

## Roads Task Force - Technical Note 20

### What are the main health impacts of roads in London?

#### Introduction

This paper forms one of a series of thematic analyses, produced to contribute to the Roads Task Force Evidence Base. This paper looks at the health impacts of roads in London.

#### Summary

- The road network plays a valuable role in supporting the social and economic vitality of London.
- However, making changes to London's roads and street environments could improve the health of every Londoner and reduce inequalities in health.
- The health of every person in London is negatively impacted by motorised road traffic. Road traffic can impact negatively on most aspects of physical and mental health.
- People who live and work on the most heavily trafficked roads are disproportionately negatively impacted by all the health harms of road transport in London. This causes inequalities in health.
- Improving the street environment in ways which will improve population health would also bring economic, social and environmental benefits.

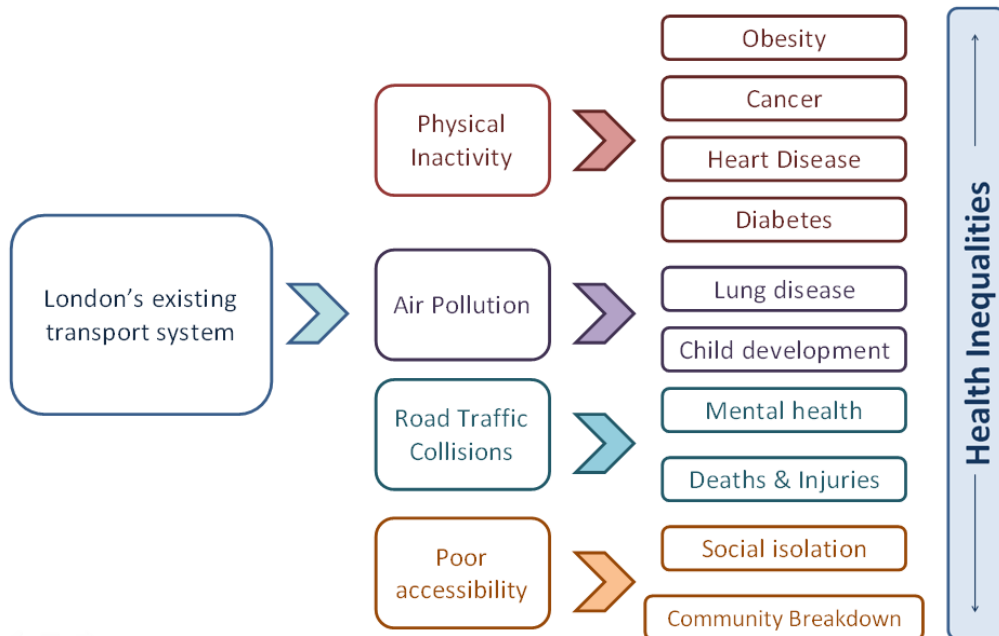
#### Summary of the range of health impacts of London's roads

London's road network plays an integral role in the health of every person in London. The road network provides access to jobs and services. It makes up a significant proportion of the public realm and is used by most Londoners every week as pedestrians. While some health benefits are already conferred by the road network in London, there is potential for much greater positive effects to improve health and reduce health inequalities.

London's roads pose a range of significant threats to human health (see figure 1), the primary source of these threats is motorised road transport. Motorised road transport can cause air pollution, injuries, noise, community severance and, most importantly, inhibits physical activity.

It is estimated that increasing the physical activity levels of Londoners to meet the minimum standard of 150 minutes per week could deliver a 20 per cent reduction in all deaths every year, which is 8,219 fewer deaths. We could also expect to see a 12 per cent reduction (1,761 people) in people diagnosed with coronary heart disease, a 23 per cent reduction in people diagnosed with breast cancer (831 people) and a 22 per cent reduction in people diagnosed with colorectal cancer (593 people). Road transport is the only sector with the potential to deliver public health gains on this scale.

Figure 1 Health Impacts of the road network in London.



Source: L Saunders, 2012.

### Physical activity

One of the biggest threats to the health of Londoners is physical inactivity. Physical activity is needed for the healthy functioning of every part of the human body. Being physically active reduces risk of dying prematurely and developing a range of chronic diseases including diabetes, dementia, depression and the two biggest killers in London - heart disease and cancer.

Adults are recommended to achieve a minimum of 150 minutes of physical activity per week for health and may need over 300 minutes of physical activity per week to prevent weight gain. In the UK over 70 per cent of adults are estimated to not be achieving the minimum physical activity needed for health. Objective measures found that only 5 per cent of adults achieved the minimum physical activity levels.

In London a significant proportion of the population are likely to be categorised as 'inactive' - achieving less than 30 minutes of physical activity per week - this is the case for up to 40 per cent of the population in some London boroughs. 'Active travel' - walking or cycling for utility purposes - is considered to be a key means for people in London to meet their physical activity needs because it can be incorporated into the daily routine. The health benefits of active travel far outweigh the risks from hazards such as poor air quality and road traffic collisions. Regular cyclists have the fitness of someone at least 10 years younger, they have a reduced risk of heart disease, are 27 per cent less likely to have a stroke, and will live, on average, over 2 years longer. Walking is the most effective way of encouraging inactive people

to take up physical activity. Cycling is an effective way of keeping a healthy weight and reducing anxiety and depression.

People who report that they walk and cycle seem to achieve their physical activity needs. This has also been found in London. Initial findings from the TfL Personal Travel Panel survey conducted during the Olympics showed that, on average, people who walked or cycled for at least 10 minutes as part of their travel met their daily physical activity needs. People who did not walk or cycle for at least 10 minutes as part of their travel did not meet their daily physical activity needs. This helps to dispel the myth that people are sufficiently active in their leisure or work time even if they are sedentary travellers. Many people in London could get the physical activity they need from 'active travel'.

Levels of walking and cycling are directly related to the speeds and volume of motor traffic. Provision of public transport also contributes to levels of walking, walking is more common in neighbourhoods oriented towards public transport use than private car use and walking as part of public transport trips can achieve recommended physical activity levels. Conversely car ownership and use are associated with lower levels of walking and cycling.

### **Obesity**

Only 6 out of ten London children are a healthy weight when they start secondary school, London has the highest rates of childhood obesity in the country. For adults, the situation is even more grave – 60 per cent of men and 53 per cent of women in London are either overweight or obese. This compares to 45 per cent in Italy and the Netherlands, 44 per cent in Sweden and 37 per cent in Switzerland. By 2050, 90 per cent of adults are expected to be obese if no action is taken. This means that children in London are growing up in a city where it is normal to be overweight.

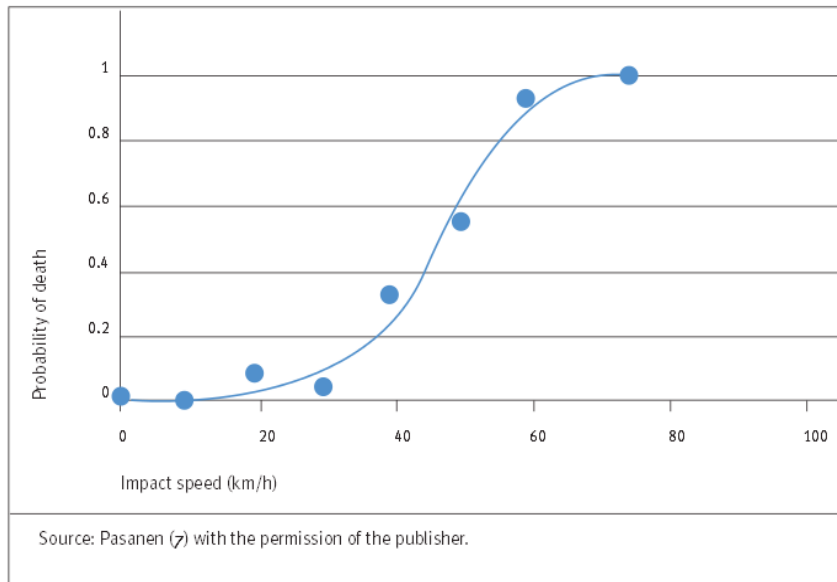
An obese Londoner can expect to die eight to ten years earlier than their non-obese neighbour. Obesity causes cancer and heart disease, it limits life choices and increases early disability and costs the city more than £4bn per year.

Travelling on foot or by bicycle is associated with not being overweight or obese. Each additional kilometre walked per day is associated with a 4.8 per cent reduction in obesity risk, conversely each additional hour spent in a car is associated with a 6 per cent increased likelihood of obesity. Use of public transport has also been associated with maintaining a healthy weight and with weight loss, while car use is associated with being obese.

### **Road traffic collisions**

Speed is the single most important determinant of safety in road transport systems. Speed affects the risk of a crash occurring: the greater the speed, the less time there is to prevent a collision. In addition, the greater the speed, the more severe the consequences once a crash has occurred (see figure 2). Road traffic deaths increase with motor vehicle mileage, and decrease with public transport usage. Pedestrian safety at all ages is inversely associated with high traffic speeds and the number of miles of main roads.

Figure 2 Probability of a pedestrian dying as a function of the impact speed of a car.



Source: World Health Organisation, 2004.

The health impacts of road traffic collisions go beyond the direct injuries and deaths caused by collisions. There are impacts on the families and friends bereaved or supporting victims with long-term injuries, victims are also at risk of post traumatic stress disorder. More broadly fear of road traffic injury is the leading reason why people choose not to travel actively and why parents restrict the independent mobility of their children which has consequences for obesity and a range of other long-term conditions.

Road traffic injury is the leading cause of death among children aged 5 – 14 years. Children's brains are not sufficiently developed to be able to assess traffic situations as pedestrians. In particular children cannot assess and respond appropriately to high volumes of motor traffic, high speeds and limited visibility until they are in their teens. Children in the UK have double the risk of injury from road traffic compared to their peers in France and Germany.

Older people are more vulnerable to injury and death as their bodies are more fragile. Older people are less able to cope with complex traffic situations which can result in them reducing their mobility and becoming socially isolated.

There are unfair differences (health inequalities) in those injured and killed in road traffic collisions. Pedestrians, cyclists and motorcyclists are at increased risk. Children, older people and people from socially disadvantaged groups are at increased risk, this partly reflects their increased exposure to high volume and fast moving traffic as pedestrians.

## Air quality

Road traffic contributes 60 per cent of particulate matter (PM<sub>10</sub>), 47 per cent of nitrogen oxides (NO<sub>x</sub>) and 20 per cent of carbon dioxide (CO<sub>2</sub>) emissions in London.

Long-term exposure to air pollution can contribute to the development of chronic diseases and increase the risk of respiratory illness. Fumes from diesel engines can cause lung cancer and possibly tumours to the bladder.

Exposure to traffic-related air pollution causes exacerbation of asthma and there is suggestive evidence that it causes onset of childhood asthma, non asthma respiratory symptoms, impaired lung function, total and cardiovascular deaths, and cardiovascular disease.

There is a growing body of evidence showing that prenatal exposure to air pollution is associated with a number of adverse outcomes in pregnancy including include low birth weight, intrauterine growth retardation, and an increased risk of chronic diseases in later life.

Emerging evidence also suggests that long-term exposure to particulate matter, at levels such as those seen in major cities, can alter emotional responses and impair cognition.

In Greater London it is estimated that in 2008 there were 4,267 'deaths brought forward' attributable to long-term exposure to small particles, this amounts to between 6 per cent and 9 per cent of all deaths, varying by borough. This figure is calculated by adding together the life lost by those affected, which averages 11.5 years. Figure 3 shows how people in London are disproportionately impacted by poor air quality compared with other parts of England.

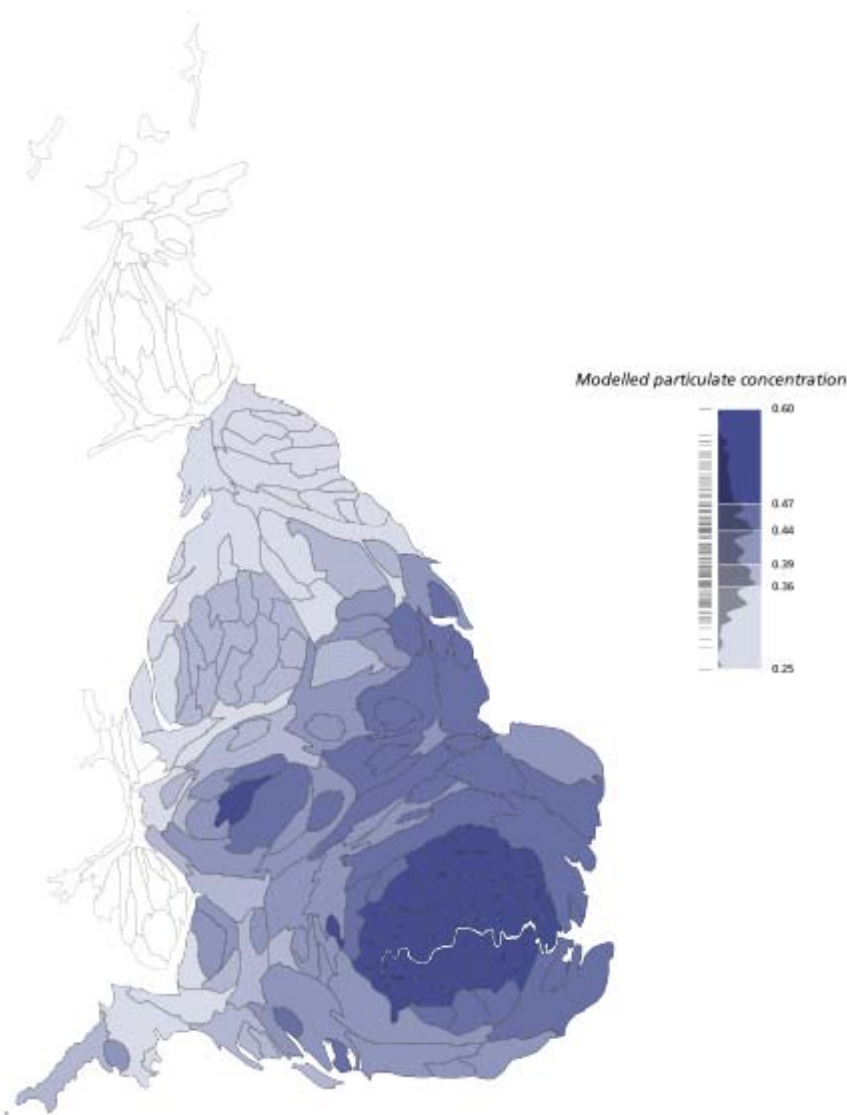
The greatest burden of air pollution usually falls on the most vulnerable in the population, in particular the young and elderly. People particularly at risk also include those with existing respiratory problems and chronic illnesses such as asthma and chronic obstructive pulmonary disease (COPD). There are approximately 690,000 asthma sufferers in London and 230,000 individuals suffering from COPD.

Individuals who live or work near busy roads are at particularly high risk of exposure to the health harms of air pollution. The same is true of those that spend longer in motor traffic. Car occupants are typically exposed to higher levels of air pollution than cyclists or pedestrians. This is, in part, because cyclists and pedestrians can use quieter streets with lower traffic volumes, which are less heavily polluted. A 2011 study conducted by Sustrans, found that the air quality on London greenways (safe, quiet routes through parks, green spaces and lightly trafficked streets) was significantly better than on adjacent busy roads. Congestion is also strongly associated with air pollution, with pollutant levels generally higher inside vehicles than in ambient air.

People living in more deprived areas are exposed to higher concentrations of air pollution, often because homes and residences of these groups are situated next to

roads with higher concentrations of emissions. Deprived communities also suffer greater burdens from air-pollution-related death and sickness. Individuals in deprived areas experience more adverse health effects at the same level of exposure compared to those from less deprived areas. This is, in part, because of a higher prevalence of underlying cardio-respiratory and other diseases, as well as greater exposure to air pollution as a result of homes being situated nearer to busy congested roads and with fewer green spaces.

Figure 3 Cartogram to reflect the population sizes most affected by particulate concentration by upper tier local authority, England, 2010.



Source: English Indices of Deprivation 2010, DCLG. (Estimates produced by Staffordshire University; Analysis by DH)

Source: Annual Report of the Chief Medical Officer 2011, 2012.

## **Noise**

Motor transport is the leading cause of noise pollution. The health impacts include sleep disturbance, anxiety, high blood pressure, poor mental health and school performance and cognitive impairment in children. Risk of cardiovascular disease increases significantly when noise levels exceed 60 decibels. Noise levels exceed 60 decibels on many roads in London. Socially disadvantaged people are more likely to live near more heavily trafficked roads so are at greater risk of the negative effects of noise pollution.

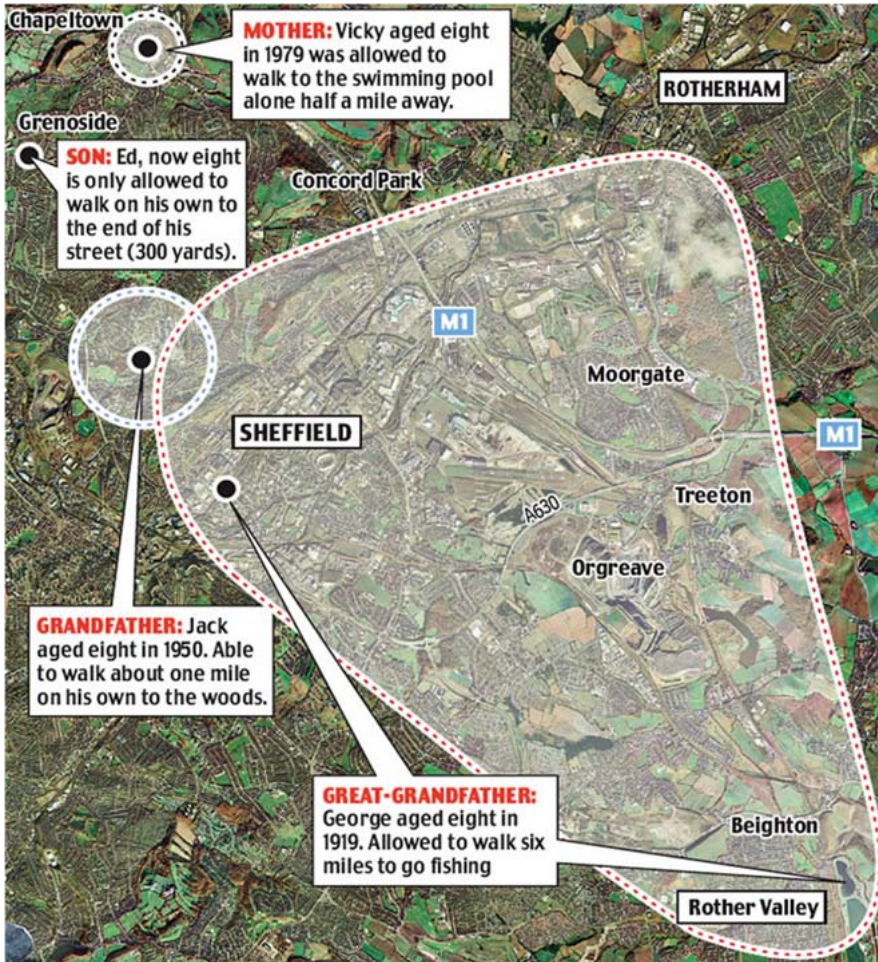
## **Community severance**

Community severance describes situations where destinations which are geographically close cannot be reached by the people who need to access them due to busy wide roads or railway lines. High volume traffic alone can act as a barrier with health consequences. People living on lightly trafficked roads have been shown to have three times more friends and twice as many acquaintances on their street compared with those living on similar streets with heavy motor traffic. This is important for health because low levels of social support are linked to increased death rates, social support is needed to promote health and protect people from negative stressors in their lives. The young, elderly or disabled are at particular risk of suffering the negative consequences of community severance.

## **Children's independent mobility**

The independent mobility of children and young people has been curtailed over recent decades. This can be seen in the decline of children walking to school independently from 80 per cent among 7-8 year olds in the early 1970's to less than 10 per cent by 1990. This is partly due to legitimate parental concerns over road danger posed to young people as motor traffic is a primary cause of serious injuries and deaths among children. Limiting children's independent mobility impacts on their development and their mental and physical health, including weight management. Figure 4 illustrates the changes in children's independent mobility over four generations on one family in Sheffield.

Figure 4 Changes in childhood independent mobility over four generations of one family.



Source: Natural England, 2007.

### Other impacts

Artificial light, dust and odour from motor traffic all negatively impact on quality of life.

### Health impacts of street environments

The biggest impact of London's roads on health is the extent to which they encourage or discourage people to walk and cycle. The speed and volume of motor traffic and the ambience of the street environment are the key factors in enabling people to walk and cycle. Making changes to street environments to make them more inviting for pedestrians and cyclists can improve all the health issues highlighted in this paper. Figure 4 below shows the nine key elements of a healthy street environment.



Figure 5 The nine key indicators of a street environment that support human health.



Source: L Saunders, 2012.

### Evidence base for creating healthy streets

These measures are recommended by the National Institute for Health and Clinical Excellence (NICE).

There is good evidence that making the following changes to roads increases health-promoting walking and cycling:

- reallocating of road space to support physically active modes of transport (e.g. widening pavements, providing cycle lanes);
- restricting of motor vehicle access (e.g. closing or narrowing roads to reduce capacity);
- specific demand management measures;
- introducing traffic calming schemes to restrict vehicle speeds (using signage and changes to highway design);
- creating safe routes to schools (e.g. traffic calming measures near schools, improving walking and cycling routes to schools).