered savings in average bus delays of 20% and a reduction in delay variability of 11% (Uxbridge Road, London)
Mixed priority street and bus friendly traffic calming	<ul style="list-style-type: none"> These approaches allow buses to operate in street environments which are more sympathetic to pedestrians and cyclists whilst affording some priority to buses. Includes infrastructure like speed humps 	<ul style="list-style-type: none"> Negligible impact on bus journey times but reduction in the number of accidents is though to have improved reliability of services

(1) DfT (2004) Bus Priority: The way ahead

The Oyster card in London shows that smart and integrated ticketing can be delivered

Policy

Modal shift

Buses

Smart and integrated ticketing has been shown to encourage travel by public transport with clear benefits to passengers and operators



- Smart tickets can reduce boarding times by around three seconds per passenger¹
- Enhanced security features can help reduce fraud
- Smart cards allow innovative ticket products to be marketed
- Research for DfT indicates that a national roll out of smartcards would have a BCR of over 7²
- Integrated tickets can reduce uncertainty about which ticket to buy and provides seamless interchange between modes
- It has been estimated that the introduction of the travel card in London in the 1980s led to a 16% increase in bus trips³

DfT are developing a strategy for integrated and smart ticketing

DfT have identified a number of barriers to the wide scale implementation of smart and integrated ticketing:

- Commercial concerns about losing market share, obtaining a fair share of revenue, OFT reaction and the lack of freedom over fares
- Uncertainty about the technology
- Significant up front costs
- Absence of leadership
- Lack of innovation

DfT will shortly launch a consultation on a strategy for integrated and smart ticketing which will propose (amongst other things):

- Continued support to the common smart card specification which has been developed with the industry (ITSO)
- Paying a higher rate of BSOG for buses equipped with ITSO smartcard readers
- Local authorities use existing tools to develop integrated ticketing schemes and operators to develop commercial products
- Enabling the Oyster system read ITSO cards
- Continuing to specify smart cards as part of newly let rail franchises

The onus will be on local authorities and operators to develop integrated tickets themselves using the arrangements provided by the Transport Act 2000, Local Transport Act 2008 and the OFT Block Exemption

Information is highly valued by passengers but it has been difficult to establish whether provision results in significant increases in demand

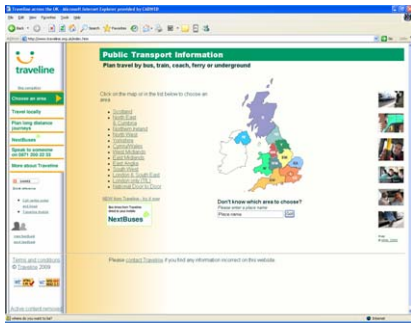
Policy

Modal shift

Buses

The provision of information is an important attribute throughout the course of a journey

Planning the journey



E.g. websites, call centres, timetable leaflets

At the bus stop



E.g. printed timetables and route maps, countdown screens, next bus data via SMS

On the bus



E.g. drivers, next stop display boards and announcements, network maps and “continuing your journey” leaflets

- A previous study has estimated that printed timetables at home were worth around 5.5p per journey (1996)¹
- Local authorities and operators have been working together to reduce and co-ordinate the number of timetable changes during the year
- Passenger Transport Executives in cities have a duty to provide information on public transport
- A number of studies have reported values of 4-9p per journey for real time passenger information at stops². Studies consistently show that real time information is valued higher than other potential improvements
- Displaying real time information at stops requires co-ordination between operators and the local authority responsible for the shelter
- Recent work for London has estimated that the provision of electronic displays and next stop announcements on buses are worth around 4p per journey²
- The leading transport operators have recently committed to improving information for customers at rail stations to help them on their onward journey⁴

Studies have struggled to demonstrate that improvements in the provision of information has led to an increase in demand. In part, this is due to investment in information often forming part of a wider package of improvements. Holdsworth (2007) argues that Real Time Passenger Information is difficult to justify on purely commercial grounds³

Bus use can dramatically increase when a package of measures is implemented

Policy

Modal shift

Buses

Bus priority measures tend to have the greatest impact when implemented as a package

	Bus priority measures	Other complementary measures	Service improvements	Journey time savings	Patronage increase
Manchester	<ul style="list-style-type: none"> Bus lanes Bus gates 	<ul style="list-style-type: none"> Quality bus corridors Park & Ride Ring & Ride Parking enforcements Improved bus stop design 	<ul style="list-style-type: none"> Articulated buses Metroshuttle high frequency services 	<ul style="list-style-type: none"> 10-15% journey time improvements 	<ul style="list-style-type: none"> 15% gain in some areas 9% overall growth from 1998 to 2003 52% of new passengers were previously car users
York	<ul style="list-style-type: none"> Bus lanes Pre-signals Bus gates Traffic Congestion Management System Bus location system 	<ul style="list-style-type: none"> Tesco free bus Travel concessions Cycle routes Parking charges Pedestrianisation 	<ul style="list-style-type: none"> Improvements to 70 bus stops Improvements to city centre pedestrian routes 	<ul style="list-style-type: none"> 4-12 minutes faster than car journeys 	<ul style="list-style-type: none"> Increase by 24.5% since 2000 22% increase in Park & Ride passengers
Edinburgh	<ul style="list-style-type: none"> Bus lanes Queue relocation Mixed priority Bus tracker signs Central Edinburgh Traffic Management 	<ul style="list-style-type: none"> Park and Ride City Car club Edinburgh Fastlink cycle lanes Traveline Updated bus shelters 	<ul style="list-style-type: none"> Smartcards Modern, efficient and reliable buses 	<ul style="list-style-type: none"> Can cut average times by 25% on Leith and 10% on peak hour Corstorphine Route 4% increase overall 	<ul style="list-style-type: none"> Annual average growth in passengers has been 3.5% across the network

Coordination of services can be achieved by partnership working or suspension of the deregulated bus market – no Local Authority has yet used power to regulate local services

Policy

Modal shift

Buses

	Voluntary Quality Partnerships	Statutory Quality Partnerships	Statutory Quality Contracts
Description	<ul style="list-style-type: none"> VQPs are agreements between bus operators and local authorities which can encompass a range of policies and investments 	<ul style="list-style-type: none"> SQPs provides a legal framework for local authorities to engage with operators to deliver improved services within the deregulated market The range of service attributes which can be included in an SQP was extended in 2008 to include minimum service levels, timings and maximum fares The main distinction with VQPs are that the agreements are enforceable—operators that fail to meet criteria are not allowed to use the facilities provided by the transport authority 	<ul style="list-style-type: none"> SQCs involves suspending deregulation in a specific area and letting exclusive contracts to operators through a competitive tendering process – these contracts can cover the full range of service attributes
Characteristics and requirements	<ul style="list-style-type: none"> Schemes need to be consistent with competition law Local authorities lead in deciding where cooperation is in the public interest Schemes are not legally binding or enforceable and the main cost of renegeing is reputational – operators can leave the scheme with minimal notice 	<ul style="list-style-type: none"> Schemes require that local authorities make improvements for operators The Local Transport Act 2008 allows for the Traffic Commissioner to refuse registrations in an area where there is a partnership scheme is the local transport authority requests it Bus operators are free to enter (or leave) the partnerships subject to them meeting the requirements of the scheme 	<ul style="list-style-type: none"> SQCs need to be passed by an Approvals Board chaired by a Traffic Commissioner SQCs need to pass a “public interest” test – this allows for a reduction in on-road competition if there are significant improvements in services Authorities have a number of powers during the transition period e.g. flexibility to procure services where an incumbent operator exits the market
Current use	<p>A number of quality partnerships are in operation in England. Data is not collected centrally on the number and impact of these schemes</p>	<ul style="list-style-type: none"> The only SQP to date was implemented in north Sheffield in late 2007 where prior to its introduction patronage was falling by 2% per year – it has risen 9.5% since the scheme was made¹ South Yorkshire ITA have recently consulted on implementing an SQP scheme in Barnsley 	<ul style="list-style-type: none"> There are no Quality Contracts in operation in England but some ITAs are currently considering whether to pursue this option. London operates a franchising system which could provide a model for wider implementation

(1) Scottish Executive (2009) Statutory Quality Partnership: Best Practice Guidance

Voluntary and statutory partnerships can be used to improve services although they can face barriers in certain areas

Policy

Modal shift

Buses

- Many Local Authorities have entered into partnership agreements with bus operators in recent years. Typically, these have consisted of local authority investment in bus infrastructure in return for bus operators delivering improvements in services and service quality. This has been accompanied by action at the national level through the Bus Partnership Forum (see box)
- Oxfordshire County Council are currently developing a partnership agreement with the two main bus operators to coordinate services on the busiest routes in the city. If successful this will simultaneously reduce the number of buses running and reduce wait times for passengers as buses will be more evenly spaced out

Co-ordination of services can improve frequency and reduce the number of buses required



- There are a number of potential barriers to partnership working:
 - actual or perceived constraints imposed by competition law
 - bus operators will likely only engage in activities which provide a commercial return
 - fragmented control and responsibility for the industry inhibits leadership and coordination of activity
 - the stability of arrangements can be threatened by operators entering/leaving the market

Bus Partnership Forum

The Bus Partnership Forum was set-up to promote co-operation and to overcome barriers to an effective climate of partnership between relevant stakeholders. Member organisations of the Forum are DfT, CPT, PTEG, LGA and ATCO²

The main outputs of the Forum have been voluntary codes of conduct and best practice reports covering:

- Service stability
- Bus priority
- Staff retention and recruitment
- Understanding customer needs
- Innovation and inclusion
- Performance monitoring and bus punctuality
- Competitively priced integrated ticketing

Competition law

OFT/DfT recently published guidance¹ on how competition law applied to the bus market, in part to address concerns raised by operators and local authorities. Features include:

- Under certain conditions competition can be restricted but this must be justified by the benefits delivered by intervention and the absence of other approaches which would deliver similar impacts without limiting competition
- Maximum but not actual fares can be set for routes covered by schemes. Competition law requires that fare decisions must be reached independently by each operator

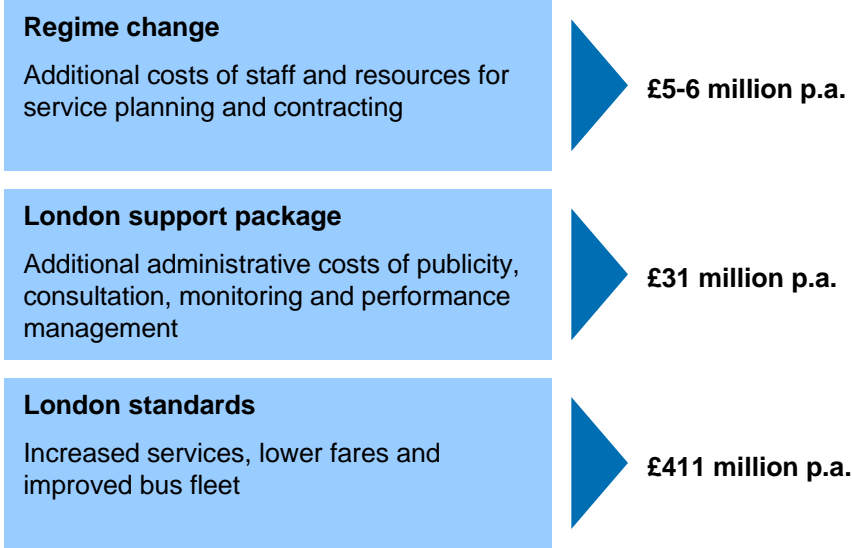
(1) DfT/OFT (2009) Guidance on the application of competition law to certain aspects of the bus market following the Local Transport Act 2008, (2) In full these are Department for Transport, Confederation of Passenger Transport, Passenger Transport Executive Group, Local Government Association, and Association of Transport Coordinating Officers

The costs of implementing Quality Contracts will be dependant on scheme design and the reaction of existing operators

Policy
Modal shift
Buses

The ongoing cost of Quality Contracts will be highly dependant on scheme design and whether an ITA chooses to enhance existing service levels. Delivering a bus system equivalent to London might cost £450 million per annum if rolled out across all ITA areas

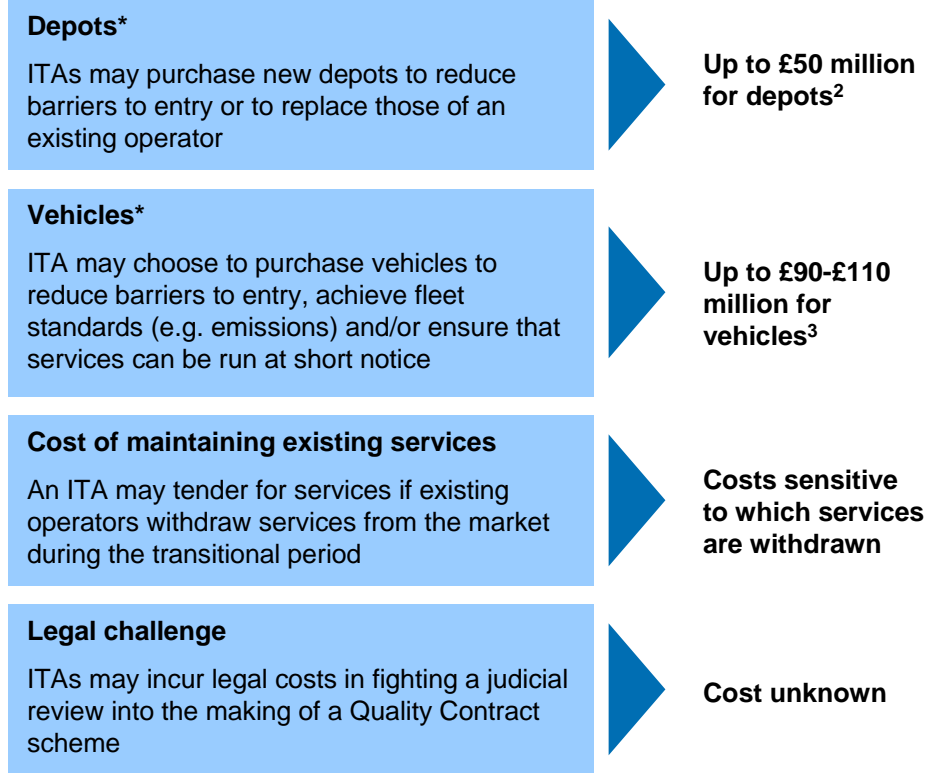
Projected costs of implementing Quality Contracts in all ITA areas¹



Some of the additional costs of a quality contract will be offset by reduced costs to operators. This will include a lower rate of return reflecting the reduction in risk associated with a franchised market

ITAs may also incur significant costs in the transition to Quality Contracts. The size of these will be highly dependant on how existing operators respond to their introduction

Estimated costs based on services run by 900 buses



* Note: owning the depots and vehicles will reduce contract costs

(1) Cited in CfIT (2004) The bus industry – encouraging local delivery; (2) Based on stated costs of First depot in Chelmsford (£5 million) with space for 88 buses and the Oxford Bus Company depot in Oxford (£10 million) which houses their fleet of 160 buses and coaches; (3) Costs of £100,000 to £120,000 assumed

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6. Conclusions

113. Transport and spatial planning are inextricably linked

114. The spatial design of urban areas has a strong influence on travel patterns

115. Positive steps have been taken in land use policy but little evidence exists on travel impact. Spatial planning could play a much more central role in affecting travel demand

Transport and spatial planning are inextricably linked

Policy

Modal shift

Spatial planning

Travel patterns are not only influenced by the transport network but where people want to travel between. This has two important implications

- Improvements in travel times might be used to travel to (or from) further away places
- Changing where we locate houses/jobs/amenities affects how we travel (mode, distance and frequency)

This suggests government can influence travel patterns through where it chooses to locate services, e.g. GPs, hospitals, schools

Most travel occurs because people gain value from being in different places e.g. going from home to work:



Home



Transport



Work

Decisions about where to live, where to work and how to travel are influenced by a number of factors:

- House prices
- Local schools
- Local amenities (e.g. parks, countryside, shops)
- Family ties

- Cost of travel e.g. fares, fuel costs
- Travel time
- Quality of journey
- Car ownership/availability

- Salary
- Pension and other rewards
- Working practices
- Job satisfaction
- Diversity of jobs available

These factors interact so transport is both an outcome of, and an input into, decisions about where to work, live, shop etc.

Where you work and live will affect what transport opportunities are available, their costs and the number of journeys you need to make

The cost and availability of transport opportunities will influence where you live, where you choose to work and the location of services you choose to access

The spatial design of urban areas has a strong influence on travel patterns

Policy

Modal shift

Spatial planning

Evidence on travel impact of different land use impacts

Land-use pattern	Conclusions	Evidence of impact on travel patterns ¹
Mixed-use development (combining housing, employment and amenities in single locations)	Greater mixed use development tends to reduce travel distances and can allow more trips to be made by walking and cycling	<ul style="list-style-type: none"> Hickman & Banister (2004) report that in Surrey mixed land-use is associated with reduced trip distances but this does not significantly impact mode share Masnavi (2001) finds that in low density areas public transport is used more frequently where there is mixed use Van and Senior (2001) find that car use for commuting declines as mixed use increases
Jobs-housing balance (refers to the ratio of residents and jobs in an area)	Mixed – associated with reduced distance travelled by car for commuting but may lead to greater use for non-work purposes	<ul style="list-style-type: none"> Research of job-housing balance in Surrey found that more balanced jobs-housing ratios are associated with reduced energy consumption from commuting² Cerevo found that communities with around one job per household were associated with lower car dependency²
Centralisation of employment	Tends to lead to increased public transport use but distances travelled may be longer	<ul style="list-style-type: none"> Simmonds and Coombe (2001) estimate that a policy of concentrating new jobs in areas served well by public transport would lead to a 17% increase in public transport use in Bristol
Urban form (whether developments are concentrated in a single city centre, along corridors, dispersed, or in linked urban centres)	Mixed – some studies show greater use of public transport in compact cities but outcomes may be sensitive to other factors such as level of congestion	<ul style="list-style-type: none"> Rickaby et al (1992) and Murto (2000) find the effect of different types of town on mode split was slight Konings et al (1996) finds public transport mode share for commute trips are higher for developments within existing city limits than for development built as an extension to urban areas or in rural communities

Policy implication: it is not only density and population which influence travel. Different land-use patterns have been shown to generate different travel patterns. This demonstrates that spatial planning is a tool which can be used to positive effect for desired transport outcomes

(1) All cited in TRL (2004) and Banister & Hickman (2006); (2) Hickman & Banister (2004)

Positive steps have been taken in land use policy but little evidence exists on travel impact. Spatial planning could play a much more central role in affecting travel demand

Policy

Modal shift

Spatial planning

Land use measures have been implemented in the UK with some degree of success, although impact on travel is uncertain:

Higher density developments of 30-50 dwellings per hectare are encouraged, developments less than 30 dwellings per hectare discouraged¹. New build densities have increased from an average of 25 dwellings per ha in 1997 to 40 dwellings per ha in 2005², however there is no known evidence of how this has impacted travel demand

Maximum parking rates of one space per 14 to 30 m² for different commercial land uses are mandated¹. The impact of this on travel demand, is unknown.

A 60% target for brownfield development was set³. About three quarters of new dwellings are on brownfield land, compared with 56% in 1997²

Spatial planning has been used effectively to reduce the demand to travel

Approach	Evidence of success
Increasing urban density	<ul style="list-style-type: none"> Higher urban densities increase the viability of alternative modes. Total public transport distances significantly increase at densities >30 dwellings per hectare and walking at >50 persons per ha⁴. Many cities could potentially reduce car use if densities are increased: typical densities range from: Greater Manchester 19, Birmingham 36, and London 46 persons per hectare⁴ Negative impacts of high density development can be mitigated through good design
Car parking supply in new developments	<ul style="list-style-type: none"> Car parking is a major land use. One study showed parking in central London takes up 16% land area (however this was relatively low compared to other cities such as Paris and New York)¹⁴ Maximum car parking rates, decoupling parking from housing and providing more unallocated versus allocated parking have been used for new developments. While there is some evidence these policies influence household car ownership⁵ and public transport use¹², the impact on congestion is uncertain⁶ Some cities apply differential urban densities and car parking supply depending on public transport accessibility (e.g. London's Public Transport Accessibility Level tool)⁷
Car-free developments	<ul style="list-style-type: none"> Many cities in Europe and the Americas are car free (e.g. Venice and Roosevelt Island, New York) or have car free zones (e.g. Freiberg) using spatial planning measures, and public transport, walking and cycling facilities to meet travel demand⁸. The UK's eco-towns initiative aims to achieve some level of car-free development, by encouraging <1 parking space per dwelling⁹
Transit orientated development	<ul style="list-style-type: none"> Curitiba, Brazil is an example of transit oriented development. It designed mixed use, high density development focussed around high frequency bus-way stations. Public transport mode share increased from 8% in the 1970s to 34% today¹⁰
Street connectivity	<ul style="list-style-type: none"> Street connectivity (designing street networks to provide the shortest route to services) can reduce distances by 0.5 to 5%¹¹. Some cities e.g. Portland, Oregon have set maximum connectivity standards¹². Others use spatial accessibility tools to achieve optimum street connectivity¹³

(1) PPG13, (2) Urban Task Force (2005) Toward a stronger urban renaissance, (3) PPS3, (4) Commission for Integrated Transport (2008) Land use and transport, (5) CLG (2007) Residential car parking research, (6) Still & Simmonds (date?) Parking restraint policy and urban vitality, (7) Mayor of London (2008) The London Plan, (8) www.carfree.com (2009) List of car free places (9) CABE (2007) What makes an eco-town, (10) IPPUS (2009) Curitiba planning and land use, (11) Litman (2008) Roadway connectivity, (12) www.vtpi.org, (13) www.spacesyntax.com, (14) Kenworthy & Laube (1999) International Sourcebook of Automobile Dependence in Cities

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6. Conclusions

- 117. The focus of this section is on large cities as this targets resources where problems are greatest but also policy would have a major impact on the wider economy
- 118. Governance arrangements and funding mechanisms are essential to maximise the impact of existing and new policy interventions
- 119. Local transport strategies are most successful when they cover average journey patterns
- 120. Evidence suggests that transport strategy should be integrated with a range of other relevant policy areas particularly economic development, spatial planning and housing
- 121. Transport authorities deliver more successful outcomes when highways, traffic and public transport powers are functionally integrated
- 122. A range of recent changes to local government offer opportunities to address some of the governance problems experienced by local transport authorities
- 123. Current funding and governance arrangements attempt to support the alignment of goals between different tiers of government, whilst leaving individual authorities to set their own priorities
- 124. There are a number of potential barriers within the current funding system which could limit the ability of transport to fully contribute to delivering successful outcomes in urban areas
- 125. There are a range of funding options which could be considered further but these need to be seen in the context of the wider governance system

This report focuses implementation on large cities where problems are greatest and where policy can have major impacts

The problems caused by transport are also greatest in large cities*

Congestion

Over 65% of the 1.8bn hours of lost journey time due to congestion in 2000 was in large cities²

Health

Cycling modal share in large urban areas is only 3%—a very large opportunity to improve health outcomes exists³

Enjoyment of space

People dislike urban features such as heavy traffic and industrial, polluted places⁴

Policy implication: policy should focus at first on the largest cities as this will both impact the areas where harms are greatest, and have a significant impact on urban success

We have looked at the largest cities because they are primary engines of growth and employment

GVA and employment by area (2006)¹

Local Transport Authority	GVA (2006) £million	Per cent of total (cumulative)	Employment (2006)	Per cent of total (cumulative)
London	234,989	24%	5,148,000	18%
West Midlands	44,865	28%	1,429,000	24%
Greater Manchester	44,782	33%	1,420,000	29%
West Yorkshire	37,621	37%	1,197,000	33%
Tyne and Wear	18,952	39%	588,000	35%
South Yorkshire	18,789	41%	659,000	37%
Merseyside	18,429	42%	652,000	40%
Partnership for Urban South Hampshire*	32,225	46%	917,000	43%
West of England Partnership*	23,315	48%	644,000	45%
Nottinghamshire*	18,007	50%	665,000	48%
England	985,477		27,890,000	

* Note: these areas are currently not ITAs but are often cited as places where an ITA might be considered given travel to work patterns

(1) SU analysis of National Statistics Data (Regional Gross Value Added and Jobs Density data) (2009) (2) DfT (2004) (3) DfT (2008) Travel survey (4) IPSOS MORI General public survey (2009) Velerade (2007) Health effects of viewing landscapes and Dixon and Wolf (2007) Benefits and risks of roadside development.

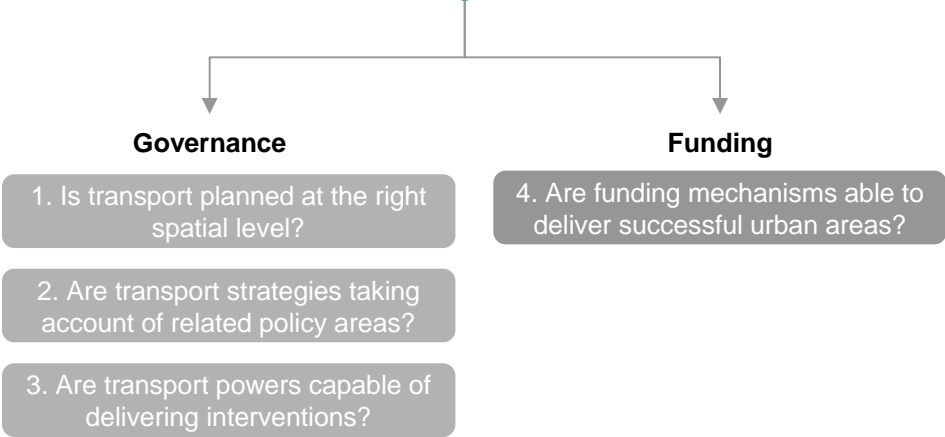
Governance arrangements and funding mechanisms are essential to maximise the impact of existing and new policy interventions

- In the previous chapters our analysis has defined urban success, it has highlighted the transport challenges which limit urban success, and has assessed the policy interventions available to improve success in urban areas
- This chapter explores whether appropriate policy interventions can be effectively implemented: what delivery arrangements best support the creation of successful urban areas?
- Delivery capability is a result of the governance arrangements and the funding mechanisms to support them.
- Within this framework four questions are raised to assess what governance organisations and funding mechanisms are most suitable for improving transport's contribution to creating successful urban areas

So far this document has:



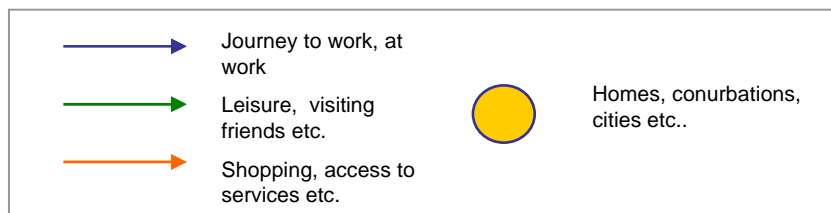
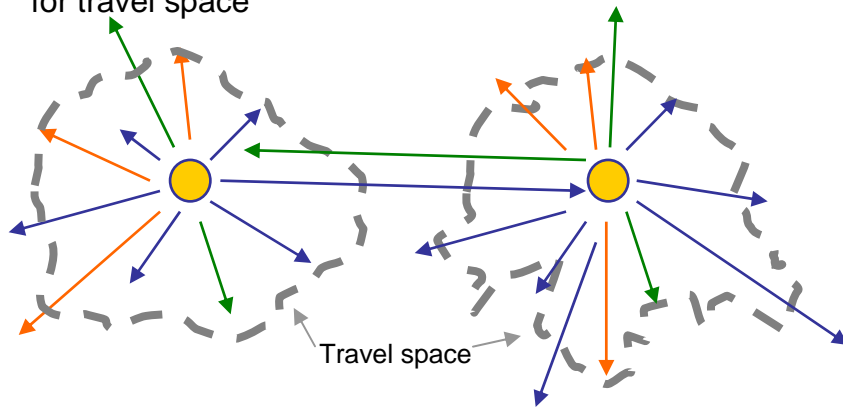
This section will:



Local transport strategies are most successful when they cover average journey patterns

Regardless of administrative boundaries, transport interventions need to support actual journey patterns

- "Travel space" is an imagined area around a place of residence within which some average pattern of journeys can be discerned
- Travel to Work Areas and city-regions are a useful proxy for travel space



Evidence suggests that local transport strategies and delivery plans should relate primarily to the travel-to-work areas of towns and cities

- Analysis from the Commission for Integrated Transport (CfIT) concludes that in the metropolitan conurbations and larger non-metropolitan areas (e.g. Bristol and Nottingham) strategy and plans should be for a single joint area across the city-region¹

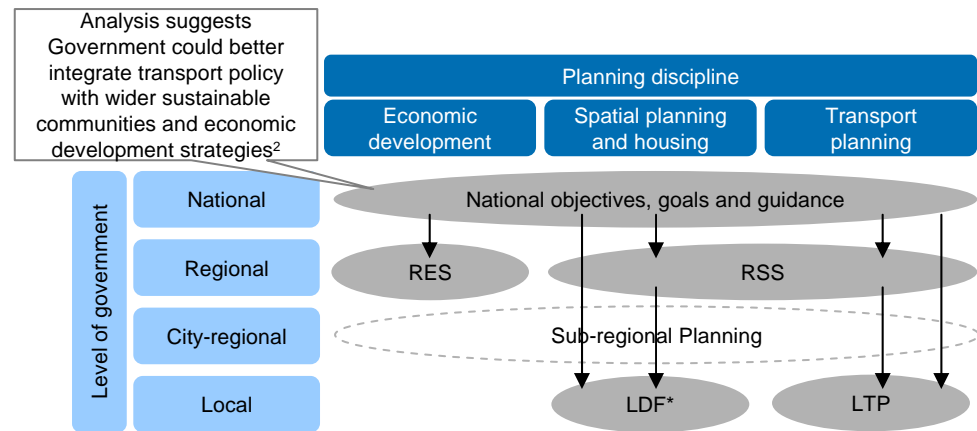
But current arrangements do not uniformly provide transport planning and delivery mechanisms at this city-regional level

- Strategic plans exist at the regional level but these are not effective infrastructure delivery documents¹
- Local transport plans can deliver local interventions but do not represent coherent sub-regional transport strategies²
- There is a gap between regional strategies and local delivery plans. This is particularly important for those metropolitan districts and unitary authorities operating within wider city-regions
 - CfIT argues for more support and formalisation of transport strategy and delivery at the city-regional level³

Evidence suggests that transport strategy should be integrated with a range of other relevant policy areas particularly economic development, spatial planning and housing

- Our analysis above made the case that transport and spatial planning are inextricably linked; in particular:
 - higher density and larger settlements are associated with lower distances travelled and a greater use of public transport
 - different land-use patterns are seen to generate different travel patterns – this suggests spatial planning is a tool which can be used to positive effect for transport
- In addition OECD analysis of experiences from across Europe suggests that urban transport policy should be viewed holistically. At different levels of government transport and spatial planning should not be undertaken in isolation¹
 - at the national level this may require integrated objectives coordinated across a single organisation, as was the case for transport in the UK from 1997 to 2001
- At the regional tier coordinated planning may require integration of related strategies. This measure is already proposed: future iterations of regional strategies will combine the Regional Economic Strategies (RES) with the Regional Spatial Strategies (RSS). This builds on previous strategic integration where Regional Transport Strategies were incorporated as part of a broader RSS

Currently there is little strategic integration at the city-regional tier to coordinate plan making across economic development, spatial planning, housing and transport
 Schematic representation of plan making at different levels of Government²



- Plan making at the city-regional tier is inconsistent. In metropolitan and two-tier areas transport planning occurs at this level – through Integrated Transport Authorities (ITAs) and county councils – but spatial planning occurs at the district level
 - for spatial planning purposes current legislation allows for neighbouring districts across a city-region to produce a joint 'Core Strategy'* but there is little evidence of this in practice. Therefore in many urban areas transport and spatial planning are decoupled from one another

(1) Challenges to implementing sustainable travel policies in urban areas – OECD (2002); (2) Amended from Integrating Transport Delivery – CfIT (2006)

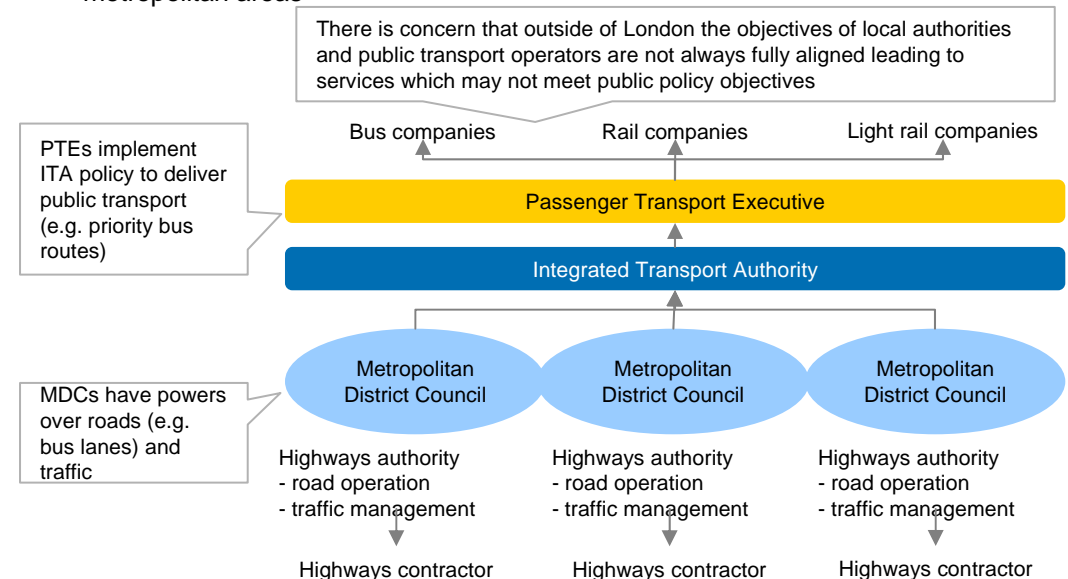
*Note: Local spatial plans are set out in the Local Development Framework (LDF) suite of documents. The Core Strategy is the main 'Development Plan Document' within the LDF

Transport authorities deliver more successful outcomes when highways, traffic and public transport powers are functionally integrated

- Analysis by CfIT finds that performance in delivering successful transport outcomes is strongly correlated with the degree of operational integration across highways, traffic and transport functions¹
 - in unitary areas all of these powers are consolidated within a single authority
 - in metropolitan areas however, these powers are fragmented: Metropolitan Districts Councils (MDCs) are designated as Highways and Traffic Authorities (responsible for local roads and traffic management); and the city-regional ITA is responsible for the provision of public transport services
- The need for ITAs and MDCs to work together despite this split of functions has long been recognised but problems exist where there is a misalignment of priorities

In metropolitan areas no single body is responsible for ensuring that public transport and road networks are working effectively across the conurbation as a whole

Schematic representation of the relationship between transport bodies in metropolitan areas



Policy implication: To encourage the delivery of more successful transport outcomes there should be greater integration of relevant functions at the city-regional level. Evidence suggests that an upward devolution by the MDCs to ITAs of control of highways and traffic responsibilities would have major benefits

- Lack of integration in metropolitan areas are seen by some as a principal reason to explain the less successful transport outcomes delivered in these areas relative to London and some larger unitary areas¹

(1) Moving forward: better transport for City-Regions – CfIT (2007)

A range of recent changes to local government offer opportunities to address some of the governance problems experienced by local transport authorities

There is broad consensus that current arrangements for the administration of statutory transport functions could be improved.¹ In response this Government has strengthened local partnership working arrangements and, through the Local Transport Act 2008, it has introduced a range of new transport powers. In addition, wider sub-regional governance changes are planned in the Local Democracy, Economic Development and Construction Bill (LDEDC). The benefits and limitations of some of the new and proposed measures are explored in the table below

HMT announced that Manchester and Leeds will take part in a City-region pilot to see how governance arrangements can be taken forward at city-regional level²

Structures proposed in the LDEDC Bill

Description

Multi-Area Agreements (MAAs) are agreements between a group of neighbouring local authorities, their partners and government to deliver a shared set of improvement targets for the wider area

Integrated Transport Authorities (ITAs) are city-regional bodies responsible for transport strategy and delivery. They replace the former Passenger Transport Authorities (PTAs)

The proposed Economic Prosperity Boards (EPBs) would be formed by local authorities and established by Statutory Order. EPBs are city-regional bodies responsible for economic development and regeneration

The proposed Combined Authorities (CAs) would be formed in the same way as ITAs and EPB. CAs are city-regional bodies that bring together the functions of an ITA with the functions of an EPB

Potential Benefit

MAAs coordinate activity between a group of local authorities and partners to deliver an agreed set of priorities. Following the LDEDC Bill, this could include statutory duties on partners to cooperate (similar to Local Area Agreements)

ITAs build on an existing and understood sub-regional governance structure (the former PTAs). ITAs provide a corporate body that can coordinate transport planning across a city-region

EPBs provide a corporate body to deliver coordinated economic development activity. They can be flexibly designed allowing constituent local authorities to delegate up to an EPB any local authority responsibilities deemed appropriate

CAs provide a corporate body that can take an integrated approach to delivery of both transport and broader economic development and regeneration across an area

Potential Limitation

A single 'responsible authority' acts on behalf of the group but funding, powers and duties cannot be given directly to the MAA. In addition these are three-year agreements potentially lacking the stability needed for long term transport planning

The functions and responsibilities of an ITA are limited to transport. This reduces the extent to which transport is organisationally and strategically integrated with other important planning functions (e.g. spatial planning and housing)

In relation to transport, EPBs can only draw up local authority responsibilities unlike ITAs which also offer the prospect of drawing down powers from the Secretary of State (e.g. over heavy rail). EPBs also have limited financial powers compared to ITAs

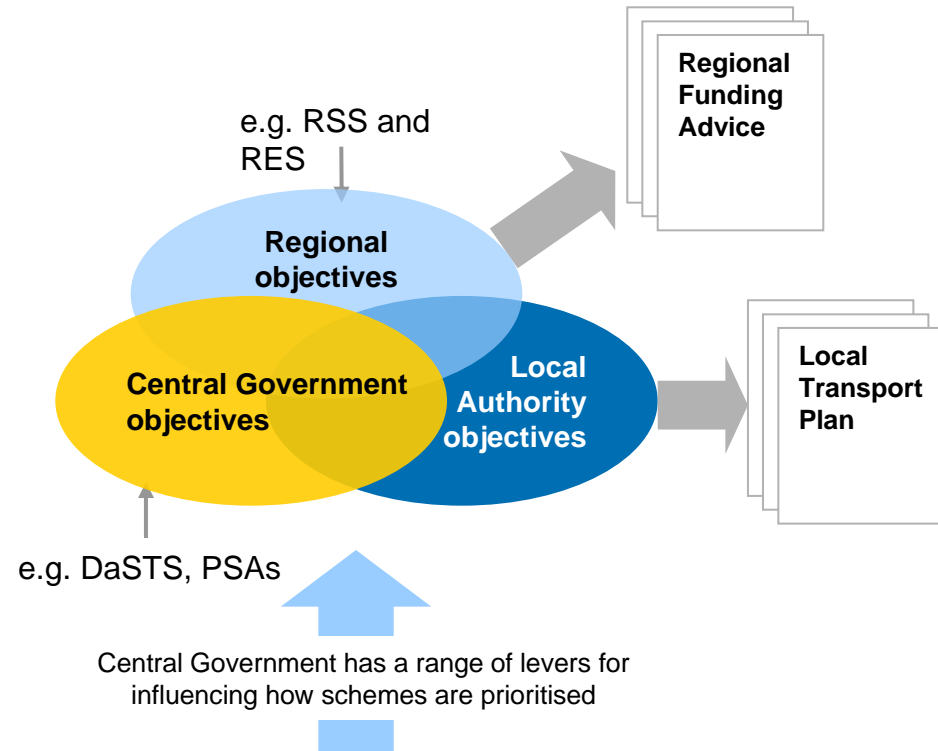
Differences in funding and financial powers between ITAs and EPBs may make practical operation of CAs complex

(1) Strengthening local delivery: The draft Local Transport Bill – DfT (2007), (2) http://www.hm-treasury.gov.uk/bud_bud09_press01.htm

Current funding and governance arrangements attempt to support the alignment of goals between different tiers of government, whilst leaving individual authorities to set their own priorities

The current system seeks to align the objectives of different tiers of government and a range of policy goals

- Transport plans are developed and delivered by Local Authorities and Regions
- When formulating these plans they are required to consider the objectives and strategies of different tiers of government
- The system encourages authorities to develop plans which align the objectives of different tiers of government and across different objectives (e.g. housing, economic development) but there will be occasions where there is tension between these goals
- Central government goals do not have pre-eminence:
 - an evaluation of LTP1¹ found that delivery of national targets had been less evident compared to local targets (particularly targets for environmental outcomes and cycling and walking)
 - environmental groups have expressed concerns about the fit of Regional Funding Advice with national CO₂ policies^{2,3}



- **Local Area Agreements:** negotiated between Local Strategic Partners and Central Government, the Local Area Agreement establishes the priorities and objectives that local government will work towards
- **Statutory requirements:** e.g. under the Traffic Management Act 2004, Air Quality Management Areas, Countryside and Rights of Way Act 2000
- **Funding:** e.g. block grants, TIF, Major Schemes
- **Assessment:** e.g. ministerial approval (and funding) for Major Schemes

- **Engagement:** e.g. through Government Offices
- **Guidance:** e.g. how LTPs should be prepared, how certain should be implemented
- **Monitoring:** e.g. authority reporting against the ten specific transport indicators in the LAA
- **Research and data:** e.g. evidence of the impact of smarter choices

(1) Atkins (2007); (2) DfT (2006); (3) Campaign for Better Transport (2009)

There are a number of potential barriers within the current funding system which could limit the ability of transport to fully contribute to delivering successful outcomes in urban areas

The current balance of funding between capital and revenue may discourage authorities from prioritising small scale revenue projects e.g. smarter choices. The way funding is allocated will also influence which projects are prioritised and in some instances could act as a barrier to the best scheme

	Balance of revenue and capital funding not well aligned with most effective projects	Funding streams skew the prioritisation of projects	Scheme prioritisation skewed by inability to show impacts against certain objectives
Evidence	<ul style="list-style-type: none"> 75% of authorities are dissatisfied with the level of revenue funding^{1*} Case studies which show that the most effective package cannot be implemented due to lack of revenue² 	<ul style="list-style-type: none"> Concerns about prioritisation of schemes being skewed to meet available funding streams⁴ However, a high proportion of funding is provided through block grants 	<ul style="list-style-type: none"> Authorities have reported difficulties in accessing funding for schemes whose impacts are more difficult to quantify and monetise (e.g. pedestrianisation)⁵
Barriers	<ul style="list-style-type: none"> Authorities are unwilling or unable to use revenue raising powers e.g. road user charging³ Ability to raise council tax is limited by threat of capping Authorities find it difficult to capitalise spending on revenue projects which deliver benefits over many years 	<ul style="list-style-type: none"> Major scheme funding is all capital so may discourage development of projects that require high levels of revenue funding² 	<ul style="list-style-type: none"> Guidance to estimate CO₂ emissions needs updating Some impacts are difficult to value in monetary terms e.g. the value of a high quality urban space Authorities do not think non-monetised benefits will be considered by DfT so do not include them in project scopes
Policy implications	<ul style="list-style-type: none"> Current funding system is probably not optimally allocating urban transport resources But there is always a risk that additional revenue will be used for non-transport services 	<ul style="list-style-type: none"> A proportion of Major Scheme funding could be provided as revenue but DfT may itself be revenue constrained 	<ul style="list-style-type: none"> Greater visibility about how appraisals inform decisions could be provided e.g. publish assessments Potential role for additional research into monetising and valuing impacts

(1) CfIT (2003); (2) SDG (2007), Alternatives to the A418 Improvements; (3) Atkins (2007); (4) see Eddington (2006) and TRL (2008a); (5) Binsted and Brannigan (2008) *Note: For the initial LTP funding period 66% of LTP expenditure was revenue allocation³. However, the additional funds available through the Major Schemes process are entirely capital based

There are a range of funding options which could be considered further but these need to be seen in the context of the wider governance system

Potential change to finding

Make changes to the Prudential Code to make it easier to capitalise spending which generates benefits over a number of years

Ensure the proportions of revenue and capital finding are those that ensure the best schemes are proposed

Encourage access to other funding sources (e.g. NHS)

Devolving bus subsidy to local authorities

Facilitate more innovative ways of funding large capital schemes e.g. Tax Incremental Financing

Potential Benefits

Increases the scope of projects which can be considered within existing budgets and ensures that projects which secure similar outcomes are considered on a like-for-like basis

As above. This can be applied to existing system for prioritising funding (RFA) and assessing business cases

Increases local transport budgets but no change in overall government spending.

Allows authorities to direct revenue spending to those projects with the highest return

Potential to lever-in additional funding for transport particularly given future fiscal constraints.

Potential Limitations

Some authorities have had some limited success in capitalising short-term support for operations (e.g. during the implementation of a new system) or marketing but it would not provide the long-term security which some schemes would require e.g. significant enhancement to the bus network¹

DfT face revenue constraints and may be unwilling to do this within current funding provision. Does not address revenue constraints for smaller schemes below the £5 million threshold for Major Scheme Funding. If it is not ring-fenced revenue may be appropriated for non-transport services

Understanding alternative funding application processes and difficulties in demonstrating impacts against non-transport objectives²

If not ring-fenced revenue may be appropriated for non-transport services

Does not address issues concerning revenue

Policy implication: these funding options cannot be viewed in isolation from the wider governance and delivery structures. The effectiveness of any changes to the way local transport is funded will be heavily influenced by the context in which they are implemented

(1) Alternatives to the A418 Improvements: Project Report (2007), SDG (2) Brannigan, Binsted and Paulley (2008), TRL

1. Purpose

2. How and why we travel

3. Transport's impact on urban success

- Economy
- Health
- Space

4. Policy effectiveness

- Roads and streets
- Modal shift
- Spatial planning

5. Implementation

- Governance
- Leadership**
- Skills and capability**
- Appraisal and packaging**

6. Conclusions

- 127. Lack of leadership may be limiting the ability of urban areas to tackle all their transport challenges
- 128. Skills and capability gaps exist—which may be hindering successful policy implementation
- 129. Lack of data, and current appraisal methods may be contributing to resource allocation that does not maximise the ability of transport to affect urban success

Lack of leadership may be limiting the ability of urban areas to tackle all their transport challenges

- A number of areas were looked at where leadership and accountability were felt to be hindering policy implementation
- The areas looked at are illustrative rather than exhaustive

Policy implication: leadership has been found to be important to launch and sustain initiatives, particularly in walking, cycling and street design. Increased understanding at senior levels of the benefits of improving street quality can help ensure that the quality of all types of streets is considered

Policy area	Leadership area	Why is this not being addressed?	Detail
Modal shift	Relatively low priority for a vision and goals to achieve modal shift towards public transport, walking and cycling	Walking and cycling are mostly considered the responsibility of local authorities Even though the Network Management Duty requires LAs to consider and promote all users of the network	In most urban areas, this manifests as uncoordinated and piecemeal programs and policies, even though LTP3 clearly supports them Many agencies have common goals for active transport (e.g. DH, DCMS), however are not adequately coordinating resources and effort As a result, resources are not used as efficiently and effectively as they could be
	There is limited accountability for walking and cycling in central and local governments	Walking and cycling are not usually high priority of senior officers Agencies often focus on their own immediate targets rather than working across disciplinary boundaries	Walking and cycling are usually delivered as part of road, street and public transport measures This means measurable increases in walking and cycling levels will only be achieved if departments responsible for roads, streets and public transport are made accountable for walking and cycling policy
Roads and streets	Infrequent use of inter-disciplinary working in road, street and public realm schemes	Inter-disciplinary working usually requires more effort Decision makers are concerned about personal liability, if they depart from standard safety design norms ²	Strong leadership and inter-disciplinary working are vital for successful street schemes. However, many senior LA officers and members may not be fully aware of potential benefits. This means that they may take risk averse options, which can result in poor street design (e.g. use of guardrails and designs more suited to roads than streets)

(1) For example, increase walking and cycling modal share by 10%; provide a minimum standard of walking and cycling conditions in neighbourhoods (e.g. using Pedestrian Environment Review Scheme (PERS) audits), (2) For example, those recommended in the Design Manual for Roads and Bridges (DMRB)

Skills and capability gaps exist—which may be hindering successful policy implementation

- Whilst again, this list is not intended to be exhaustive, there were two areas of most concern with regard to skills shortages: traffic management and active travel

Policy implication: good policies are not enough: skilled people are needed to ensure they are well implemented and that best practice is spread

Policy area	Skill area	Why is this not being addressed?	Detail
Roads and streets	General skills shortages in the transport sector	Project Brunel ¹ identified a number of transport skills shortages both now and in the future as senior managers retire. No 'local transport profession' exists to drive improvements in skills	Project Brunel ² recommended developing new skills academies and qualifications, and measures to aid recruitment Improvements in local transport skills are driven from the top-down – a self-sustaining profession would be a more effective mechanism
	Congestion and traffic management skills shortages	Skills and information gaps in ability to analyse local congestion and in using traffic management measures intelligently. Weak modelling capability in some local authorities	Congestion analysis could be improved and information (e.g. cost effectiveness) made more accessible. Traffic management requires specialist skills (e.g. mathematical skills for signal management). Some computer models used to analyse congestion not fit for purpose
Modal shift	Lack of awareness in local government about the different activities involved in delivering successful active transport interventions	It is difficult to do. Different parts of local authorities and government agencies are focussed on delivering their own immediate targets rather than working across disciplinary boundaries to deliver effective active travel interventions	The Healthy Urban Development Unit in London raises awareness of active travel and skills among PCT staff and LA urban planners. This could be used as a model for active travel. Cycling England have developed an advisory network of local authority professionals and consultants to support local authorities in cycling strategy and implementation
	Lack of capacity in PTEs to plan, procure and manage bus networks	New powers only recently came into effect and PTEs are currently reviewing bus network and what partnerships might involve	Organisational capacity and capability may frustrate delivery of bus strategies particularly partnerships and quality contracts

(1,2) Project Brunel: Transport Industry Resources Study – Franklin Andrew report to DfT/TfL (December 2008); (2) See <http://www.partnershipsuk.org.uk/What-PUK-Do.aspx>

Lack of data, and current appraisal methods may be contributing to resource allocation that does not maximise the ability of transport to affect urban success

- Evidence was found that suggested the way some decisions are currently being made, may not be leading to implementation of the most appropriate policies to tackle urban transport problems

Policy implication: selection of projects and appraisal are an important part of the policymaking process and should be considered important to the intended outcomes

Policy area	Issue	Why is this not being addressed?	Detail
Relevant to all areas	Decisions about transport in urban areas regularly prioritises congestion relief over other objectives e.g. health. Analysis above suggests that this might not be the best allocation of resources to increase urban success	<p>The evidence base on the impact of transport on other objectives (e.g. health) is not well publicised</p> <p>Other government departments do not routinely view transport as a way of meeting their goals</p>	The analysis above suggests that the costs of congestion and poor air quality, physical inactivity and accidents in urban areas are broadly similar
	Impacts on pedestrians are not routinely modelled and monetised as part of appraisals. As a result schemes which improve the walking environment may struggle to secure funding; pedestrian improvements as part of larger schemes may be minimised to maximise the benefit cost ratio. Equally schemes which negatively impact the pedestrian environment may be prioritised over other schemes that have a lower or no impact	<p>There are a number of technical and methodological challenges which need to be addressed</p> <p>Individual authorities (perhaps with the exception of TfL) are unlikely to develop new methodologies themselves given the costs of research and uncertainty over whether methodologies will be accepted by DfT</p> <p>There is a lack of data on the number of pedestrians and how they move through urban spaces</p>	<p>Techniques for assessing the benefits to pedestrians are being developed and tested in London (PERS)</p> <p>Unlike traffic volumes we do not have comprehensive data on walking trip patterns. Walking data is usually only collected at a city-wide scale (i.e. via the National Travel Survey) and rarely at lower levels e.g. street network scale</p>
Modal shift (walking) and streets	Lack of data on the quality of existing infrastructure for pedestrians makes it difficult to identify and prioritise areas for improvement	<p>This needs to be coordinated centrally to obtain comparative data</p> <p>Some methods exist, but are only implemented in a piecemeal way (e.g. street audits carried out by Living Streets, and PERS)</p>	No comparative data exists on residents perceptions of walking in their city, or physical walking conditions of different cities in the UK with other cities worldwide

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131. The evidence in this paper has important implications for tackling the future challenges in delivering urban transport

The evidence in this paper has important implications for tackling the future challenges in delivering urban transport

Chapter

Main finding

How and why we travel?

- Car use continues to grow; bus use continues to fall
- Many short journeys that can be cycled or walked, are driven

Transport's impact on urban success

- Transport can impact a city's economy, health outcomes and people's enjoyment of its space
- The total cost of transport in urban areas exceeds £40bn, around £11bn is accounted for by congestion

Policy effectiveness

- More clearly identifying the roles of roads and streets can increase traffic flow and make areas more pleasant
- In the absence of road pricing, there are still many ways congestion can be reduced
- Increasing active transport requires behaviour change; this needs targeting and longevity, as well as infrastructure
- Spatial planning has a long-term impact on travel patterns

Implementation

- Transport policy works best when integrated at the city-region level
- Leadership, skills and decision making processes are important to policy success

Government has made a set of announcements that support the evidence in this report

Building  Britain's Future

bike 4 life

- Building Britain's Future commits the Department for Health and the Department for Transport to developing a National Cycle Plan and a new active transport strategy by the end of 2009¹
- DfT recently announced £14m to provide enhanced cycling facilities at train stations and the Cycle to Work Guarantee, which is aimed at large employers² who provide:
 - secure, safe, and accessible bike parking facilities for all staff who want them
 - good quality changing and locker facilities for all staff who want them
 - offset the cost of cycling equipment and save on the tax through the 'Cycle to Work scheme'
 - bike repair for cyclists on or near site
- Alongside this report DfT is publishing The Future of Urban Transport which sets out its desired way forward in light of this analysis³
 - this document starts a new dialogue with cities to consider what more might be done for the future of urban transport
- They are also publishing a detailed analytical paper on the wider costs of urban transport⁴

(1) <http://www.hmg.gov.uk/buildingbritainsfuture.aspx>, (2) www.dft.gov.uk/pgr/sustainable/cycling/cycletowork/, (3) see www.cabinet-office.gov.uk/strategy (4) The Wider Costs of Transport in English Urban Areas in 2009 (DfT)