TRANSPORT AND HEALTH IN LONDON

The main impacts of London road transport on health

MAYOR OF LONDON

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Greater London Authority
City Hall
The Queen's Walk
More London
London SE1 2AA
www.london.gov.uk
enquiries 020 7983 4100
minicom 020 7983 4458
Copies of this report are available
from www.london.gov.uk

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Key findings

The majority of Londoners' travel time is spent on roads (80%) on foot, public transport, bicycle or in cars. This is where the majority of the health impacts of travel also lie.

The health benefits of physical activity from walking and cycling outweigh the harms of exposure to air pollution and road traffic injuries.

Currently around 25% of Londoners meet their minimum physical activity needs (150 minutes per week) through walking and cycling for transport alone. This is a significant contribution to overall activity levels in London.

The increased cycling expected by 2031 in the Mayor's Transport Strategy could deliver health benefits of between 3,800 and 6,800 years of healthy life for the population of London. This is equivalent to nearly £250 million in monetary terms.

Looking further into the future, this research concludes that over 60% of travel time could theoretically be spent walking or cycling. Currently only 28% of travel time is, less than half of this theoretical potential. If, in the longer term, this theoretical potential could be fulfilled it would deliver over 61,500 years of health benefit each year. It would also mean that around 60% of Londoners could meet their physical activity needs through transport alone. This would deliver an economic benefit of nearly £2.2billion.

CONTEXT

We know that how we travel impacts on our health. It is not always clear to us which are the greatest hazards to our health, the health implications of our policies or whether the benefits of 'active travel' outweigh the risks.

This research was commissioned to answer these critical questions.

The Integrated Transport & Health Impact Model(ITHIM) was developed into a bespoke tool for London using Transport for London data. This model enables comparison of the impacts of physical activity, air pollution and injuries on the population of London. A range of different hypothetical scenarios were modelled to indicate the relative harms and benefits of different transport policy options.

This document sets out the main results of this modelling exercise. Details of the methodology are presented at the back.

For further information contact lucy.saunders@london.gov.uk

The main health impacts of road travel in London

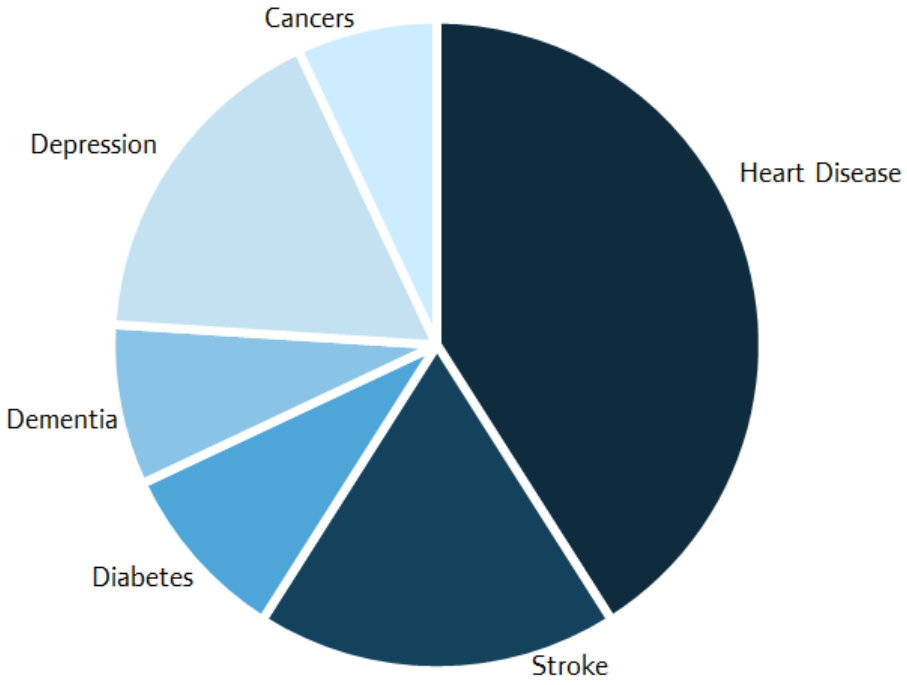
The three biggest health impacts of travel on roads in London are physical activity from walking and cycling, exposure to poor air quality and injury in a traffic collision.

Physical Activity

Most people in London are not sufficiently physically active for good health.[1] This increases the risk of a range of diseases and early death.[2]

The biggest health benefits of physical activity come from reductions in heart disease, followed by stroke and depression. The biggest benefits to health come from increasing physical activity from low to moderate levels.

The health benefits of more walking and cycling in London



Air Quality

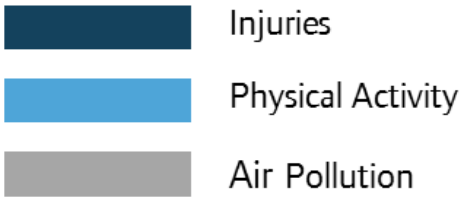
In London poor air quality affects the health of everyone. Motorised road vehicles are a significant source of some air pollutants in London.[3]

[1] Active People Survey January 2012 – January 2013, available at www.phoutcomes.info/
[2] Start active, stay active: a report on physical activity from the four home countreis' Chief Medical Officers (2011) Department of Health
[3] Roads Task Force Technical Note 21 (2013) Transport for London

Road Traffic Collisions

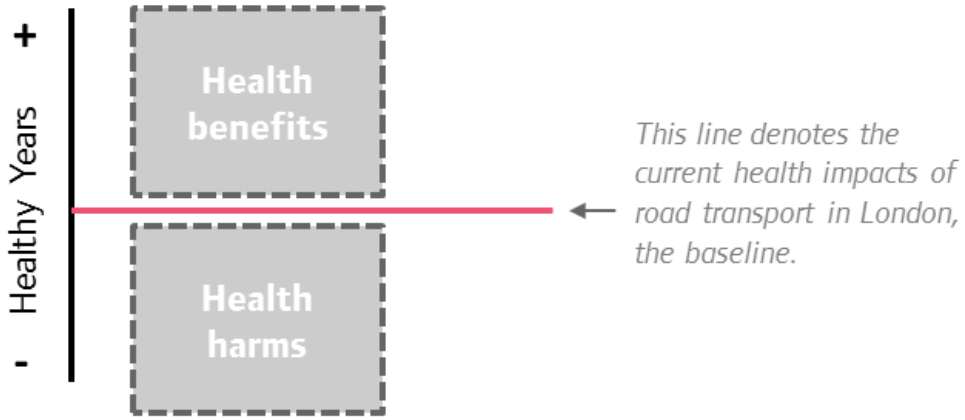
Pedestrians and cyclists make up nearly half of all serious injuries and fatalities following road traffic collisions in London.[4]

These three health impacts will be represented by this colour code in charts



To enable comparison of these 3 impacts on disease and death they are all measured in Disability Adjusted Life Years (DALYs). **One DALY is 1 year of life lived in perfect health.** The DALYs presented in this report relate to changes in 1 years incidence but the benefits are then accrued over multiple years. A fully description of DALYs is included in the Notes on Methodology.

The health impacts of each scenario modelled are in comparison with the current impacts of the transport system in London. This is denoted by the horizontal line. The modelled benefits of each scenario will lie above this line and the harms will fall below it.



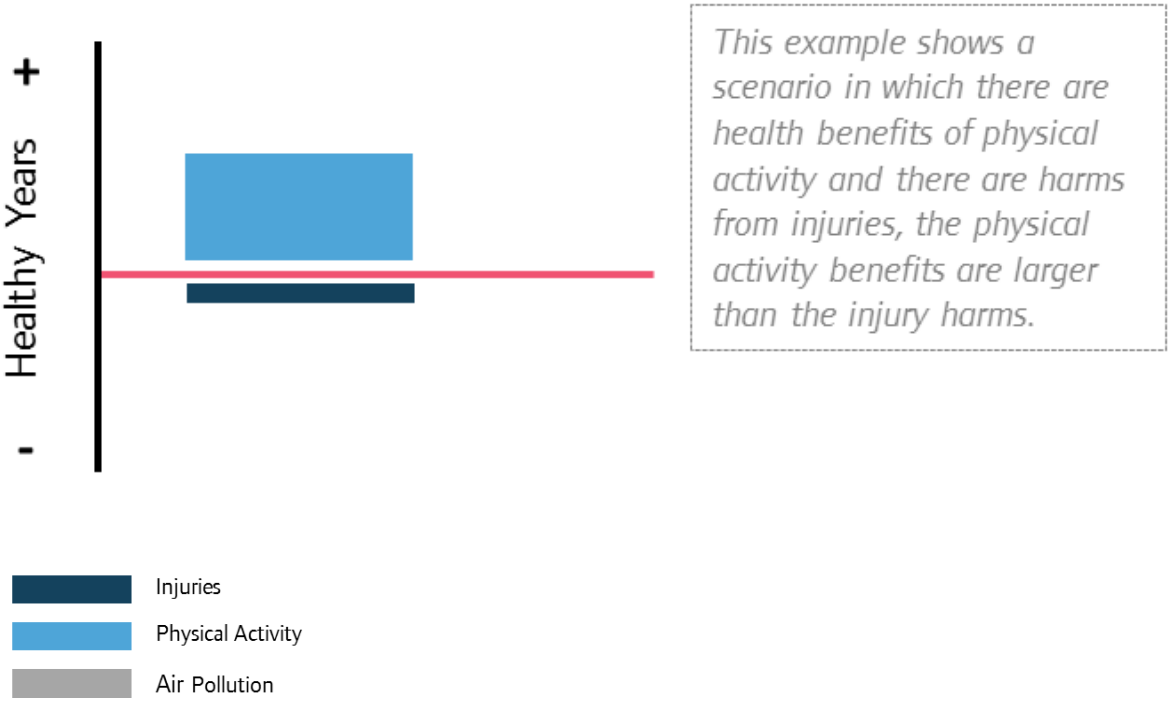
The size of each of these three impacts on health is determined by who travels by which mode.

The number of DALYs presented in this report are mid-point estimates, uncertainty is not shown, therefore they should be viewed as estimates and not exact figures.

[4] Collisions and casualties on London's roads: annual report 2012 (2013) Transport for London

Example

A greater proportion of people travelling on foot could mean increased physical activity benefits but also (a smaller) increased risk of road traffic injury.



This example shows a scenario in which there are health benefits of physical activity and there are harms from injuries, the physical activity benefits are larger than the injury harms.

THE HEALTH IMPACTS OF DELIVERING THE MAYOR'S TRANSPORT STRATEGY

How Londoners spend their travel time

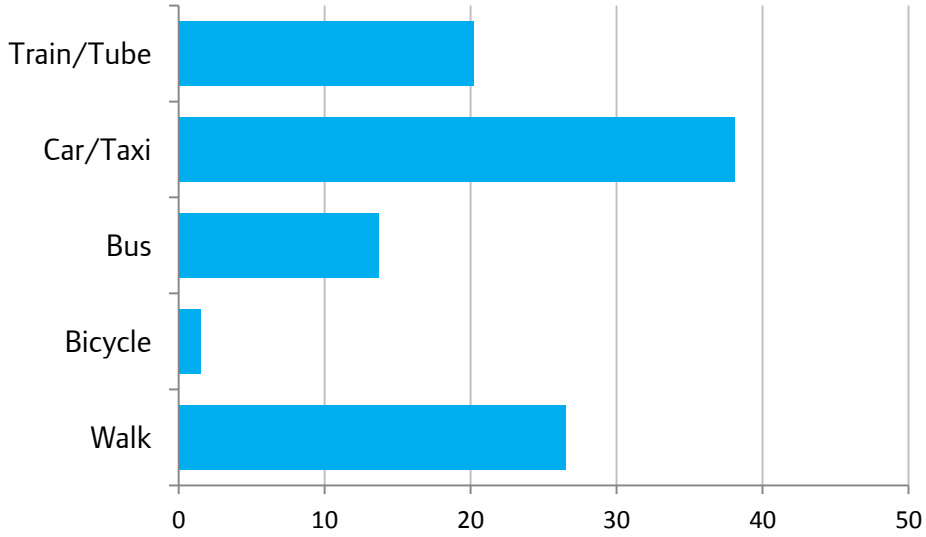
The majority of Londoners' travel time is spent on roads (80%). This is where the majority of the health impacts of travel also lie in London.

Londoners spend more of their travel time (38.1%) in cars and taxis than any other mode.

Londoners spend more than a quarter of their travel time walking (26.5%) so travel contributes significantly to the physical activity of the population (see section 4).

Currently, at a population level, cycling only accounts for a very small proportion of travel time (1.5%). There is a relatively small group of people who make up a significant amount of this cycling.

Percentage of time spent by each transport mode 2005-2011

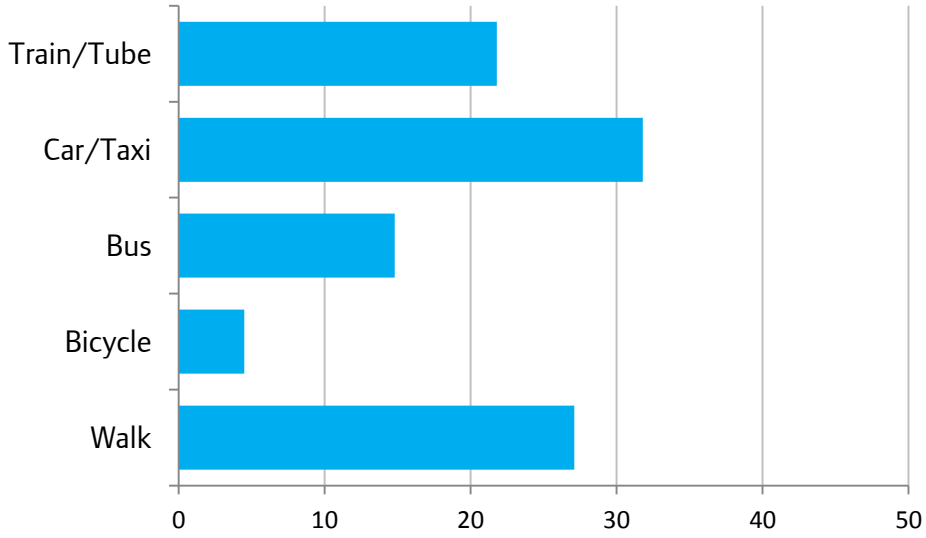


How Londoners' travel is predicted to change by 2031

The Mayor's Transport Strategy was published in 2010. It sets out the expected changes in how people in London will travel by 2031 given the planned changes in transport infrastructure.

Compared with how Londoners spent their travel time in 2005-11 the main difference predicted for 2031 will be a 6.3% reduction in time spent travelling by car/taxi which will be redistributed to bike (4.5%), bus (14.8%) and train/tube (21.8%).

Percentage of time spent by each transport mode 2031



Figures have been rounded to one decimal point. This data is taken from the London Travel Demand Survey which reflects travel by Londoners only, not visitors or freight. This data reflects travel by people rather than vehicles. It is the average for 2005-2011, cycling has increased over recent years so will be slightly higher.

The health impacts of delivering the Mayor's Transport Strategy

Delivering the changes in 'mode shares' of the Mayor's Transport Strategy will mean a small absolute increase in cycling as a proportion of all travel time by people in London (from 1.5% to 4.5%), although it is a larger increase in relative terms.

If this increase is achieved by getting those who are currently cycling to cycle more, we can expect nearly 4,000 years of healthy life gained by the London population each year. The majority of those years of healthy life gained will be to those who are cycling benefiting from reduced risk of diseases caused by physical inactivity (3,000 of the years of healthy life gained).

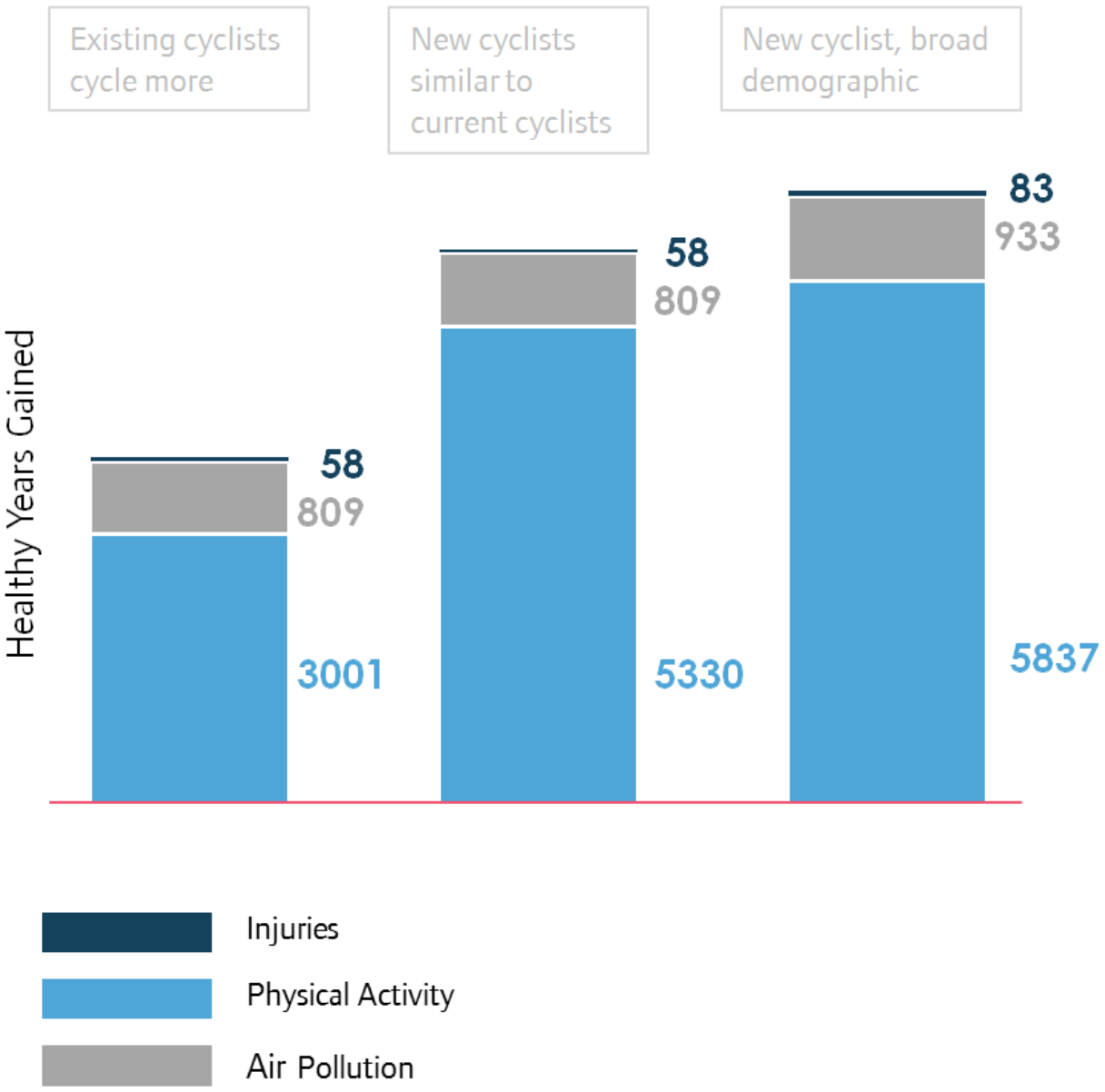
- Physical activity benefits will be delivered by more journeys cycled.
- Air pollution benefits will result from less pollution from vehicles and less exposure to poor air quality
- Injuries reduce very slightly. This is based on a relatively optimistic assumption of risks changing when people switch to cycling from motorised modes of travel.

Current cyclists are predominantly aged 20 – 40 and there are more men than women. The additional benefit of more physical activity from more cycling is small for this group of current cyclists because they are already physically active and, being younger, are at lower risk of the range of diseases associated with physical inactivity.

If instead, the increase in cycling were achieved by attracting new cyclists, drawn from the same demographic groups as existing cyclists, the health benefits from physical activity would be greater, over 6,000 years of healthy life gained compared with under 4,000. This is because the biggest health benefits are generated from the initial take up of physical activity.

Likewise, if the increase in cycling were achieved by attracting new cyclists, drawn more from older age groups, the health benefits would be greater still, near to 7,000 years of healthy life gained and almost double (177%) the benefit of increased cycling among existing cyclists.

Health impacts of delivering the Mayor's Transport Stregy through different groups of the population increasing cycling



Other policies which might change vehicle fleet emissions have not been included.

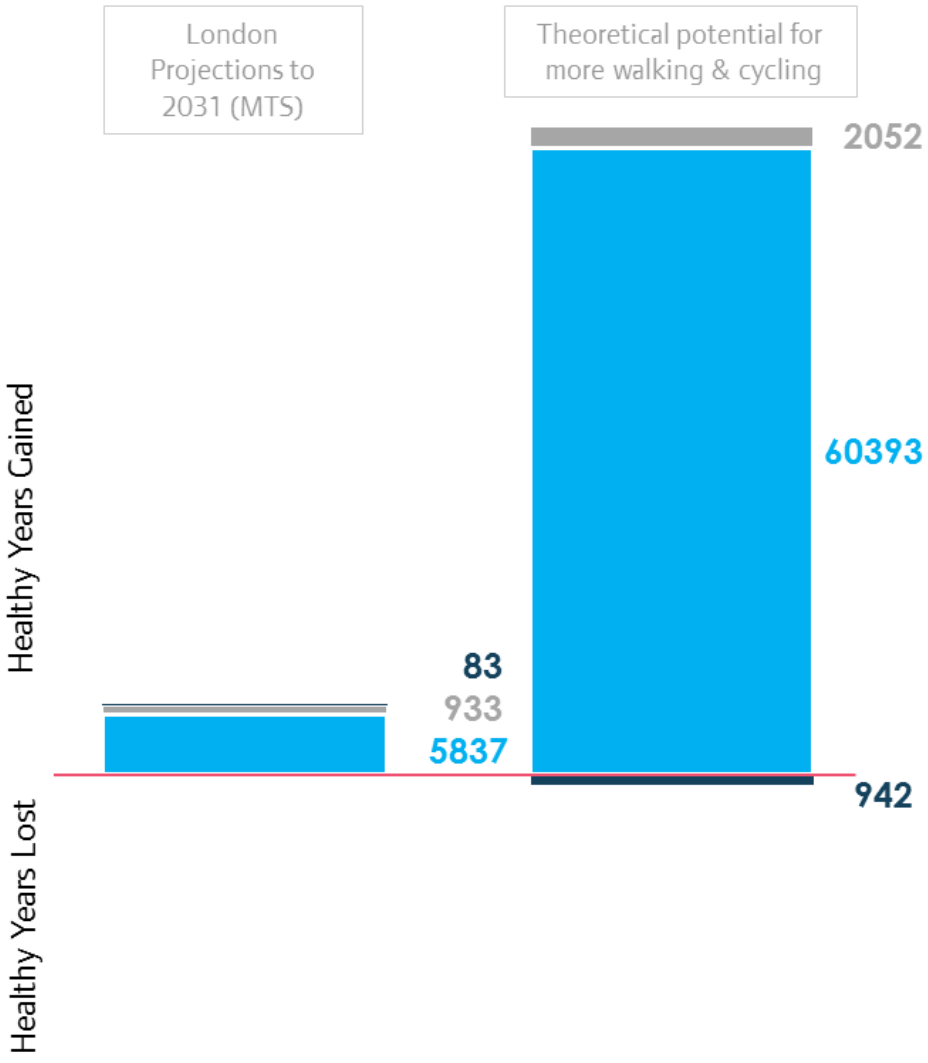
THE HEALTH IMPACTS OF EVEN MORE CYCLING AND WALKING

Current policies for delivering the Mayor's Transport Strategy will deliver a major shift towards more cycling (see Section 3). Looking further into the future there are many more short trips in London that are currently completed by motorised transport which could in theory be walked or cycled.

Trips which are considered to have the theoretical potential to switch from motorised modes to walking and cycling are those which are short (under 2km) for walking or medium length (under 8km) for cycling, not carrying heavy or bulky items and not travelling late at night or early in the morning. More details of the exact parameters are set out in the notes on methodology at the back of this document.

To give an indication of the possible benefits of achieving more walking and cycling in the future a hypothetical scenario was developed. This scenario shows that if all of the short motorised, theoretically 'switchable' trips were transferred to 'active modes' then the time Londoners spent walking and cycling would be very different to the way we currently travel and also to the plans for how we will travel in 2031. This modelled scenario is described here as 'Theoretical potential for more walking and cycling'.

Health impacts of the 'Theoretical potential for more walking and cycling' scenario compared with the current projections for 2031 (Mayor's Transport Strategy)



Over 60% of travel time could be spent walking or cycling, currently only 28% is, less than half of the theoretical potential.

The biggest health impact of transport is physical activity. Switching many short journeys from inactive modes e.g. car or bus, to active modes – walking & cycling – would deliver enormous health benefits.

The most optimistic hypothetical scenario for 2031, which assumes that the cycling increase set out in the Mayor's Transport Strategy (MTS) is delivered by a wide range of people taking up cycling would deliver around 6,800 years of healthy life.

This can be compared with the hypothetical scenario of converting shorter motorised trips to walking and cycling which would deliver a 10 fold increase in the health benefits with a net gain of around 61,500 years of healthy life.

There would be a very small increase in the number of healthy years of life lost to injuries as a result of increased time spent walking and cycling. This disbenefit would be equivalent to 1.5% of the total benefit from increased physical activity and reduced harms of air quality.

It would not be realistic to assume that all these shorter journeys that could technically be easily switched to active modes could be converted in the short-term. Even in the longer-term future forecasting it may not be realistic as people's travel choices are complex in reality. However this scenario was modelled to give an indication of the amount of time spent travelling shorter distances by motorised transport modes which could potentially be travelled actively.

Health economic cost savings

Physical inactivity costs society in terms of poor health, absence from work and lower productivity, healthcare and social care. These costs are not just for those who are sick but also those who care for them and wider society. It can be hard to monetise these impacts. However, as a proxy, Disability Adjusted Life Years can be converted into a monetary value by multiplying them with the Gross Value Added (GVA) per capita. GVA per capita for London is 2011 was calculated by the Office of National Statistics as £35,638 which can be multiplied by the net gain in health years of approximately 6,800.

The Mayor's Transport Strategy will produce an economic health benefit of nearly £250 million annually.

By comparison the net gain in healthy years estimated for the hypothetical scenario of around 61,500 can also be multiplied by the GVA per capita.

This produces an economic health benefit of over £2 billion if London were in future to achieve its theoretical walking and cycling potential. This does not include the wider benefits that would be accrued to the economy and society.

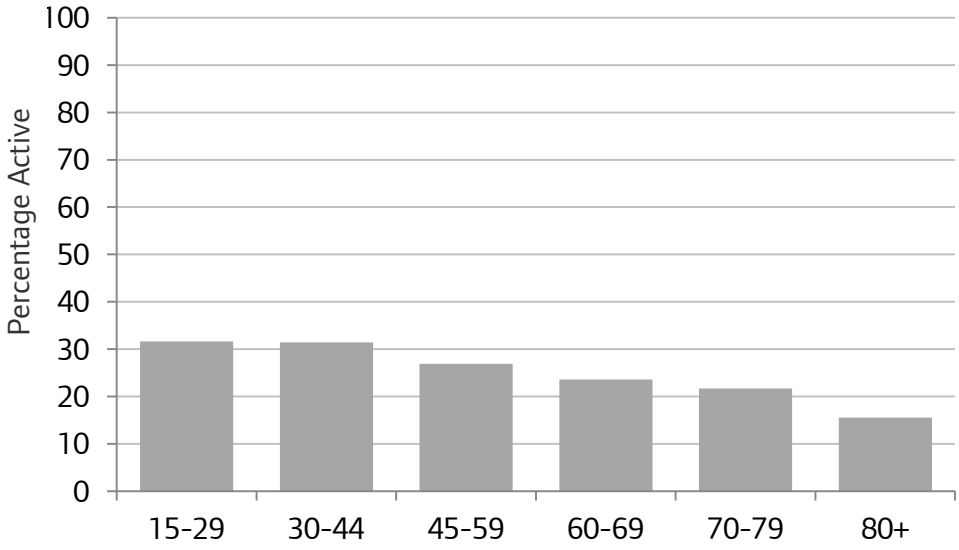
Proportion of adults meeting their physical activity needs through walking and cycling

Adults need a minimum of 150 minutes of moderate intensity physical activity (e.g. brisk walking) in periods of 10 minutes or more each week for health (Start active, stay active, Dept of Health 2011). It is estimated that 43% of adults in London achieve this minimum (Active People survey 2012/13).

Londoners walk a lot as part of their travel and it is estimated that 25% of adults meet the recommended 150 minutes of physical activity through travel alone. This is based on the fairly conservative assumption that only around half of walking is sufficiently brisk to be of 'moderate intensity'.

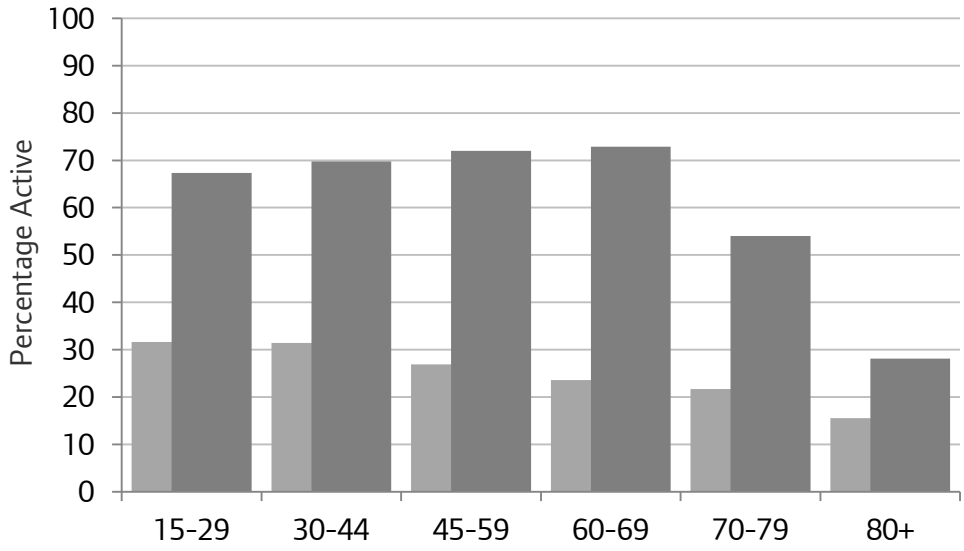
Walking is probably the main way that Londoners stay active, and unlike sport, walking levels stay fairly consistent across the life-course.

Proportion of adults in London currently meeting their physical activity needs through walking and cycling (2005 – 2011)



However, if Londoners walked and cycled all of the shorter trips that in theory they could, the proportion of adults meeting their physical activity needs would significantly increase. Instead of 25% meeting their physical activity needs through transport, the figure would be 60%, more than double the current level.

Proportion of adults in London who could meet their physical activity needs through walking and cycling



THE HEALTH IMPACTS OF TRAVEL IN LONDON COMPARED WITH ELSEWHERE

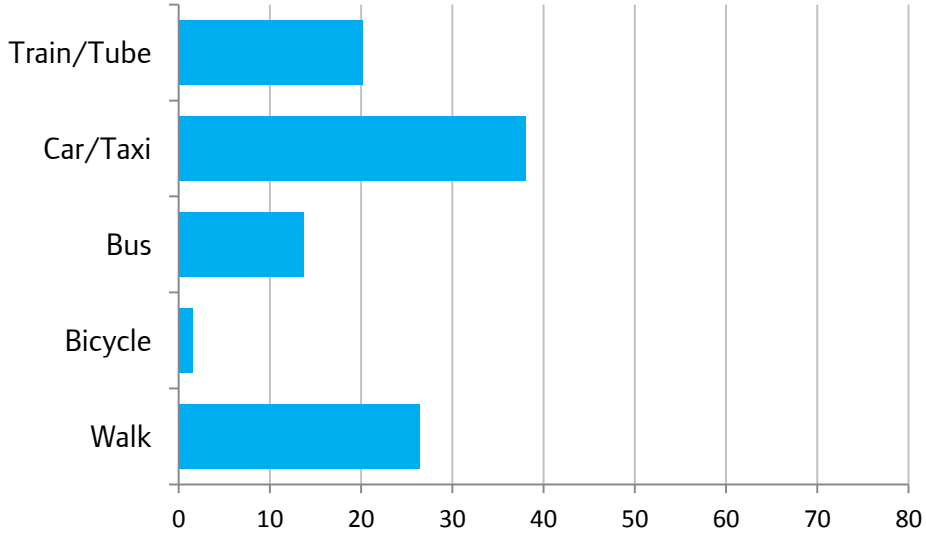
Health impacts if Londoners travelled as they do in other urban areas in England and Wales

Londoners spend more time on train, tube and bus than adults in other urban areas in England and Wales.

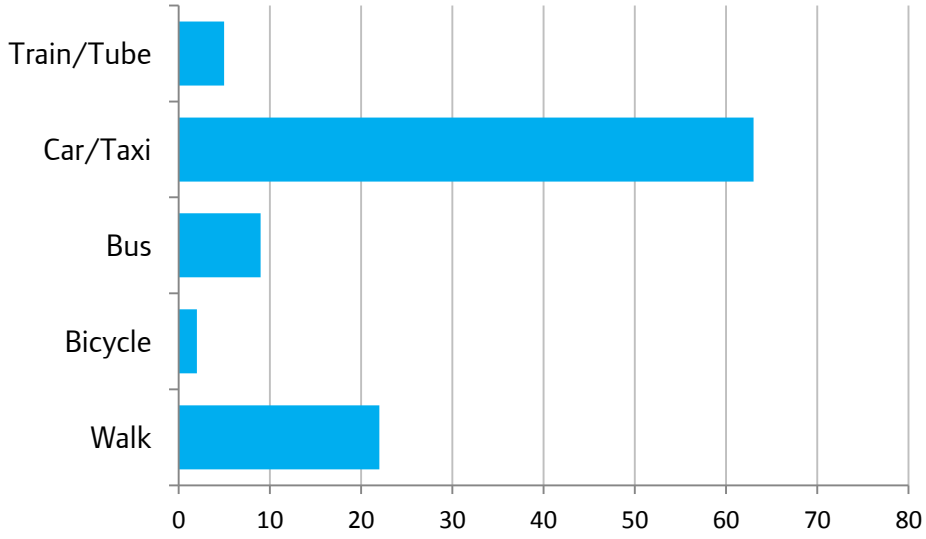
Londoners spend less time in cars and taxis and slightly less time cycling (although this is an average of travel between 2005 – 2011 for London so cycling may well now be higher).

Londoners spend more time walking (26.5%) than adults living in other urban areas of England and Wales (22%). This is not just whole trips walked, a significant amount of walking is as part of public transport trips by bus and train/tube.

Percentage of time spent by each transport mode in London



Percentage of time spent by each transport mode in urban areas of England & Wales (non-London)

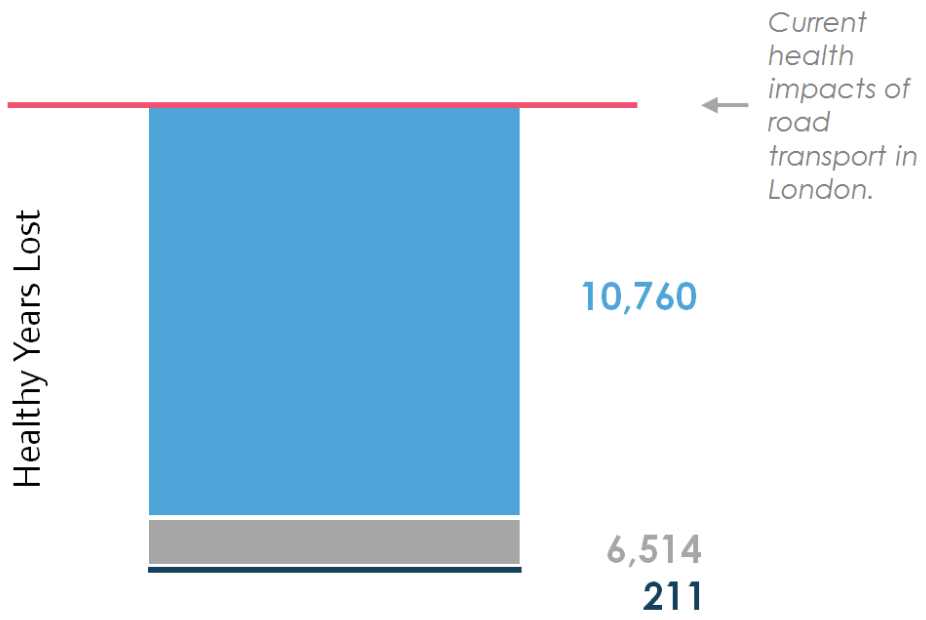


If Londoners travelled as people do in other urban areas of England there would be an overall negative impact on population health.

Lower levels of walking would mean health harms from reduced physical activity.

Greater use of cars would mean more negative impacts on health from air pollution and more injuries from road traffic collisions.

Health impacts if people in London travelled as they do in other urban areas of England and Wales



Health impacts if Londoners travelled more by car

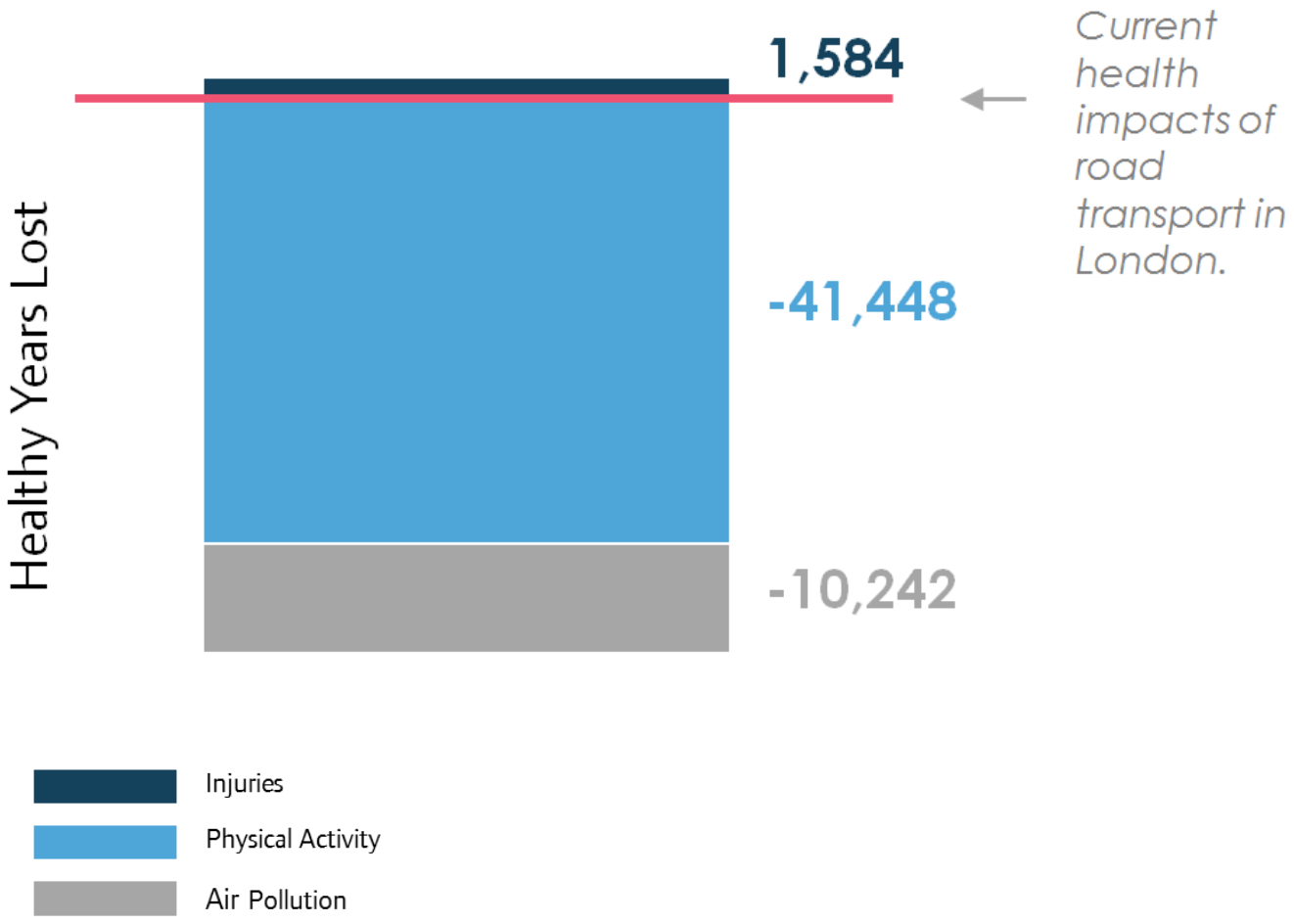
Health impacts if Londoners only travelled by car

To illustrate the health benefits of London's current transport mix the theoretical scenario was modelled of all travel by Londoners being done only by car. If all Londoners travelled only by car there would be an overall negative impact on population health. Lower level of walking would mean health harms from reduced physical activity. Greater use of cars would mean more negative impacts on health from air pollution.

There would be a relatively small health benefit from reduced injuries because, in this hypothetical scenario, there would be no pedestrian or cyclists and therefore no injuries of these vulnerable road users.

However the overall health impact of such a scenario would be negative with a loss of over 50,000 years of healthy life compared with a gain of just 1,500.

Health impacts if people only travelled by car

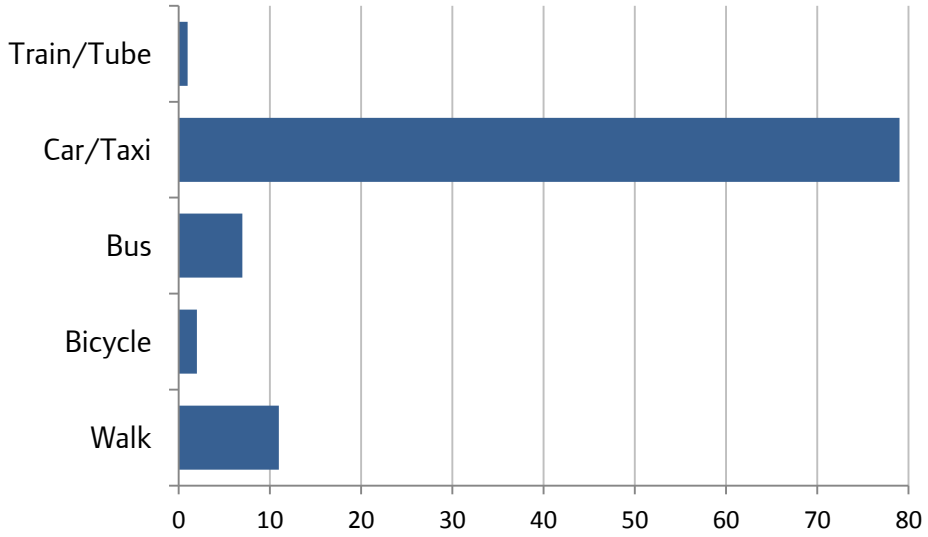


California – High car use

London can be compared with other real urban areas which have distinctive characteristics in terms of their dominant travel modes.

California has very high levels of car use compared with London and very low levels of public transport use, it may be a more realistic illustration of the health benefits of London's transport system than the 'car only' scenario modelled above.

Percentage of time spent by each transport mode in California

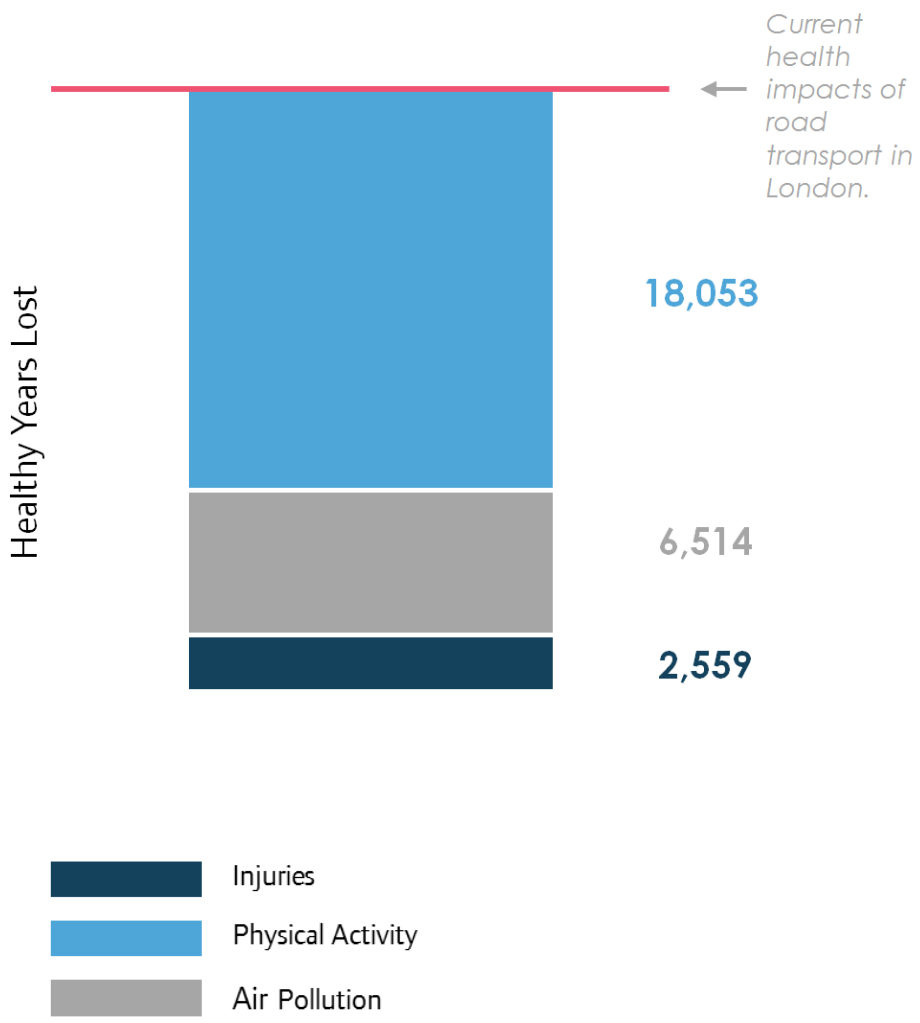


If Londoners travelled like Californians we could expect an overall negative impact on population health equivalent to over 27,000 years of healthy life lost.

Reducing time spent walking for transport would mean a huge loss in physical activity benefits close to 20,000 years of health life.

In addition the increased use of cars would result in over 9,000 years of healthy life lost to air pollution and injuries.

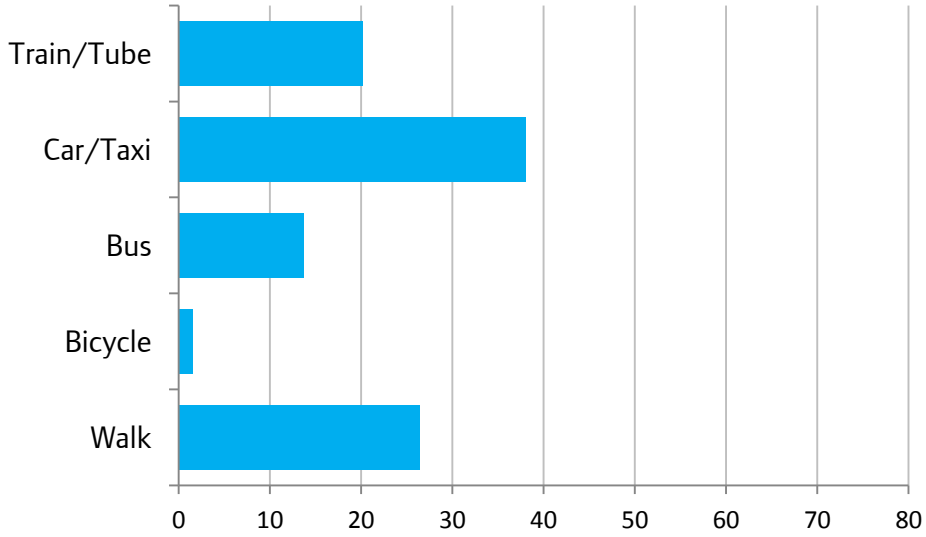
Health impacts if people in London travelled as they do in California



Health impacts of travel in London compared with urban areas with higher levels of cycling or walking

London can also be compared with other urban areas which have distinctive characteristics in terms of their high levels of active travel.

Percentage of time spent by each transport mode in London

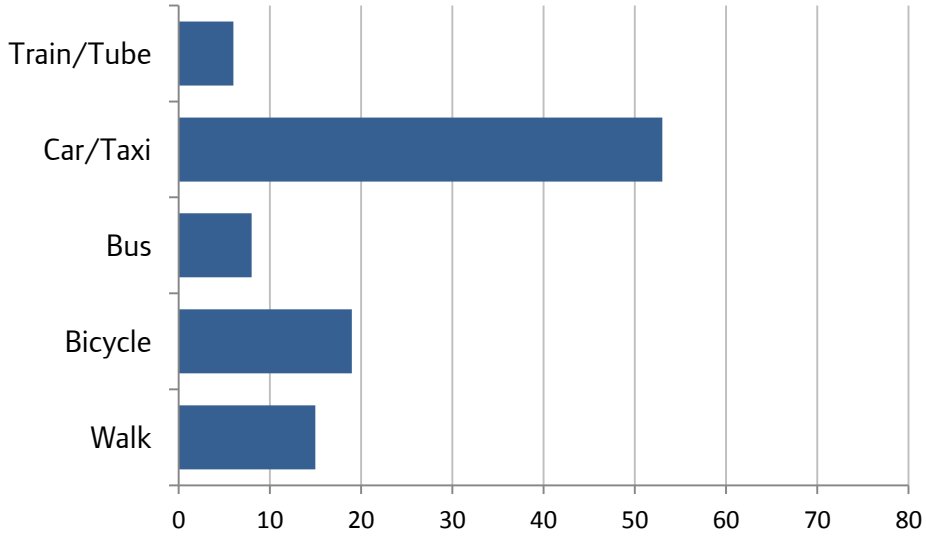


Netherlands Urban Areas – high cycling levels

In Dutch urban areas cycling levels are high, although below the theoretical potential levels for London, as modelled in 'London with more walking and cycling'. Walking levels are also moderate but lower than London.

The Dutch urban areas also have higher levels of car use than London.

Percentage of time spent by each transport mode in the Netherlands (urban areas)



If Londoners travelled like the Dutch do in their urban areas we could expect an overall positive health impact equivalent to over 15,000 years of healthy life gained.

Even though walking levels would be lower, the increased cycling would deliver a net gain in physical activity benefits of 18,000 years of healthy life.

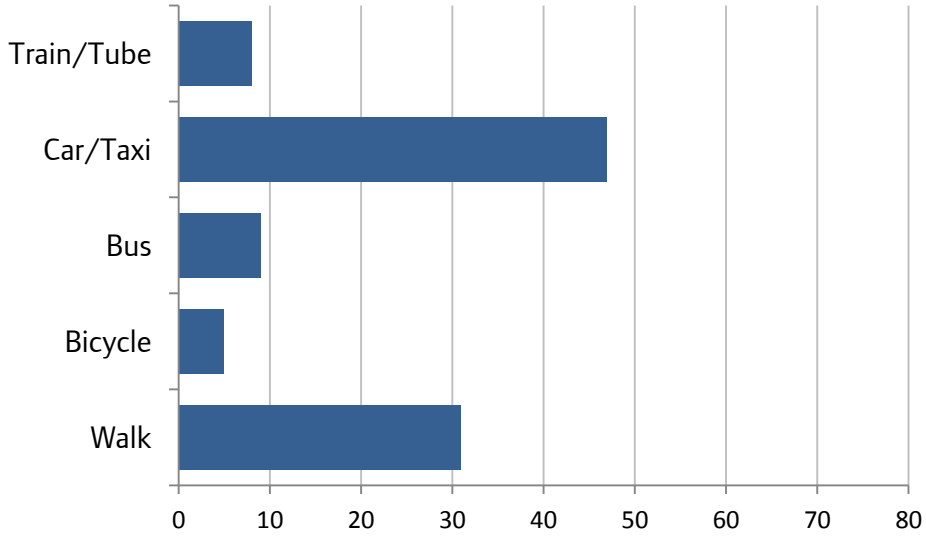
However the higher use of cars in Dutch urban areas mean that there would be increased negative impacts of air pollution and injuries.

Switzerland Urban Areas – high walking levels

Switzerland has high walking levels in urban areas. Cycling levels are also higher than the current expectations for London by 2031.

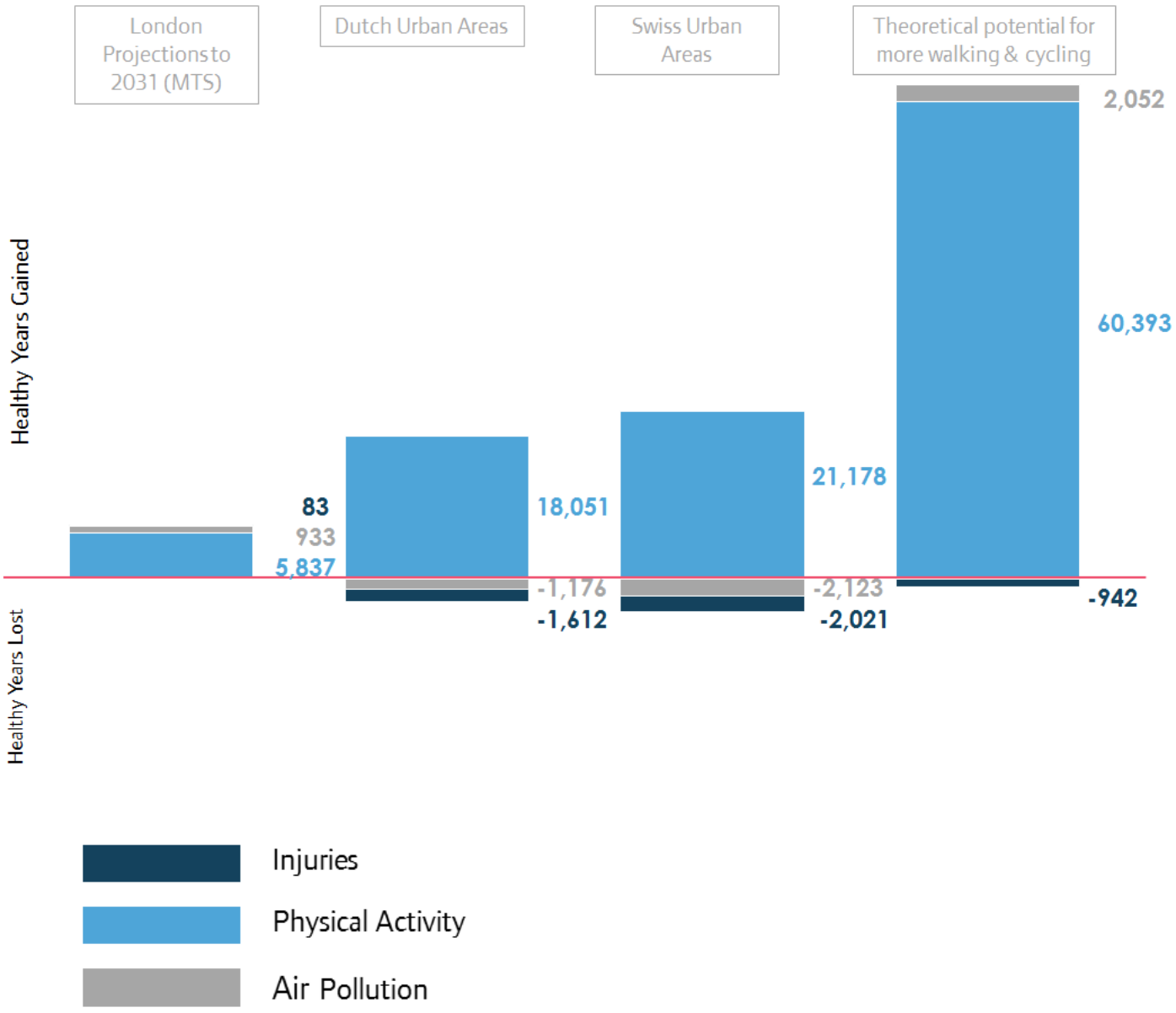
However car use is much higher than London and public transport use is lower.

Percentage of time spent by each transport mode in Switzerland (urban areas)



If Londoners travelled as the Swiss do in their urban areas we could expect an overall positive health impact slightly greater than that of the dutch scenario at over 17,000 years of healthy life gained. This is because their overall time spent in active travel modes is higher. Like the Dutch, Swiss people use cars more in urban areas than Londoners so if Londoners were to travel like the Swiss the harms from pollution and injuries would be over 4,000 years of healthy life lost.

Comparison of the health impacts on Londoners if they travelled more on foot or by bicycle



CONCLUSIONS

This report set out a range of hypothetical modelled scenarios to explore the current and future health impacts of road transport in London and how these compare with other urban areas which have different transport mixes. This modelling suggests that:

- The health of Londoners benefits from our relatively high levels of walking and public transport use and low car use.
- In future we can expect these benefits to grow with increased cycling, especially if those who take up cycling include more older people than the current demographic of cyclists.
- There is potential for walking and cycling levels to increase beyond those anticipated by 2031 in the Mayor's Transport Strategy. If this were the case then there would be larger health benefits for Londoners, primarily as a result of increased physical activity levels.
- London's transport system currently plays a significant role in ensuring Londoners remain physically active. There is potential for many more Londoners to get the physical activity they need from active travel in London.

Summary of the net health gains in each of the scenarios modelled in this report (DALYs)

If Londoners travelled as they do in other urban areas	Net health gains (DALYs) rounded to the nearest 100
California	-27,000
England and Wales	-17,500
Netherlands	15,300
Switzerland	17,000

If Londoners travelled more or less by active modes	Net health gains (DALYs) rounded to the nearest 100
All travel in London by car	-50,100
2031 Projection	6,900
London 'more walking and cycling' scenario	61,500

NOTES ON METHODOLOGY

Methodology

Summary of the methodology

Data on travel, air pollution and injuries in London were put into a health impact model to estimate what the impacts on the health of adult Londoners would be of changes to passenger transport (as opposed to freight) based on various scenarios. The impacts (benefits or harms) are presented as disability adjusted life years (DALYs) to compare across different outcomes. A gain of one DALY is equivalent to a gain of 1 year of life in good health.

This analysis uses the London Travel Demand Survey and scales up the responses to 'how I travelled yesterday' to give an idea of the travel behaviours of Londoners over a typical week. From knowing which parts of trips were walked or cycled the health benefits of physical activity can be calculated. There is good evidence from epidemiological studies for the diseases that are reduced by being more physically active.

Data on road traffic collisions was taken from Stats19 and the air quality (PM 2.5 only) model was developed in consultation with TfL. These were used to see what additional or reduced risks there would be by changing travel behaviours.

The health impacts were then calculated using a simulation model, ITHIM. The models uses a method called 'comparative risk assessment' for physical activity and air pollution and a 'risk & time' model for injuries. All of these health impacts are presented as DALYs so they are comparable.

Inclusions & Exclusions

This analysis only looks at personal travel time by adults.

This analysis does not look at changes to freight.

This does not model the health impacts on visitors to London or children.

The results are for all Londoners, not for individuals or for people who choose one particular travel mode.

How the model deals with uncertainty

Results are presented as mid-point estimates from the ITHIM simulation model. The parameters (and model structure) used in this model come with varying degrees of uncertainty. In this short project it was not possible to present reliable uncertainty estimates around these numbers and model the impact of this uncertainty on the presented results. However, future research building on this project will present estimates of uncertainty.

What is a Disability Adjusted Life Year?

DALY stands for 'Disability-Adjusted Life Year'.

DALYs are a commonly used measure of the impact of disease on a population. They measure the number of years of healthy life lost due to premature death or disability.

Number of DALYs = Years of life lost to premature death + Years of life lost to disability (injury and illness).

DALYs are used to measure population health benefits by combining years of healthy life gained by 1) living longer and 2) living in good health (by avoiding disability).

DALYs allow us to combine different health impacts in a single measure e.g. deaths due to road traffic collisions and disability due to poor air quality.

One DALY is equivalent to gaining one year of life in perfect health

Are the DALYs for 1 year?

In terms of time, the DALYs relate to changes in 1 years incidence but the benefits are then accrued over multiple years. For example, if in one scenario there is one less death of a person of age 30 from road traffic injury then that person would on average live for an extra 50 years and benefits would accrue over each of the next 50 years. Then another premature death is avoided the following year and again that person gains 50 years too (depending on their age).

Calculations of physical activity levels

The figures are calculated by taking daily data on the proportion of people walking or cycling in bouts of more than 10 minutes. This has then been modelled to estimate what this might mean as a weekly proportion of people walking or cycling in bouts of 10 minutes or more and how many of these are likely to be achieving more than 150 minutes in a week. This estimates that slightly over half of all walking is sufficiently energetic to meet the required intensity minimum, and that all cycling was sufficiently energetic

Assumptions in the Mayor's Transport Strategy Scenarios

Air Pollution

The air pollution effect includes both the changes in background concentrations and the differential exposure and ventilation rates whilst travelling by different modes. The impact of other policies or changes in the vehicle fleet on emissions have not been modelled.

Road Traffic Injuries

This estimate makes relatively optimistic assumptions on how risks change with changes in travel by mode.

If risks for cyclists do not fall as fast as modelled then injury burden could increase.

The absolute number of deaths is actually modelled as increasing slightly, the reason that this does not lead to an increase in disease burden is that the average age at death increases.

Other factors that would tend to reduce injuries year on year e.g. paramedic care have not been modelled.

Cycling risks & infrastructure

The model starts with current time based risks for all modes in London based on observed travel times and injuries. The risks are both for being injured and for injuring other road users. Risks are assumed to vary by gender and age. It was then estimated how changes to travel times would change injuries. It was assumed that each additional travel time added a less than linear increase in risk both of being injured and of injuring others. For cycling the non linearities are likely to capture some of changes in infrastructure and norms between high and low cycling environments e.g. the Netherlands and London but perhaps not all. This also does not comment on how a big increase in cycling in London might be achieved, which might well involve more infrastructure and measures which would make cycling safer. This model does not model Dutch injury risks but rather modified London injury risks. This model assumes no change in speeds - clearly if travel by car increased significantly then car speeds would be very low with very low injury risk, while if there were fewer cars and they had the same space, (with no other measures to reduce speed) then speeds would increase which would lead to more injuries.

Freight

It is assumed that non passenger transport remains the same. A large proportion of cyclist fatalities are from being hit by HGVs. We have not modelled changes to HGVs but we have assumed that more cycling means lower risk from HGVs for each cyclist.

Assumptions in the more walking and cycling scenarios

Theoretical potential for more walking and cycling

This figure is only intended to illustrate the effects of more cycling and walking based on current trip distances. It is thus useful for understanding both what might happen to mode share if the easiest trips were walked and cycled and to give an indicative feel of the scale of the benefits.

The table below shows the filters that were applied to the database to exclude those trips not easily switched to walking or cycling.

Walking filter	Cycling filter
Person carrying heavy tools	Person carrying (specifically) a) a pushchair/pram, b) heavy tools or c) shopping in a random 50% of shopping trips
Trip is longer than 2km for those aged 15-69; 1.5km for ages 70-79; and 1km for age 80+	Trip is longer than 8km for those aged 15-69; 5km for ages 70-79; and 3km for age 80+
No age restriction (but see differential distance rules above)	No age restriction (but see differential distance rules above)
No restriction on how long the journey would take	No restriction on how long the journey would take
Trip is made between10pm and 7am, and a random 50% of trips made between 7-10pm	Trip is made between 10pm and 4am
Traveller has a disability limiting daily activities unless this is a mental health disorder	Traveller has a disability limiting daily activities unless this is a mental health disorder
Trip made by van, dial-a-ride, plane or boat	Trip made by van, dial-a-ride, plane or boat

Assumptions in how people travel in other urban areas

This data is taken from travel surveys from these other settings. It only includes people living in towns or cities.

This does not model the actual health impacts in these places. This models what the health impacts would be for Londoners if Londoners had the same travel times as these other places but started with our own population profile and risks. For example the rest of England and Wales don't necessarily have more injuries than London, nor is the rest England and Wales more polluted. Rather if Londoners in our more crowded streets spent as much time driving as people do in other urban areas of England and Wales then London would be more polluted.

For all modes it was assumed that each additional amount of time spent travelling in them was both a bit safer for the user and was a little less dangerous to other road users

Notes of key data sets used in this analysis

London Travel Demand Survey (LTDS)

LTDS from 2005-2011 was used to parameterise the baseline scenario for London and for the walking and cycling potential analyses. All analyses are stratified by age and sex: after doing this the LTDS weights made almost no difference to estimates of travel times and were only available from 2008 onwards. Therefore weighting was not used in the analyses. All trip stages with duration of 0-3 minutes (including trips with a total duration of less than 3 minutes) were excluded.

Travel diaries were not completed for children aged 0-4 years, but in all trips the number of accompanying 0-4 year olds is noted. These records of trips made with accompanying 0-4 year olds were therefore used as the basis for defining travel behaviour in each age group. If a trip had one 0-4 year old accompanying, it was counted as 1 trip in this age group, if there were two 0-4 year olds it was counted as two trips in this age group, etc. If the number of co-resident 0-4 year olds living in the household of the person making the trip were the same as the number of 0-4 year olds on the trip, then it was assumed these corresponded to the same individuals. Otherwise gender was assigned at random.

National Travel Survey

The NTS was used to parameterise the 'other urban England and Wales' scenario and to create scaling factors to translate one-day data (from LTDS) to estimates of past-week activity.

Stats19

Stats19 2005-2011 (inclusive) was used in order to estimate the number of road traffic injuries in London by different combinations of casualty and striker mode. In multi-vehicle collisions we assumed that the striking vehicle was the largest other vehicle involved, defining size as HGV > bus > van > car/taxi > motorcycle > cyclist > pedestrian > 'other motor vehicle'.

When looking at injuries from a 'casualty' perspective, these analyses were stratified by injury severity of the casualty and by sex of the casualty. When looking at injuries from a 'striker' perspective these analyses were stratified by injury severity of the casualty and by sex of the striker. 7 modes were distinguished between: pedestrian, cyclist, car/taxi, motorcycle, bus, other and 'no other vehicle involved'. This 'other' category included modes such as vans and HGVs which were assumed not to be affected by the changes in modal share which we modelled.

International Data sets

To create the international scenarios travel surveys from those settings were used: the 2005 Netherlands Travel Survey, the 2005 Switzerland Travel Survey, and the 2009 Household Transportation Survey-California Add-On. Only data on people living in urban areas was analysed . For all travel surveys only walking or cycling stages of three minutes or greater were included. Analysis on the Swiss Travel Survey was undertaken by Dr Thomas Götschi & on the California Travel Survey by Dr Neil Maizlish.

Other formats and languages

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Chinese
如果需要您母語版本的此文件，
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Hindi
यदि आप इस दस्तावेज की प्रति अपनी भाषा में चाहते हैं, तो कृपया निम्नलिखित नंबर पर फोन करें अथवा नीचे दिये गये पते पर संपर्क करें

Vietnamese
Nếu bạn muốn có văn bản tài liệu này bằng ngôn ngữ của mình, hãy liên hệ theo số điện thoại hoặc địa chỉ dưới đây.

Bengali
আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি (কপি) চান, তা হলে নীচের ফোন্ নম্বরে বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

Greek
Αν θέλετε να αποκτήσετε αντίγραφο του παρόντος εγγράφου στη δική σας γλώσσα, παρακαλείστε να επικοινωνήσετε τηλεφωνικά στον αριθμό αυτό ή ταχυδρομικά στην παρακάτω διεύθυνση.

Urdu
اگر آپ اِس دستاویز کی نقل اپنی زبان میں چاھتے ھیں، تو براہ کرم نیچے دئے گئے نمبر پر فون کریں یا دیئے گئے پتے پر رابطہ کریں

Turkish
Bu belgenin kendi dilinizde hazırlanmış bir nüshasını edinmek için, lütfen aşağıdaki telefon numarasını arayınız veya adrese başvurunuz.

Arabic
إذا أردت نسخة من هذه الوثيقة بلغتك، يرجى الاتصال برقم الهاتف أو مراسلة العنوان أدناه

Punjabi
ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਹੇਠ ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

Gujarati
જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.