



accidents don't have to happen

Pedestrian safety in areas of deprivation

Report and review of the research

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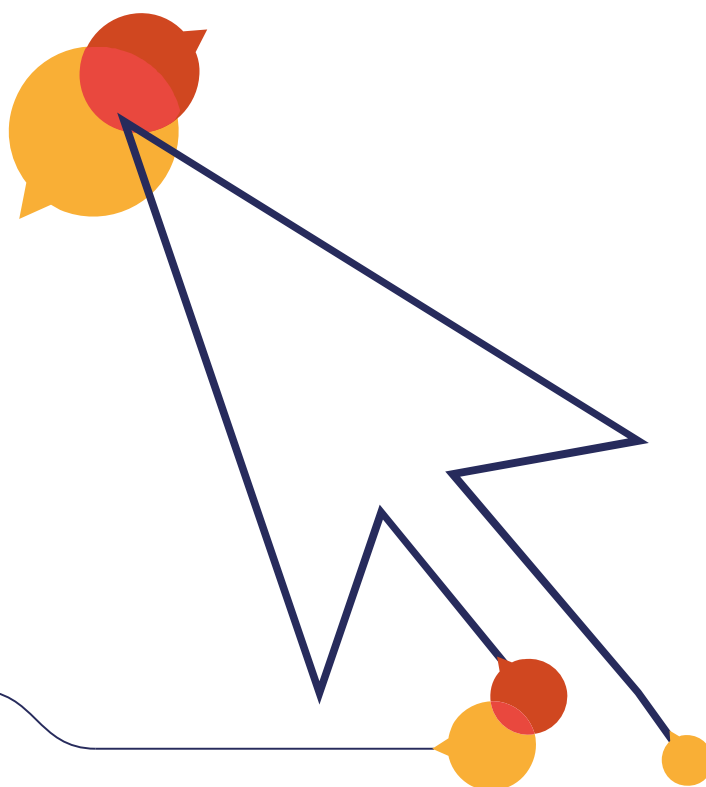


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1. Executive summary

This report provides a comprehensive overview of pedestrian life in the UK, highlighting inequalities in health outcomes for pedestrians living in areas of deprivation. The report begins by illustrating the extent to which pedestrian safety is an issue in the UK, providing key casualty statistics and facts, and discussing the current casualty picture for children (0-15), adults (16-59) and older adults (60+). It is shown that pedestrian casualty numbers, similarly to other types of casualty, have plateaued since 2010 with no significant reductions in the amount of pedestrians injured annually, with the UK falling behind its European neighbours, some of whom display high rates of reduction of fatality numbers.

UK walking statistics, policy and campaigns are then explored, which begin to show some of the inequalities faced by pedestrians with a lower socioeconomic status (SES). The UK has seen successful pedestrian campaigns (historic and current), but recent walking statistics uncover some concerning themes, with a high dependence on motor vehicles, a decline in the number of children walking to school, and individuals with a lower SES getting less physical activity than those with a higher SES.

The report then spends some time reviewing the literature surrounding the issue of inadequate pedestrian safety in areas of deprivation and subsequent remedial measures for this problem. Research shows a clear difference in pedestrian health outcomes for those living in deprived areas compared to those living in less deprived areas. Although the strength of this relationship differs depending on the age of the pedestrian (children have been demonstrated to be affected the most), it affects all age groups, and it is clear that existing and future pedestrians in areas of deprivation must be safeguarded. The report concludes by giving some RoSPA recommendations on tackling the inequalities in pedestrian health outcomes.

2. Introduction

The uptake of regular walking provides a huge range of benefits. These include a reduced risk of developing a range of major health issues, including cardiovascular disease and Type II diabetes, reduced congestion and pollution due to a decrease in dependence on motor vehicles, and overall improvements to an individual's mental and physical wellbeing.¹ Evidence gathered by Public Health England (PHE) in 2018 overwhelmingly suggests that if population levels of walking (and cycling) were to increase, there would be huge health benefits, not only to individuals but to the NHS as a result of tackling physical inactivity: PHE also reported that 42 per cent of women and 34 per cent of men in England are not carrying out enough physical activity to be conducive to good health, costing the NHS £450million per year.¹

Despite the overwhelming benefits of walking, it can be dangerous. According to the World Health Organisation (WHO), pedestrians constitute 20 per cent of annual road deaths worldwide, and the risk factors that contribute to this figure are numerous: they include extremely high and increasing levels of motor vehicle use, driver error, insufficient infrastructure design, and a lack of enforcement.² In 2019,* 470 pedestrian fatalities took place on Great Britain's roads, accounting for 27 per cent of road deaths that year; 6,688 pedestrians were seriously injured, and 14,612 were slightly injured.³

The Department for Transport (DfT) defines pedestrians as a vulnerable road user, due to the fact they are part of a group of road users that have very high casualty rates compared to other modes of transport such as cars. This is illustrated by the fact that in 2019, the pedestrian casualty rate per billion passenger miles in Great Britain was 1,640, and the rate for cars was 195. The pedestrian fatality rate per billion passenger miles was

35.4, and for cars it was 1.6, painting a harrowing picture of the level of risk faced by pedestrians on our roads.³

The high level of risk faced by pedestrians is a faceted and multifactorial problem, and contributory factors take on a large range. One contributory factor that is very well documented is pedestrian socioeconomic status (SES) and resulting levels of deprivation. One of the first acknowledgements of the fact that SES can result in variable health outcomes was the UK Government’s Report of the Working Group on Inequalities in Health, more commonly known as the Black Report. The Black Report, published in 1980, identified how poor health in the UK was not uniform in distribution, and how social inequalities such as low income, poor education and housing were contributing to this.⁴ Decades later, the dramatic impacts of SES and deprivation on pedestrian health outcomes are very clear and are regularly reported on. These impacts are even more pronounced for children and young people: a 2018 report published by Public Health England (PHE) in collaboration with RoSPA demonstrated that pedestrians between the ages of five and nine years old living in the 20 per cent most deprived areas have a six times higher rate of being killed or seriously injured (KSI) than children living in the 20 per cent least deprived areas. Between the ages of 10 and 14, the rate is 2.6 times higher.⁵

3. Pedestrians in the UK

3.1 The current pedestrian casualty situation

3.1.1 Overall

The 2019 figure of 470 pedestrian fatalities was a three per cent increase on the number seen in 2018, and 2018’s figure of 456 was a three per cent decrease on 2017’s figure. Small changes in pedestrian casualty numbers such as this have been happening since 2010, and the DfT states that they are likely due to natural variation. Before 2010, there was great progress in reducing road user fatalities in Great Britain: figures would fall every year, particularly between 2006 and 2010.³ Since 2010, little progress has been made in reducing these fatalities further, including for pedestrians, as can be seen in Table 1.

	2016	2017	2018	2019
Killed	448	470	456	470
Serious	6,880	6,797	6,956	6,688
Slight	16,222	16,538	15,020	14,612
Total	23,550	23,805	22,432	21,770

Table 1: Reported pedestrian casualty figures between 2016 and 2019.⁶

Key Great Britain pedestrian casualty facts:

- National Travel Survey figures for 2019 show that females carry out more walking trips per year than males (267 vs 232), as well as walking slightly more miles overall.⁷ Despite this, many more male pedestrians than females are killed or seriously injured each year in almost every age group.^{8,9}
- Cars contribute to the most pedestrian casualties by far; in 2019, of the 21,770 reported pedestrian casualties that occurred, 16,275 of these individuals were injured by cars, with 274 being killed and 4,933 seriously injured. The next most common vehicle to contribute to pedestrian casualties is vans and light goods vehicles. In 2019, 1,382 pedestrians were hit by vans and light goods vehicles, of which 33 were killed and 415 were seriously injured.¹⁰
- Far more pedestrian casualties occur on urban roads than on rural roads: in 2019, 19,272 reported pedestrian casualties occurred on urban roads, compared to 2,429 on rural roads. It is important to note, however, that despite the much lower casualty number on rural roads, there were 125 fatalities compared to 322 on urban roads.¹¹ This shows that collisions involving a pedestrian on a rural road are much more likely to result in a fatality than on an urban road.

The UK is performing poorly at reducing pedestrian road fatalities compared to other countries in Europe. According to data from the European Transport Safety Council (ETSC) that details the average annual change in pedestrian deaths reported by the police between 2010 and 2018, Norway shows the best performance with an 8.7 per cent reduction, and the UK shows the worst performance with a 1.3 per cent increase. However, when accounting for population size, the UK performs better, with the eighth lowest number of pedestrian fatalities per million inhabitants out of 32 other European countries in 2018.¹²

3.1.2 Children (0-15)

Child pedestrian safety in the UK is a serious concern. In 2019, 1,514 child pedestrians aged 15 or under were killed or seriously injured on Great Britain's roads (compared to 591 car passengers), with 5,200 casualties in total. Pedestrians accounted for 38 per cent of road casualties aged 15 and under that year.¹³ The DfT states that children under the age of 16 are one of the most vulnerable road user groups, in part due to their lack of roadside experience and education.¹⁴

Out of the casualty figures of those aged 15 and under, the 12-15 year old age group sees the highest numbers annually. Figures also show a consistent large jump between the age ranges of five to seven and eight to 11,¹³ likely reflecting the move from primary school to secondary school and walking to school independently;⁵ in 2019, the total number of pedestrian casualties aged five to seven was 724, compared to 1,662 for eight to 11 year olds.¹³ The 2018 PHE and RoSPA analysis showed that child pedestrians are most likely to be KSI in the afternoon and evening hours following the end of the school day. It was also shown that male road users face significantly higher levels of risk than female road users,⁵ and this is reflected in the figures for child pedestrian casualties; in 2019, of the child pedestrians aged between 0 and 15 that were killed or seriously injured on the roads, 63 per cent were male.¹⁵

In the Road Safety Statement 2019, the DfT stated that analysis has shown that failure to look when crossing the road is the most common contributory factor in child pedestrian casualties and has consequently predicted that distraction from mobile phone use and listening to music may be significant in causing injuries. Research

is being planned that will investigate whether significant distraction as a result of a mobile phone can lead to an increased risk of injury, and how this behaviour could be influenced if that is the case.⁴⁴ The fact that significant distraction could be leading to injury may illustrate a lack of road safety education in the UK.

3.1.3 Adults (16-59)

In 2019, 237 pedestrians between the age of 16 and 59 were killed on Great Britain's roads, 3,531 were seriously injured and there were 12,209 casualties in total. Within this age group, the subgroup of 30-39 saw the highest number of casualties.¹³ Several campaigns have taken place that target adult pedestrians specifically. This is likely because of the data surrounding adult pedestrians. For example, of the accidents that involved a pedestrian in 2019 that were assigned a contributory factor, 48 per cent of accidents were assigned "pedestrian failed to look properly", followed by "pedestrian careless, reckless, or in a hurry" and "pedestrian failed to judge vehicle's path or speed" at 17 per cent and 14 per cent respectively.¹⁶

A 2013 Road Safety Analysis report¹⁷ stated that the characteristics of child and adult pedestrian accidents are significantly different, and they should therefore be treated differently. The report states that many adult pedestrian accidents occur during the late evening, and adults are much more likely to be injured during darkness hours than children.¹⁷ The report informed Safer Essex Roads Partnership's adult pedestrian campaign, which aimed to increase driver and pedestrian awareness of the high risk that adult pedestrians face when they are travelling in the dark, under the influence of alcohol or in a rush.¹⁸

3.1.4 Adults (60+)

The age groups of 70-79 and 80+ showed the highest numbers of pedestrian fatalities in 2019 by far, with 77 and 85 fatalities respectively. This high level of pedestrian fatalities in these elderly age groups has been a trend that has continued for many years, despite the fact that total casualty numbers are lower than most of the middle-aged subgroups.¹³ This means that although these age groups may be less likely to be injured than most of the 16-59 subgroups, when they do become casualties they are more likely to be fatally injured, possibly reflecting the frailty of individuals in these age groups, as well as age-related health issues such as poor vision and hearing loss.

According to data from the ETSC, elderly pedestrians face a high level of risk: 47 per cent of pedestrians killed on EU roads are aged 65 or over.¹⁹ In Great Britain in 2019, 215 adults aged 60 or over were fatally injured on the roads, and 1,620 were seriously injured with 3,964 casualties in total. This means that elderly individuals accounted for nearly 46 per cent of pedestrian road fatalities in 2019, despite being a relatively small age group.¹³ However, overall casualty numbers for older adults (and other age groups) may be artificially low, as smaller accidents, such as a fall caused by the road or a road user, are generally not reported to the police. Underreporting is known to be a potential significant issue in realising the full picture of vulnerable road user casualty rates, and hospital admissions may provide a more accurate record.²⁰

3.2 Walking statistics in England

Walking rates in England have remained broadly similar across recent decades, as shown by the fact individuals made on average 250 walking trips in 2019 compared to 264 in 2002 (a small decrease of five per cent). Individuals in England walk for an average of 17 minutes per day and cover 205 miles per year. Women make on average 15 per cent more walking trips per year than men, and cover slightly more miles.²¹ In 2019, walking accounted for 26 per cent of all trips taken in England, and three per cent of the total distance

travelled. This is high in comparison to cycling, which accounted for two per cent of all trips, but low compared to car usage, which accounted for 61 per cent of all trips and 77 per cent of total distance travelled.²² As part of 2019's National Travel Survey, individuals were asked what improvements would encourage them to walk more. The most popular responses were all related to road conditions; 20 per cent stated they would want safer roads, 17 per cent wanted improved pavement maintenance, and 10 per cent wanted safer crossing points.²¹

UK households with a lower SES are less likely to have access to a car; in 2019, 86 per cent of households that were in the top 20 per cent of household income owned at least one car, compared to 55 per cent of households in the lowest 20 per cent of income (this figure has only increased by five per cent since 2002, showing that this disparity in car ownership is largely consistent over time).²³ Individuals who do not have access to a car are more dependent on walking; in 2019, individuals living in households without access to a car walked for 50 per cent of their trips and 10 per cent of their total distance travelled, compared to those from households who do have access to a car who walked 23 per cent of their trips and covered three per cent of their total distance travelled.²¹

Despite the above, in 2017/18, the socioeconomic group with the highest proportion of adults walking at least once per week was students, followed by those in managerial, administrative and professional occupations, with both groups being above 75 per cent. The socioeconomic group with the lowest proportions were "other/unclassified" at 56 per cent and "long term unemployed or never worked" at 57 per cent.³⁰ This suggests that although individuals with a lower SES walk a greater proportion of their journeys, they carry out fewer journeys overall, meaning they do not get as much physical activity as those with a higher SES.

Around 43 per cent of children aged between five and 16 walk to and from school, compared to 46 per cent of children aged between five and 10, and 39 per cent of children aged between 11 and 16.²⁴ Walking to school rates have been declining for decades; the DfT states that a generation ago, 70 per cent of primary school children walked to school, but now the figure sits at just 51 per cent, and the Government has a target to increase this to 55 per cent by 2025.²⁵ Living Streets, a UK charity that encourages walking, reports that 80 per cent of boys and 72 per cent of girls are physically inactive, and a key barrier that prevents them from walking to school is the fact that their parents do not feel that it is safe for their children to walk alone, but they do not have the time to walk with them.²⁶

Walking rates in England are relatively low compared to motor vehicle use, with a major dependency on the use of cars, even for short trips. However, although England compares poorly with some other European countries when it comes to modes of active travel such as cycling, its walking rates compare well.²⁷

3.3 UK pedestrian policy and protection

3.3.1 Cycling and walking investment strategy

Pedestrian policy in England is underpinned by the DfT's [Cycling and Walking Investment Strategy \(CWIS\)](#), published in April 2017. The development of a CWIS was required as part of the Infrastructure Act 2015, and it recognises the fact that individuals rely very heavily on cars, even for short trips, and that there must be a dramatic modal shift in order to reduce this dependency,²⁸ making cycling and walking the "natural choice" for short journeys (or as part of a long journey) and allowing us to reap the benefits of active travel. The CWIS sets out the active travel improvements the Government wants to deliver by 2020, 2025 and 2040. The 2040

improvements include: improved safety, e.g. safer and more welcoming walking and cycling routes; improved mobility, e.g. the introduction of more active travel networks near public transport hubs; and better streets, e.g. integrating active travel into the community with activities such as led rides.²⁹ The CWIS encompasses other key policy documents, including the [Future of Mobility: Urban Strategy](#) and the [Clean Air Strategy](#).³⁰

The Government has faced criticism for the CWIS, with the Transport Committee stating that some of the targets are not ambitious enough, for example one of the 2020 targets was 300 walking stages per year per individual in England. Since the CWIS was published, the methodology for counting stages has changed, resulting in an increase in figures and meaning the target has technically been met for many years. The Transport Committee states that due to issues such as this, and the poor progress towards meeting one of the 2025 targets, the Government should revisit and revise the CWIS.²⁸

In February 2020, the Government published the CWIS Report to Parliament in order to provide updates on the progress being made towards active travel targets. The CWIS Report to Parliament states that around half of the 26 actions identified in the CWIS have been “substantively completed”, with key walking achievements as of March 2019 including a £5.6million investment in workplace active travel as part of the Cycling and Walking to Work Fund, development of the Walk to School Outreach programme to encourage more children to walk to school, and supporting the development of Local Cycling and Walking Infrastructure Plans (LCWIPs) for local authorities to develop cycling and walking networks, with 46 local authorities being selected to benefit from a £2million investment package.³⁰

3.3.2 Pedestrian protection campaigns

The UK has a long history of pedestrian protection campaigns, particularly aimed at young children. In the 1990s and early 2000s, Sustrans, a UK charity that promotes safe and sustainable travel, ran the Safe Routes to Schools project.³¹ Safe Routes to Schools was a practical project that aimed to encourage the use of active travel for school journeys in order to reduce traffic levels, and consequently danger, on routes to and from schools.³² Now, Sustrans carries out their School Streets programme, which supports schools and local authorities by reducing motor vehicle traffic near schools at the start and end of the school day. Making school areas into walking and cycling only zones encourages active travel to and from school by reducing congestion, pollution, traffic and road risk.³³

Other historical pedestrian protection campaigns include Tufty Fluffytail and the Green Cross Code. Tufty Fluffytail was a character created by RoSPA in 1953 to help children learn about road safety, leading to the Tufty Club being formed in 1961, a network of local road safety groups for children whose membership passed two million in 1972. Tufty was much loved, and continued to promote road safety education throughout the 70s, 80s and 90s using a range of media including storybooks, posters, adverts and short films.³⁴ The Green Cross Code, derived from RoSPA's 1942 Kerb Drill,³⁵ is a popular method of teaching road safety to children that involves a step-by-step routine of what to do before crossing a road.³⁶ The Green Cross Code is cited in the Highway Code, where it is stated that parents and guardians should teach their children the code, and ensure that they are proficient in using it before they are allowed outside alone.³⁷

There are several campaigns, projects and initiatives in place now to protect pedestrians, particularly those who are of school age. Living Streets carries out their Walk to School initiative, encompassing young people ranging from early years up to college and university, by providing walking resources, activities and stories as well as campaigning for increased walking rates and a safer walking environment.³⁸ In terms of practical

pedestrian training, this is mainly carried out by local authorities/councils using a mixed approach, as shown by a 2018 survey by RoSPA in which 81 per cent of local authority respondents stated that they carry out pedestrian training for schoolchildren in England, and in 67 per cent of cases this consists of both classroom and practical on-road training. However, the survey found that some local authorities have concerns about funding for training, with some stating that cuts had meant they could no longer provide it, and 39 per cent stating that they believe less practical pedestrian training is being delivered to children in years 1 to 4 compared to five years ago.³⁹ RoSPA provides a [Practical Pedestrian Training Pack](#) that can be used by schools to organise training for year 3 - 4 pupils, including resources such as lesson plans, pupil certificates and risk assessments.⁴⁰

Another significant initiative for teaching children practical road safety skills is Kerbcraft. Kerbcraft, whose pilot programme was cited by the WHO in 2008 as an example of an effective method of teaching critical roadside skills,^{41,42} is based on University of Strathclyde research findings that children require practical as well as theoretical training in order to display measurable improvements in safe roadside behaviour.⁴¹ The Kerbcraft programme involves trained volunteers taking children out onto local streets across multiple sessions, and teaching them key skills such as choosing a safe place to cross and then how to cross the road safely.⁴³

3.3.3 Safe System approach

Another key UK road safety policy document is the [Road Safety Statement 2019](#). The Road Safety Statement describes ongoing work by the Department for Transport, as well as work that will take place for several years after the release of the Statement. Much of the work is underpinned by the Safe Systems approach, and its use is encouraged amongst local authorities.⁴⁴

The Safe System approach, also known as Vision Zero, underpins the WHO's Global Plan for the Decade of Action for Road Safety, and aims to ensure that road collisions do not result in serious or fatal harm to humans.⁴⁵ The Safe System approach recognises that human error is an inherent problem in road safety that can never be fully eradicated, and concurrently an individual's need to travel should never compromise their life, meaning that any serious injury or fatality as a result of a collision is mainly a failure of the road system.⁴⁶ This approach is different to the traditional approach to road safety in that more responsibility is placed on those who design the road system, such as road managers, politicians and organisations, rather than those who use the road system, who are mainly responsible for following regulations.⁴⁵

4. Deprivation and pedestrian casualty risk in the UK

As aforementioned, the 1980 Black Report was one of the first pieces of research to recognise the link between health outcomes and SES in the UK, identifying that social factors such as income, education, housing and employment were resulting in health inequalities. As a result of these inequalities, the report recommended widespread social policy interventions, but few individuals had the chance to read the findings at the time.⁴ The Black Report is still influencing research today, with one 2017 study citing the report and stating that we need to view road safety through a public health lens: "Transport poses a public health risk and the burden is greatest on the poorest in society."⁴⁷

Research into the area of deprivation level and risk of road traffic injury continued into the decades following the Black Report, and it was quickly identified that pedestrians suffered the effects of this association the most. In 2006, a report from the London School of Hygiene and Tropical Medicine for Transport for London

(TfL)⁴⁸ investigated the relationship, finding that the most deprived London pedestrians were more than twice as likely to be injured in a road traffic accident than the least deprived. As a result of this, the report recommended that walking (and cycling) should be made safer using interventions to reduce both the volume and speed of traffic.⁴⁸

It was also stated that there was minimal evidence that road injuries could be reduced by education and publicity interventions alone, even when these interventions are targeted at members of the population with the highest road injury risk. The authors stated that the ideal way to tackle the problem was to intertwine road safety policy and public health, whilst considering the effects of changes in transport modes and how these changes are likely to impact risk exposure. Finally, it was suggested that road safety resource allocation should be matched with deprivation indicators across wards, and any interventions should be constructed carefully in order to target the specific needs of different sections of the population.⁴⁸

It has been stated that although there is a clear relationship between pedestrian injury risk and level of deprivation, this relationship may be present due to the characteristics of deprived or urban areas.⁴⁹ A 2005 study⁵⁰ investigated this area, considering the idea that higher pedestrian casualty rates in dense urban areas may be incidental due to the characteristics of those areas that make accidents more likely, such as a higher child population, rather than the effects of deprivation. The study used STATS19 data and assumed a negative binomial distribution to investigate the effects of deprivation.

The results of the study showed the presence of a significant relationship, meaning that as the level of deprivation increases, so does the expected number of child pedestrian injuries. This relationship is also strong for adult pedestrians, but not as strong as it is for child pedestrians. Notably, these relationships were caused by distinct socioeconomic factors driving deprivation, regardless of the expected characteristics of living in deprived areas (such as higher traffic levels). The researchers state that interventions based on existing accident rates will not necessarily be successful in improving these rates in following years. Instead, it is recommended that resources are allocated by using accident prediction models to determine where accident rates will be high in the future.⁵⁰

The above is validated by a 2008 study that used cross-sectional analysis and linear regression models of child pedestrian casualties in England, finding a distinct and major effect of deprivation characteristics on child pedestrian casualties, independent of environmental characteristics. Interestingly, the incidence of crime in the local area had the most significant effect on child pedestrian casualties and KSIs. The authors state that it is difficult to investigate factors such as this further through data analysis, and instead detailed survey and case study work is required.⁵¹

4.1 Child pedestrians

Several years after the above reports, a 2011 study⁵² looked at child pedestrian casualties specifically, stating that although the link between deprivation and casualty risk is well established, it is difficult to identify the causation behind this link. Using 796 explanatory variables associated with deprived areas and individuals, 2,670 child pedestrian casualty records and the assumption of a negative binomial distribution, this study used several accident prediction models to attempt to uncover the socioeconomic and environmental risk factors driving child pedestrian casualties. The data used was from 2000 to 2005 and covered Bradford and Leeds. Significant socioeconomic factors contributing to child pedestrian casualties were single-parent families,

families relying on income support, and areas of high crime deprivation. Significant environmental factors were domestic garden size, junction density and the density of pedestrian and vehicular flow.⁵²

Furthermore, when an accident prediction model was used that considered where the accident took place, environmental risk factors were more significant. When a model was used that considered the residency of the child, socioeconomic risk factors were more significant.⁵² The authors argue that the residency findings have implications for road safety policy, with non-engineering interventions being better for these areas. However, the finding that amount of garden space is a significant risk factor suggests that safe spaces for children to play in are crucial, in order to stop them playing on or near roads,⁵² particularly as parents in deprived areas can struggle to provide access to extracurricular clubs for their children due to factors such as cost and service shortages.⁵³

The above findings are supported by older research which studied fatal child head injuries across several years. It was found that 76 per cent of the studied children were injured in a road traffic accident, and 53 per cent were playing at the time of the injury, with a significant number of these individuals playing near to their home.⁵⁴ Furthermore, research carried out in Birmingham showed that the most deprived populations have significantly less access to public parks compared to populations who are less deprived.⁵⁵

More recent research also finds that child pedestrians from the most deprived areas are more likely to be injured. One 2018 study used 2016 STATS19 KSI data (1,341 child pedestrians, cyclists or car occupants aged between four to 10 and 11 to 15 years old) with deprivation measures of 32,844 neighbourhoods in England. Unsurprisingly, it was found that pedestrians constituted the highest casualty numbers compared to other road users in both the younger and older age groups, but the findings on deprivation were profound; child pedestrians in the four to 10 year old age group living in the most deprived neighbourhoods were 2.89 times more likely to be KSI than those living in the least deprived neighbourhoods. Those aged 11 to 15 years old were 2.90 times more likely to be KSI, suggesting that the effect of deprivation on KSI risk is consistent between younger and older children,⁵⁶ contrary to existing research which states that the effect of deprivation on injury risk is more profound for younger children.⁵⁷

In terms of gender differences, the study found that male pedestrians were the most vulnerable across both younger and older age groups. These gender differences were greater in the four to 10 year old group than the 11 to 15 year old group, and in the four to 10 year old group the differences decreased as deprivation levels decreased. The authors state that overall findings from the study show that the inequalities identified years ago are still present and significant, and more work needs to be done to tackle this, ideally by looking at the problem from a public health perspective and continuously monitoring socioeconomic factors. It is suggested that future research needs to concentrate on uncovering the causation between child pedestrian injury risk and deprivation by looking at how different types of disadvantage affect risk, and by investigating the locations at which collisions are taking place, such as crossings and streets.⁵⁶

The majority of the above research uses the STATS19 dataset to compare road accident rates to deprivation scores, meaning only one category of child injuries is being investigated. One study,⁵⁸ despite outdated census data, provides an insight into the relationship between deprivation and hospital admission rates of children aged 0 to 15. The study used Hospital Episode Statistics (HES) of admissions of children to hospital as a result of external causes. The HES data was compared with Index of Multiple Deprivation (IMD) scores, and serious injuries (such as fractures) were investigated. It was found that 31 per cent of child hospital admissions for

serious injuries were caused by transport, and pedestrians had a higher injury rate than cyclists and car occupants (2.2 per 100,000 children compared to 1.5 and 0.6 respectively). Child pedestrians resident in areas with the highest IMD scores had a 4.1 times higher rate of serious injury than those resident in areas with the lowest scores, and rates were higher in urban areas than town, fringe and village areas.⁵⁸

4.2 Adult pedestrians

As was the case in the previously mentioned 2005 study,⁵⁰ research has shown that there is a relationship between deprivation level and likelihood of pedestrian injury for adults, but that this relationship is not as strong as it is for child pedestrians. In fact, the 2005 study used deprivation scores and found that deprivation had twice as much of an effect on child pedestrian casualties and KSIs as it did on adults.⁵⁰

Research suggests that deprivation results in inequalities in pedestrian health outcomes across all age groups. For example, a study⁵⁹ conducted between July and November 2020 in Birmingham found key differences in the experiences of 173 older (65+) pedestrians walking in low- and high-deprivation wards. GPS tracking, questionnaires and interviews were used to investigate the outdoor walking level of participants and obtain qualitative data on neighbourhood walking experiences. It was found that participants in high-deprivation wards walked significantly less on average than those in low-deprivation wards, felt like their wards had insufficient infrastructure and aesthetics, and (particularly women) felt like there was a lack of safety due to gangs, drug use, and lack of street lights. Participants from high-deprivation wards also faced issues with excessive traffic volume and speed, with one participant stating that they only walk outside when it is quiet.⁵⁹

This study shows that older adults are more likely to spend more hours walking for physical activity and leisure when they perceive their neighbourhood to have sufficient infrastructure, safety and noise levels. As deprived areas are less likely to meet these requirements, older adults resident in high-deprivation areas will generally walk less than older adults resident in low-deprivation areas. However, it should be noted that older adults living in high- and low-deprivation areas have the same requirements for wanting to spend time outdoors walking, so any engineering interventions designed to encourage walking should not exclude particular groups of older pedestrians based on their deprivation levels.⁵⁹

The results of the above research are made even more concerning when paired with a 2012 study⁶⁰ that assessed the amount of time it took 3,145 individuals aged 65 and over to cross the road (walk eight feet) in England. The key finding was that the average walking speed calculated for the participants (for both women and men) was not fast enough to use a UK pedestrian crossing. However, there were also implications for deprivation level, with participants residing in deprived areas more likely to have an impairment that reduces their walking speed even more.⁶⁰

4.3 Recent research

In May 2021, Agilysis, in collaboration with Living Streets, published a research report⁶¹ titled "Road traffic and injury risk in ethnic minority populations". The research aimed to investigate the relationships between pedestrian casualties, level of deprivation and ethnicity, and used ten years of STATS19 collision data, 2011 census data and Index of Deprivation scores to investigate pedestrian casualties from the 25% most deprived and 25% least deprived neighbourhoods. By weighting casualty data by ethnicity and then matching this data to deprivation scores using postcodes, 101,858 pedestrian casualties were analysed. It was found that, per 100,000 people, annual pedestrian casualties were 62 ethnic minority (excluding white minority) deprived, 48

white deprived, 24 ethnic minority (excluding white minority) non-deprived, and 20 white non-deprived. When comparing these figures, they show that pedestrians that reside in a deprived neighbourhood and belong to an ethnic minority are more than three times more likely to be injured whilst walking than pedestrians that reside in a non-deprived neighbourhood and are white.

The results of the above study reinforce the strong relationship between pedestrian safety and levels of deprivation, as well as illustrating the effect of ethnicity. Furthermore, the fact that there was little difference between the casualty rates in non-deprived areas for white and ethnic minority pedestrians compared to the large difference in deprived areas shows that, although deprivation levels increase risk, ethnicity can significantly add to this risk. The authors of the report state that further research in this area would be beneficial, as the differences in figures could be a result of the features of the areas that different ethnic groups reside in rather than their ethnicity itself.⁶¹

5. Remedial measures

The research into pedestrian safety in areas of deprivation shows a clear relationship between increasing levels of deprivation and risk of pedestrian injury, regardless of age group. This relationship has caused inequalities in pedestrian health outcomes for decades, and as such there is a need for current and future pedestrians to be safeguarded with new initiatives. As mentioned in Section 2, 42 per cent of women and 34 per cent of men in England are not carrying out enough physical activity to maintain good health.¹ Combined with air pollution, climate change and severe congestion in cities, the need to safely increase rates of active travel, particularly given the significant disparities in walking rates between different socioeconomic groups,³⁰ is huge.⁶²

The following section will explore research centred around potential remedial measures in pedestrian safety research; however, analysis from the 2020 Parliamentary Advisory Council for Transport Safety (PACTS) report *"What kills the most on roads?"*⁶³ should be noted here. The report investigates the danger presented by different transport modes and discusses road casualty data, and in terms of pedestrians states that, although pedestrian (and cycling) safety needs to be improved significantly, if rates of these travel modes were to increase, this would not necessarily result in an increase in fatalities. Key reasons for this, according to the report, include the fact that active travel modes will not replace long journeys that are carried out by car, the same amount of mileage would not be covered by these modes, and pedestrian fatalities have fallen during the last 15 years despite an increase in the UK population. It is stated, however, that the need to reduce the level of risk faced by pedestrians is key, as this is in line with the Vision Zero/Safe System approach, and individuals will not want to engage in active travel if they perceive a dangerous environment.⁶³

As can be seen in Section 3.2, rates of walking to school are low and declining, with parents of schoolchildren citing safety concerns as a key barrier to walking. A 2018 Living Streets report describes several potential ways to increase the amount of children walking to and from school, and how to make the walking environment safer in order to allow this. Key recommendations from the report that encourage both increased levels of road safety and walking are as follows:²⁶

- Schools, local authorities and the Government should work together to implement and take advantage of accreditation and behavioural change schemes to support more children in walking to school safely
- Walking in the local area should be included as part of the school day in an interactive manner that maximises the learning of key road safety skills

- The design and implementation of walking infrastructure should put children first and allow them to have safe and enjoyable walking experiences
- Default 20mph limits should be implemented and encouraged by local authorities and the Government in key walking areas such as where people shop and play
- Future schools and services should be placed in a way that means they are accessible via safe active travel and have high quality active travel amenities.

Targeted walking initiatives for children can have large positive effects. Research carried out by Sustrans⁶⁴ in 2020 that assessed the effects of their School Streets programme showed an increased number of children using active travel to get to and from school, resulting in increased levels of physical activity and reduced traffic levels. Similarly, a 2020 case study released by the DfT⁶⁵ describes the successes of the Living Streets Walk to School Outreach (WTSO) project, which was designed to promote walking through behavioural change initiatives. Over 2018 and 2019, it is estimated that the project encouraged around 10,000 extra children to walk to school, and schools newly enrolled in the project saw a 38 per cent increase in walking rates, resulting in a reduction in car journeys to and from school by 1.3 million. Although initiatives such as these can have such positive effects, it is important to ensure that pedestrians facing increased risk due to their level of deprivation are not left behind.

Research that involves targeting deprived areas includes several studies by Lyons et al.,^{66,67} which explored "advocacy in action", the process of advocating for the safety of pedestrians in deprived areas by informing local politicians of the high level of risk these pedestrians face and what can be done to help. Lyons et al.'s 2008 study⁶⁶ involved providing either pedestrian injury information (the intervention group) or general information (the control group) packs to 615 politicians across 57 of the most deprived local authorities in England and Wales using a cluster randomised control trial. The politicians selected to receive the pedestrian injury information packs were also interviewed by telephone. More than two years (25 months) later, the number and types of road safety interventions in the relevant local authorities were assessed in Lyons et al.'s 2013 study.⁶⁷

Despite the intervention group stating that they now felt more able to tackle the rate of child pedestrian accidents in their ward and possessing an increased ability to identify appropriate interventions, there were no significant differences in key outcome indicators (such as percentage of traffic calming measures and school 20mph zones, new road safety interventions and practical pedestrian training provision) between the control group and the intervention group. This result shows that although politicians are receptive to increased amounts of interest in tackling pedestrian accident rates in high deprivation wards, this interest does not necessarily lead to interventions. However, as interest levels increased as a result of the information packs, the study shows that it is important for road safety professionals to be skilled in long-term political advocacy to help push interventions through.⁶⁷

The need for advocacy in deprived areas is illustrated by a 2010 study⁶⁸ that investigated the relationship between the deprivation of English secondary school areas (IMD scores) compared to their exposure to a HPV campaign. It was found that, after schools had been sent a letter about the campaign, those situated in the least deprived areas were 1.32 times more likely to request the campaign materials than those in the most deprived areas, with take-up rates of 25 per cent and 32 per cent respectively. There were also significant regional differences with some areas being almost twice as likely to request the materials as others. The authors state that although the differences are not particularly major, small inequalities like this build up over

time and can negatively affect health outcomes.⁶⁸ This shows the importance of advocating for more deprived areas to ensure that they receive the same messaging and interventions as less deprived areas.

The 2018 report⁵ mentioned in Section 2, published by Public Health England and RoSPA, sets out some key pedestrian injury prevention opportunities, particularly for children living in deprived areas. Firstly, it is suggested that walking safety needs to be improved for children walking to and from school (particularly as such high numbers of KSI child pedestrian casualties occur in the hours following the school day), which could be achieved by local authorities regularly assessing the needs for services and facilities in their area and considering the needs of those that use active travel modes first, working with schools and parents to make the transition to secondary school safer and by helping to develop school travel plans and integrating these with other measures such as road engineering. It is also suggested that more 20mph zones and limits should be introduced in vulnerable areas, supported by appropriate levels of campaigning and enforcement, as these are an important part of the Safe System approach to road safety.⁵

Similarly, a 2014 report from University College London, although concentrating on using transport facilities as a resource to tackle deprivation in terms of employment and education opportunities, provides some good insights into how inequalities could be reduced and lead to better health outcomes.⁶⁹

- A set of criteria should be established during infrastructure planning to ensure the transport needs of deprived areas are met
- Collaboration must take place in order to provide a safe and high quality walking environment, such as by improving poor driving behaviour and traffic volume, particularly as deprived individuals are more likely to rely on walking as their main transport mode
- There should be a minimum set of standards to ensure that everyone can access the facilities they need and to monitor where interventions are needed.

6. Conclusions and recommendations

Research shows that there is a significant relationship between pedestrian health outcomes and the level of deprivation of the area in which they live, and this relationship seems to affect children the most. To put the effects of this relationship into context, Public Health England estimates that there would be 810 fewer fatal or serious pedestrian injuries every year if young people in the most deprived areas had the same level of risk as those living in the least deprived areas, rather than their risk level being as high as it is currently.⁵ Combined with the urgent need to increase rates of active travel for all age groups, this problem represents a significant hurdle in UK road safety. As the Government's Cycling and Walking Investment Strategy continues, highly targeted interventions are required to ensure that deprived areas are not left behind.

RoSPA believes that the following actions would be conducive to tackling inequalities in pedestrian health outcomes in the UK:

1. Further research needs to take place in order to further establish and explore the factors driving the relationship between pedestrian safety and deprivation. Current research in this area focuses on data collection and analysis, but qualitative techniques may be useful for gaining greater insights, such as which aspects of deprivation affect pedestrian safety.

2. Similarly, further research is needed to investigate the best way to tackle inequalities. This is a problem that has persisted for decades and requires more attention in order to further our understanding of potential solutions.
3. Current and future pedestrians, particularly children and older people, must be safeguarded in order to create a secure environment for active travel to take place. Similarly, children from deprived areas require high quality spaces for playing outdoors, especially when they have nowhere else to play, e.g. due to lack of space and dedicated activities.
4. Collaborative working should take place to form joint approaches, such as local authorities working with schools to establish local engineering measures and to tackle traffic speed and volume, and public health and road safety stakeholders working together to consistently monitor the relationship between deprivation levels across the country and subsequent casualty numbers (potentially using hospital admissions data to tackle the problem of underreporting and to more accurately determine future accident rates), and act on this with targeted interventions whilst considering upcoming modal shifts.

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*Due to changes in severity reporting across some police forces since 2016, newer statistics are not comparable to earlier years. Therefore, the DfT provides both adjusted and unadjusted casualty figures in their statistical data tables. RoSPA uses adjusted figures as the DfT states that they are recommended “for the analysis of trends over time”.

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