Beyond 2010 – a holistic approach to road safety in Great Britain

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for Transport Safety

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Foreword

Over 20 years ago, Great Britain recognised the importance of a co-ordinated approach to reducing casualties on our roads. Successive governments have reaffirmed their commitment to research-based and evidence-led policies to make our roads safer. We welcome this resolve that has led us to being one of the leaders in casualty reduction in Europe.

Recent trends suggest that our performance is "flatlining". Deaths have not fallen as sharply as serious injuries. In particular, deaths involving drinking and driving, failure to wear a seat-belt or driving too fast (whether for the conditions or the speed limit) have failed to fall at all.

Now is the time to consider what further work we need to do beyond 2010 and what policy approaches we need to adopt as we near the end of the current round of casualty reduction. We also must place road casualty reduction and policy priorities in a wider context of changes in society.

This report offers the opportunity to see road safety and casualty reduction in a wider perspective. It is the result of considerable consultation within and beyond the road safety community. We welcome its publication and urge the government and Parliament to take seriously its recommendations.

Peter Bottomley MP
Louise Ellman MP

Parliamentary Co-Chairs
Parliamentary Advisory Council for Transport Safety

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Policy and Campaigns Officer
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Introduction

As we approach 2010 and the expiry of the current road safety strategy and casualty reduction targets, it is appropriate to consider how best to continue working towards reducing death and injury on the roads. More than a narrow analysis of casualty statistics outlining who, what, where and how people are being killed and seriously injured, this report aims to position road safety in a broader context. Transport is a means to an end not an end in itself. Similarly casualties are not abstract events divorced from the causes of road use nor from the trends influencing who uses the road and how they interact with it. This report examines trends occurring across society and considers their impact on future road use and consequent potential implications for casualties.

Methodology

The research for this project began with a comprehensive programme of reading and a literature review. For such a wide ranging report, this took in government, Parliamentary and non-government reports and detailed research papers as well as press and professional journal coverage of topical issues. The process of research through literature review continued throughout the life of the project.

Central to gaining a deeper understanding of the issues road safety policy must address in the next round of casualty reduction was the stakeholder consultation. Thirty people were interviewed in summer 2006. Consultees' backgrounds ranged across vehicle design, policy, engineering, local government, driving instruction, cycling, urban design, motorcycling and risk assessment. A list of those interviewed is provided at Appendix 1. The semi-structured questionnaire asked about the factors that have contributed to the UK's strong history of casualty reduction, the role of targets and the impediments to further progress. It also aimed to gauge perceptions about the nature of the UK's overarching approach to road safety and the role of a vision in other countries.

An online survey was also used to gain insights into road safety priorities for the coming decade. This asked respondents to include their profession and interest in road issues and to rate the most likely causes of road crashes and their preferred solutions. The final part of the questionnaire asked for comments on four priority casualty groups: children, motorcyclists, driving at work and deprived areas. More than 600 people responded and many gave significant commentary. The notes from interviews and the online questionnaire were analysed using grounded theory methodology to discover themes and sub-themes in comments.

As the project developed and took shape, the advisory group gave feedback on process, content, structure and potential recommendations.

Executive Summary

The UK has long been a leader in road safety and an important element of this success has been its pioneering use of targets to motivate government and non-government organisations to take action, encourage activity focused on priority casualty reduction areas and accurately monitor progress. Although national targets have been criticised in recent years as their use has expanded across all facets of public policy, the casualty reduction targets are strongly supported by those with responsibility for achieving them. Nonetheless, with the increasing need to involve a broader range of government agencies and non-government groups in efforts to reduce casualties, as well as the persistently high levels of deaths, there is scope to augment targets as the predominant impetus for activity and develop a wider vision for safety within road transport.

In considering the adoption of a vision for road safety, we have the example of those used in other jurisdictions. Sweden's approach is called Vision Zero whilst the Netherlands' is Sustainable Safety. An additional option is the pragmatic vision, based on reducing risk on the roads to within a range similar to that of other everyday activity.

The majority of road safety professionals interviewed for this project admired the aspirational nature of the Swedish Vision Zero and the commitment of the Swedish Government to achieving it. However, many believed that, at a philosophical level, road use contains inherent risk, that an aspiration to remove all risk of death and serious injury was not helpful and that it would not fit the 'British psyche'. In contrast, a combination of Sustainable Safety and the "pragmatic approach" presents a more viable alternative model. The vision for the post-2010 road casualty reduction strategy should be based on a holistic approach, with the ultimate goal of reducing risk on the roads to not more than twice that experienced elsewhere in everyday life.

In order for the vision to be adopted and for a programme of action to be implemented to achieve it, a high level of political leadership is required. Part of the difficulty in generating political leadership is the conflict between the public's expressed concern about safety on the roads and their ambivalence about some of the actions necessary to reduce casualties, particularly on the issue of speed management. To continue to achieve casualty reductions in the UK in future years, focused, co-operative and co-ordinated campaigns by a range of non-government organisations will be needed to build public support for the implementation of necessary interventions.

As road use is a highly regulated activity, it is also important that government departments work together to support casualty reduction policies and programmes. A frequent criticism in the project consultation interviews was that, while road safety policy has been effective in reducing casualties, it has been quite insular. Expanding on the core three 'E's, road safety also needs to move out of its silo and actively establish partnerships with other public and non-government agencies for whom improved road safety is not the prime focus, but where improvements support the achievement of their own objectives.

Tackling the health implications of the rapid rise in overweight and obesity and the consequences of climate change will be two of the Government's most challenging tasks in coming years. Improving road safety has a key role to play in these efforts, as establishing a road environment that is conducive to active travel has both health and environmental benefits. Within the traditional remit of road safety, speed management will be central to this, but the profession will also need to push the boundaries of its role, particularly in terms of supporting the liveable neighbourhoods agenda.

It is unfortunately the case that, although tackling poverty has been a focus for the current Government, deprivation levels in Britain are still high[1]. This is of concern from a road safety perspective because deprivation has been found to be a risk factor for casualty involvement, particularly for child pedestrians. Over the past decade the connection between deprivation and casualties has been examined and received significant attention – indeed, as outlined in the opening chapter, an additional target for a faster rate of improvement in deprived areas was included in the **Tomorrow's Roads** strategy. This was achieved in 2005, with casualties in neighbourhood renewal areas falling 4% more than the whole of England [2]. Despite this welcome achievement, casualties in deprived areas remain disproportionately high and require ongoing attention.

The UK population is ageing and likely to keep driving further, in larger numbers and for longer than previous generations. To improve safety while maintaining mobility will require a multi-faceted approach, encompassing vehicle design, vehicle safety technology and the provision of more comfortable, reliable public transport as an attractive alternative. Underpinning these changes will be the provision of engaging and clear information about ageing and driving. With their increased frailty and potentially declining capabilities, an older population poses a significant challenge to the road safety profession and the early implementation of a co-ordinated strategy is important to address these issues.

In developing future casualty reduction strategies, it is important to be alert to trends in the economy and employment as these have a direct impact on road use. Ensuring that transport supports continued economic growth will be a feature of future transport policy and with moves to encourage road pricing as a mechanism towards this, consideration of road pricing's potential safety consequences will be important. At the same time, new emphasis must be placed on safe driving at work, with the 'white van man' phenomenon and the strong service sector character of the UK's employment profile seeing a rise in employees out on the roads. This requires a more systematic approach to improving work-related road safety through a more regulatory oversight of driving at work.

As one of the three 'E's of road safety, enforcement underpins efforts to achieve compliance with traffic law and support safe road use. Despite this important role, there has been a real and perceived decline in traffic law enforcement activity other than by cameras. In part, the shifting of attention away from roads policing is due to other pressures on the Police. At national and local level, initiatives have been developed to tackle anti-social behaviour, street crime and, in the larger cities, gang-related gun and knife crime. At a global level, people-trafficking and terrorism have been a major public and governmental concern. At the other end of the scale, neighbourhoods policing has

[1] See Joseph Rowntree Foundation, http://www.jrf.org.uk/child-poverty/
[2] DfT (2007), Tomorrow's Road – safer for everyone: the second three year review, DfT, p18

become prominent in recent years as an important element of tackling crime in the context of its impact on quality of life. While there is some evidence of renewed interest in roads policing, the need to tackle terrorism, in particular, will continue to place demands on police resources. Articulating the benefits of increased roads policing within the framework of neighbourhoods policing and the Respect agenda and in terms of responding to community concerns offers additional support for increased activity.

The reduction in casualty levels seen in recent years has not been uniform and there is still an unacceptably – and disproportionately – high number of young people who kill and injure themselves and other road users each year. A significantly different approach to learning and licensing is needed as an early intervention to improve young people's safety on the road. A substantial body of research indicates that the attitudes young people hold towards driving are a significant contributory factor to their high casualty rate and that their attitudes are formed at an early age. Tackling young people's attitudes to driving will be a key element in reducing casualties in the longer term. Safe road use as a pedestrian, cyclist or motorist is a life skill and it is of concern that a co-ordinated approach, with each year's learning building on the last, is not applied nationally. Parental involvement is also an important factor in shaping attitudes towards road use. Programmes to support accompanying drivers should be evaluated for wider application. However, it is a defining characteristic for teenagers to rebel against authority figures and risky road behaviour may well be not only understood, but also actively sought out. Because the origins of the behaviour relate to the peer group's codes of acceptable and desirable behaviour and the need for peer approval, road safety messages need to tap into the social norms prevalent amongst young people. A twin track strategy is needed: changes to the learning and licensing regime to reduce casualty risk in the immediate future coupled with consistent persistent work to achieve generational change in attitudes.

No discussion of future road casualty reduction strategies would be complete without considering the role of technology, both in creating road risk and in mitigating it. The increasing popularity of nomadic devices and the introduction of driver hazard alert systems raise the issues of human-machine interface and distraction while driving. In considering how best to respond to the road safety implications of these, devising a reliable assessment procedure and providing accurate and accessible information to drivers will be important. Developing an integrated plan to manage the safe and effective introduction of technology-based safety interventions is necessary to maximise the benefits.

Visions and targets

That the next stage of road casualty reduction include an ambitious target (or targets) as an integral element.

That a target for reducing deaths is set, in addition to a target for reducing combined deaths and serious injuries.

That the United Kingdom adopt a vision to guide future road safety policy.

That an engagement plan to involve organisations and policy fields that have not traditionally worked in road safety is developed as part of a future strategy.

That the next stage of road casualty reduction is based on a holistic approach towards the ultimate achievement of risk on the roads being not more than twice that experienced elsewhere in everyday life.

Achieving the Vision

That members of the Delivery Board are drawn from a wide range of backgrounds, some of whom have championed and led partnerships.

That indicators for safer roads within local areas are established via the Local Area Agreement process. This could include vehicle speeds, number of people/ children walking and cycling, opinion surveys.

The Sustainability Agenda: linking road safety, obesity and climate change

That the Department for Transport (DfT) undertake to provide KSI per hour and per trip.

That a default speed limit of 20mph in all built up areas is implemented in ways that achieve high levels of compliance.

That priority is given to early type approval of time over distance cameras for use at speeds below 30 mph.

That, in the next round of Local Transport Plans, advice should be given to local authorities to look at extending application of Manual for Streets.

That, in advance of the development of mixed use street design guidance, the DfT should commission a series of events to disseminate best practice findings from the urban mixed priority routes project.

That trips made on the national cycling network are included in the national travel survey.

That all new residential developments are subject to a 'pint of milk test' (can a resident reach a shop for a pint of milk in under ten minutes without using a vehicle).

That a programme is developed to disseminate the findings of the cycling demonstration and sustainable travel towns.

That cycle-share schemes are supported in the same manner as car-share schemes.

The Deprivation Effect

That the Road Safety Delivery Board prioritise the dissemination of the evaluation of the Neighbourhood Road Safety Initiative.

Ageing Population

That the next road safety strategy includes a comprehensive sub-strategy dedicated to reducing the rate of KSI experienced by older (60+) people per km travelled.

That funding is made available to implement older driver assessment and support programmes, including personalised travel planning.

That the design of bus interiors is reviewed to ensure maximum levels of safety and comfort for older people.

That Passenger Transport Authorities and PTEs, in co-operation with bus companies and with local and non-government bodies, implement education and awareness sessions for bus drivers and bus company managers regarding the needs of older passengers and people with mobility difficulties.

Young Drivers

That programmes to support accompanying drivers, such as The Perfect Partner Pre-Pass Support Scheme piloted in Lancashire County Council, are evaluated for wider application.

That peer-to-peer schemes are investigated for their potential applicability to safe road use education.

Economy and Employment

That all road pricing proposals must include a specific risk analysis of potential traffic dispersal.

That the publicity strategy for road pricing zones includes the dangers of driving tired, with a particular emphasis on driving while at work.

That a high profile cyclist and motorcyclist awareness campaign aimed at car and HGV drivers is launched in the road pricing zones to limit the increased risk of any modal shift.

That a set amount of revenue from pricing is dedicated to safety improvement schemes for pedestrians, cyclists and users of Powered Two Wheelers.

That central and local government agencies develop partnerships with non-government bodies to continue their publicity campaigns highlighting road risk to LGV drivers.

That the DfT works in partnership with the Learning and Skills Council to introduce road safety and eco-driving to relevant formal training and apprenticeship schemes.

That Intelligent Speed Adaptation is introduced into all fleet cars.

That the HSE establish and resource a road deaths investigation unit.

That Coroners in England and Wales are given powers to investigate fatal collisions where they have involved a person driving in the course of employment.

That the DfT and local authorities work with professional bodies (IHT, IHIE, ICE etc) to promote highways engineering as a discipline, building on the findings of the skills shortage survey.

Offending and policing

That perceptions and experiences of road risks are included in all consultation and opinion surveys undertaken towards setting neighbourhoods policing priorities.

That all forces have hand held computers available for efficient checking of driving licences and of vehicle licence, roadworthiness and insurance records.

That guidance on best practice implementation of ANPR is developed and circulated by the National Police Improvement Agency to all Chief Constables.

That evidential roadside breath testing devices are approved as a priority.

The Changing Vehicle

That the primary New-Car Assessment Programme ratings include HMI aspects of the driver assistance systems individually and in combination with other in-vehicle information systems.

That an audit of use of vehicle performance/safety features be undertaken, to assess the extent to which they work, and are understood and used by drivers.

That an integrated plan be developed to guide the introduction of information, driver assistance and primary safety technologies.

Visions and targets

Motivation and aspiration: setting a vision for road safety

The UK has long been a leader in road safety and an important element of this success has been its pioneering use of targets to motivate government and non-government organisations to take action, encourage activity focused on priority casualty reduction areas and accurately monitor progress. However, targets have been criticised in recent years as their use has expanded across all facets of public policy. In the light of this criticism and with the increasing need to involve a broader range of government agencies and non-government groups in efforts to reduce casualties, as well as the persistently high levels of deaths, there is scope to augment targets as the predominant impetus for activity with a wider vision for safety within road transport.

Road safety: the next steps

In 1983 the Department of Transport established an inter-departmental review group on road safety "to take stock of what has been achieved thus far and consider what action is required to maintain casualties on a downward trend for at least the remainder of the present century"[3]. Reporting in 1986, the Government accepted the review's recommendations and subsequently set the first road safety target, to reduce road casualties by a third by the year 2000, in the 1987 strategy document, **Road Safety: The Next Steps**[4].

In consultation interviews for this report, the advent of this initial target was considered to be a significant moment in road safety policy. A product of rigorous analysis and an innovative approach at the time, interviewees commented that the 1987 target garnered widespread professional support and media and public interest:

> It generated a lot of publicity and interest with the press and non-government organisations. There was an increased budget allocation for implementation, but not hugely so, it was more about a change in outlook and ethos and the understanding that killing nearly 15 people each day was unacceptable.[5]

Thanks to developments in vehicle design and laws limiting drink driving and requiring seatbelts to be worn, casualties were falling by 1987. Working from this strong base, the target increased attention to road safety and, "gave the will to implement the policies for progressively improving the rate, which meant tightening the regulations and influencing the attitudes"[6]. The success of this approach can be seen in the statistics showing that by 2000 road deaths had fallen by 39% and serious injuries by 45%[7].

[3] DfT (1987), Road Safety: The Next Steps, DfT, London, p2
[4] ibid
[5] Interviewee 19, project consultation interview, July 2006
[6] Goodwin, P (2006), Determination and Denial: The Paradox of Safety Research and Traffic Policy, Westminster Lecture, PACTS, London, p5
[7] DETR (2000), Tomorrow's Roads – Safer for Everyone, DETR, London, p.7

Tomorrow's Roads: safer for everyone

Following a series of consultations from the mid-1990s, and statistical modelling by the Transport Research Laboratory[8] into factors likely to affect future casualty numbers, the Government retained and refined the use of targets to shape the road safety strategy for 2000-2010, **Tomorrow's Roads - safer for everyone**. Whereas the 1987 target set a blanket reduction of a third, **Tomorrow's Roads** was more sophisticated and focused:

By 2010 we want to achieve, compared with the average for 1994-98:
- a 40% reduction in the number of people killed or seriously injured in road accidents;
- a 50% reduction in the number of children killed or seriously injured; and
- a 10% reduction in the slight casualty rate, expressed as the number of people slightly injured per 100 million vehicle kilometres.[9]

The overall record for child safety in the UK was relatively good, but the child pedestrian record was poor compared with some European countries. The specific target for reducing child casualties was set higher than for overall KSIs to focus attention on this anomaly. Further, in 2002 the Department for Transport's Public Service Agreement was amended to include the additional requirement to tackle the significantly higher number of road accident casualties occurring in disadvantaged areas.

Critiques of targets

The use of targets has been a hallmark of British road safety policy and beyond road safety, the current government placing a particular emphasis on their role in service delivery. National targets in other policy fields have, however, come under much criticism from practitioners, commentators and policy makers. Consideration of these critiques is a necessary precursor to developing future strategies to continue road casualty reductions.

Targets are primarily a performance management tool, used to gauge progress over time towards a desired objective and compare that progress between like organisations; they also provide a way of ensuring accountability for public monies spent towards the achievement of government goals. And yet criticism of their use has charged that targets do not fulfil these objectives in practice. Rather, critics argue, because targets are set centrally via the PSA (Public Service Agreement) process, they are insufficiently sensitive to local conditions that affect their achievement; are too numerous to provide direction and can conflict; produce unintended and perverse outcomes; encourage 'gaming' and manipulation of the system; become an end in themselves rather than a measure of progress; stifle innovation or flexibility in response to local issues; and result in excessive attention being given to what can be easily measured, "at the expense of what is difficult or impossible to measure quantitatively even though this may be fundamental to the service provided (for example, patient care, community policing, or the time devoted by a teacher to a child's needs)"[10]. Much of this has been played out in the national newspapers. Indeed, a kind of sport has sprung up with newspapers highlighting examples of ill-devised targets or outrageous perverse consequences[11]. In contrast, the **Tomorrow's Roads** targets have been very successful in harnessing professional commitment, giving a focus to casualty reduction activities and proving a measurement and accountability tool.

[8] See Broughton, J et al (2000), The numerical context for setting national casualty reduction targets, TRL, Crowthorne
[9] DETR (2000), Tomorrow's Roads – Safer for Everyone, DETR, London, p.7
[10] HoC Public Administration Select Committee (2003), On Target? Government by Measurement, TSO, London, p17 See:
[11] Simon Jenkins (24 September 2006), "Set a silly target and you'll get a crazy public service", The Sunday Times
  http://www.timesonline.co.uk/article/0,,1059-2372141,00.html
  John Carvel (20 May 2002), "NHS 'hindered not helped' by targets", The Guardian
  http://society.guardian.co.uk/nhsperformance/story/0,,718798,00.html

The Audit Commission commented on the characteristics of a successful target:

What makes a target 'good' is not just the way a target is expressed—it's about the way it was derived, the extent to which service users were involved in its development, the extent to which it helps to achieve policy objectives, the extent to which it has the support of the staff whose efforts will achieve it, the quality of the data used to measure its achievement, and the clarity and transparency of its definition[12].

Assessed against this definition, the road safety targets are 'good' and are perceived to be good by those with responsibility for achieving them, contrary to commentary in other fields such as health and education. Although some interviewees consulted in the course of this project felt that the target could have been more ambitious and stretching, there was broad agreement that Tomorrow's Roads had set reasonable targets, soundly based on evidence and research:

The road safety targets were more rigorously based [than in other policy areas]. They're not just a 'wet finger in the air'. They are achievable – the people who have to achieve them are involved in establishing them so they have ownership. Other targets in other areas are imposed from above. [13]

Backed up by this evidence-based approach, interviewees commented that the targets gave a focus to the range of casualty reduction activities, undertaken by a range of organisations:

The target gave a lot of direction to achievement. It was carefully worked out, who contributes what – what design, enforcement and education could do. The target actually meant something…[it] was very simple but with a sophisticated calculation behind it on how it was derived.[14]

Practitioners and stakeholders agree with targets and see the benefits. If you take ownership of a target, it's much more likely to be met. The road safety targets are data led – we only focus on groups, users and locations where we are going to get benefits…We do need targets, it's something to focus the mind and aim towards… [15]

In addition, an advantage of the **Tomorrow's Roads** targets highlighted by interviewees was that they were not overly prescriptive: the UK has the benefit of a mature road safety industry and the outcomes-based nature of the 2010 targets was considered conducive to innovation within an environment of high professional standards and established research:

[The use of targets] was innovative and voluntary, and therefore it wasn't a case of "the Government says you have to have a target". It was the outcome of consultation and discussions. It's simple, both to measure and understand. People can generate their own activity to meet the targets without undue scrutiny and there was buy-in from all the stakeholders. The consultation got all those involved and it was seen as something acceptable. Nobody felt the target had been dumped on them. There was a high level of ownership and there wasn't the rigidity of "you have to do this to achieve the target". [16]

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[12] The Audit Commission, in HoC Public Administration Select Committee (2003), op cit, p11
[13] Interviewee 28, project consultation interview, June 2006
[14] Interviewee 21, project consultation interview, July 2006
[15] Interviewee 11, project consultation interview, June 2006
[16] Interviewee 19, project consultation interview, July 2006

A further advantage of the 2000-2010 targets was their role in monitoring progress on casualty reduction. As there were long-established processes to collect data on road deaths and injuries, through **Road Casualties Great Britain**, measuring progress did not prove as difficult as it might have in other areas. In addition, there was an in-built requirement for three-yearly reviews.

With the number of people killed and seriously injured more than halving between 1985 and 2005[17], targets have proved to be "a valuable means to get and to keep traffic safety on the political agenda"[18]. And with continuing high levels of support, targets, then, have not outlived their usefulness as motivators for casualty reduction activity and efficient measurement tools.

> **Recommendation: That the next stage of road casualty reduction include an ambitious target (or targets) as an integral element.**

A vision for road safety

With these strategies spanning more than twenty years and both advocating a measured and incremental method of reducing casualties, the British approach to road safety has been described as, "problem oriented and professional practitioner led"[19]. Road safety professionals interviewed in the course of consultation on this project supported this characterisation, commenting that in comparison to other European countries, "we have a more pragmatic approach, but the aim is the same"[20]. Nearing the end of the second target period, there is a need for a new approach to refresh both those currently working in road safety and generate enthusiasm from those professions that have not historically been involved, but could play a role in future efforts. Using targets as a tool within a broader vision for road safety in the UK provides the potential for that refreshed approach.

The European Transport Safety Council has commented that key to making further in-roads into casualty numbers is establishing a widespread view that such casualty levels are an unacceptable trade off for mobility; a vision has an important role to play in establishing such a view:

> A prerequisite for effective action radically to reduce death and injury in road traffic collisions is a strongly felt and lasting motivation for change which is sufficient to root out and overcome the deep seated tolerance of disproportionate numbers of people being killed or injured on the roads that characterise highly motorised societies. This motivation for change has to extend to enough opinion-formers and decision-makers eventually to convince all the relevant stakeholders. One way of generating and communicating such a motivation for change is by promoting an inspiring vision of safer road use. [21]

The other European countries with which the UK is most frequently compared in the context of road safety are Sweden and the Netherlands. An important difference between these two nations and the UK in this context is that they have clearly articulated 'visions' that form the foundation of their approaches to reducing road casualties: **Vision Zero** in

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[17] See DfT (1987), Road Safety: The Next Steps, DfT, London, p4; and DfT (2006), Road Casualties Great Britain: 2005, TSO, London, p8

[18] Koornstra, M and Lynam, D et al (2002), SUNflower: A comparative study of the development of road safety in Sweden, the United Kingdom, and the Netherlands, SWOV, Leidschendam, p20

[19] Ibid, p21

[20] Interviewee 19, project consultation interview, July 2006

[21] European Transport Safety Council (2003), Assessing Risk and Setting Targets in Transport Safety Programmes, ETSC, Brussels, p 15

the case of Sweden and **Sustainable Safety** in the Netherlands. These philosophies will be discussed in more detail below, but it can be said that they aim to provide a prism through which road transport and mobility issues should be viewed. By comparison, **Tomorrow's Roads** is more in the mould of a plan, outlining actions to be taken by each stakeholder in road safety towards the achievement of medium-term casualty reduction targets. While the three point target set out in **Tomorrow's Roads** is well conceived and well known within the profession, it does not, on the face of it, articulate "an inspiring vision of safer road use".

In this way, a vision provides an explicit aspiration and inspiration. One of the architects of Vision Zero, Prof Claes Tingvall of the Swedish National Roads Authority commented that, "having a target without a vision means you don't know what, in the end, you're aiming for"[22]. The development of Vision Zero was also a product of a strong motivation for change. According to Ines Usmann, Minister for Transport in Sweden in the mid-1990s, "after a long period of decline in road deaths and serious injuries, the rate had plateaued and there was no further decline. Sweden had to do something to sort out this problem. It was not acceptable that the decline should stop"[23].

The UK is now facing a situation where progress on reducing the number of people killed in road collisions appears stubbornly slow. Casualty forecasts for 2010 show that overall target KSI reductions are likely to be achieved. However, this expected success will be disproportionately divided between the death and serious injury categories: as at 2005, serious injuries have been reduced by 34% compared to the 1994-98 average, but there has only been an 11% reduction in deaths[24].

The existence of a road safety vision does not necessarily immediately lead to superior outcomes, as some features of Sustainable Safety and Vision Zero have traditionally been used in Britain (e.g. roundabouts)[25]. However, more than four years on, an examination of death rates in the three countries suggests that comprehensive road safety visions can generate the additional political and public interest and attract the resourcing for enforcement and interventions to reduce deaths:

Deaths/ million population [26]	2000	2001	2002	2003	2004	2006
NL	68	62	61	64	50	43
SE	67	66	63	59	54	49
UK	60	60	60	62	56	56

Recommendation: That a target for reducing deaths is set, in addition to a target for reducing combined deaths and serious injuries.

A vision gives coherence to the necessarily disparate sets of actions undertaken by many organisations across the public, private and non-government sectors, unifying them within an inter-connected programme of efforts towards a common outcome. With less than four years to the target date and long lead times for educational or vehicle design measures to take effect, it is quite probable that the trend in deaths will not be significantly altered. This dynamic will, then, be part of the post-2010 road safety

[22] Prof Claes Tingvall, project consultation interview, February 2007
[23] Whitelegg, J and Haq, G (2006), Vision Zero: adopting a target of zero for road traffic deaths and serious injuries, Swedish Environment Institute, Sweden, p19
[24] DfT (2006), Road Casualties Great Britain 2005, TSO, London,, p16
[25] Koornstra, M and Lynam, D et al (2002), SUNflower: A comparative study of the development of road safety in Sweden, the United Kingdom, and the Netherlands, SWOV, Leidschendam, p21
[26] 2000-2004 data: ETSC (2006), Road Accident Data in the Enlarged European Union: learning from each other, ETSC, Brussels, p7
       2006 data: European Commission, Energy and Transport DG, "Road Safety: how is your country doing?"

political and professional landscape and concerted attention and resources will be required to affect it. An explicit statement of a vision for road safety would be both an expression of political will and commitment – "a strongly felt and lasting motivation for change" – and a generator of change itself.

Recommendation: That the UK adopt a vision to guide future road safety policy.

Creating road safety advocates

A vision, more than a set of targets, has the potential to attract the involvement of groups that have not traditionally played an active role in reducing road casualties. Road safety has historically been largely defined within the construct of "the three Es": engineering, enforcement and education. This is rightly so, as these are centrally concerned with the road and vehicle, the rules and road user. And yet, death and injury as a consequence of road travel also has a strong profile as a public health issue, both in relation to clinical care required as a direct consequence of collisions and the impact of avoidance of health-giving activities such as walking and cycling due to perceptions of unsafe roads. Additionally, there are intersections between road safety and urban design, particularly for vulnerable road users, in terms of how finite road space is designed and allocated to competing road user groups. Road safety has relevance for the environment movement too, in that an underlying issue in discussions about minimising damage to the environment and encouraging modal shift away from private vehicles is, as with public health, a reluctance to make such a shift while non-motorised travel is perceived as unsafe. Prof Tingvall firmly believes that the development of a vision encouraged a wider range of stakeholders to become involved:

> [Vision Zero] absolutely has got more stakeholders involved. You can share a vision, but you don't necessarily share a short term target or action plan. It has generated momentum we wouldn't have seen... It's a key success factor and the biggest strength. If you know the end point and if you feel you're part of the vision, you'll contribute towards it. [27]

A vision that engages as wide an audience as possible and allows the various professions to see their independent actions as contributing to a greater whole – and towards a clear ultimate end point – offers the potential to create a larger number and broader scope of advocates for road safety. It will be important to reach out to these professions and clearly communicate how improved road safety can facilitate the achievement of a range of policy objectives. Prof Tingvall spoke on this point, describing how before and during the implementation of Vision Zero, "many cups of coffee were shared" during conversations with a wide range of organisations while explaining the vision and need for improved road safety[28].

Recommendation: That an engagement plan to involve organisations and policy fields that have not traditionally worked in road safety is developed as part of a future strategy.

In considering the adoption of a vision for road safety, we have the example of those used in other jurisdictions. As noted above, Sweden's approach is called Vision Zero and the Netherlands' Sustainable Safety. A final option is "pragmatic road risk", based on reducing risk on the roads to within a similar range as that of other every day activity.

[27] Prof Claes Tingvall, project consultation interview, February 2007
[28] Prof Claes Tingvall, project consultation interview, February 2007

Vision Zero

Introduced in 1995 and endorsed by the Swedish Parliament in 1997, Vision Zero is "based on the ethical standpoint that no one should be killed or seriously injured for life in road traffic"[29]. This is a paradigm shift in approach to road safety, as it requires "abandoning the traditional economic model where road safety is provided at reasonable cost and the traditional transport model in which safety must be balanced against mobility"[30].

As road users do inevitably make mistakes, Vision Zero accepts that traffic accidents cannot be avoided completely. However, mistakes "should not be punishable by death"[31] and so the road environment is engineered to limit the physical harm of a crash. This move reflects a more fundamental shift of responsibility from the individual road user, to the road and transport professional:

The road transport system must be designed so that any mistakes will not cause serious or fatal injury. This approach means shifting a major share of the safety responsibility from road users to those who design the road transport system.[32]

According to Vision Zero, professionals responsible for the road system are not just those directly working in highways engineering, policing or vehicle design, but also include schools, transport and logistics firms and the judiciary. Road users have the responsibility to abide by the law.

In Vision Zero, speed is the key factor for controlling the safety of the system and a focus for intervention. This has led to more extensive use of roadside and median barriers, while intersections have been redesigned to roundabouts. Additional technological interventions designed to overcome lapses and violations in safe road behaviour include a striking increase in the provision of electronic stability control in cars – up from 15% to 70% of new cars; seat belt reminders for the driver's seat; and the recent introduction by Saab of an in-built alco-key[33].

Sustainable Safety

Sustainable Safety is the approach to casualty reduction launched in the Netherlands in 1992, implemented from the mid-1990s and reviewed in 2005. Although it does not have the explicit aspiration "of no deaths or serious injuries", it has similarities to Vision Zero: it aims to prevent crashes and exclude risk of severe injury and, following a user-oriented model where 'man is the measure of all things', human physical vulnerabilities and cognitive capacities and limitations are the foundation of interventions. This involves "tailoring the environment to human characteristics and preparing the road user for traffic tasks"[34]:

Sustainably safe road traffic can be attained by an integral approach to the components 'man', 'vehicle' and 'road'. This means that the infrastructure has to be designed such that it meets human capacities and limitations, that the vehicle supports the

[29] Swedish Road Administration (2006), Safe Traffic: Vision Zero on the move, SRA, Sweden, p5
[30] Whitelegg, J and Haq, G (2006), Vision Zero: adopting a target of zero for road traffic fatalities and serious injuries, Swedish Environment Institute, Sweden, p7
[31] Swedish Road Administration (2006), Safe Traffic: Vision Zero on the move, SRA, Sweden,, p5
[32] Ibid, p6
[33] Tingvall, C (2005), "Europe and its road safety vision – how far to zero", European Transport Safety Lecture, ETSC, Belgium, p9 http://www.etsc.be/etsl.php
[34] Wegman, F & Aarts, L, (2005), Advancing Sustainable Safety, SWOV, Leidschendam, p13

performance of traffic tasks and provides protection in the event of a crash, and that the road user is well informed and trained, and is controlled wherever necessary in the correct performance of the traffic task.[35]

The aspect that particularly sets Sustainable Safety apart is its methodical approach: in this model crashes occur when dangerous road user actions combine with, or are exacerbated by, system gaps; interventions are then devised on the basis of research into injury-causing crashes. These system gaps are known as 'latent errors', a concept borrowed from safety systems research[36]. Underpinning this rigorous systems approach, five principles have been developed that guide work to alter interactions within the road environment:

Sustainable Safety Principles

Functionality of roads	Monofunctionality of roads as either through roads, distributor roads, or access roads, in a hierarchically structured road network
Homogeneity of mass and/or speed	Equality in speed, direction, and mass and direction at medium and high speeds
Predictability of road course and road user behaviour by a recognizable road design	Road environment and road user behaviour that support road user expectations through consistency and continuity in design
Forgivingness of the environment and of road users	Injury limitation through a forgiving road environment and anticipation of road user behaviour
State of awareness by the road user	Ability to assess one's task capability to handle the driving task [37]

Sustainable Safety thus works towards removing in-built risk as far as possible to make road transport inherently safe. Since dangerous actions can never be completely avoided, it is a system where road designers and operators shoulder a significant portion of responsibility for safety so that "road safety depends as little as possible on individual road user decisions"[38]. This gives rise to requirements for substantial physical adaptation of much of the existing system of local roads.

A Pragmatic Approach [39]

The development of Vision Zero highlighted a debate within the road safety profession – indeed one that runs through the transport sector as a whole – about how many deaths and injuries are considered an acceptable trade off for the benefits of mobility. A level of risk exists in every human activity and some transport professionals argue that to remove all risk of death or injury from use of the roads would require interventions that are likely to exceed the limits of public acceptability, in terms of both the scale of financial commitment and limitations on people's freedom. In this model, "safety is for living and living is more than just keeping safe"[40].

[35] Ibid, p28
[36] Ibid, pp28-29
[37] Ibid, p13. Note: the first to third principles were the originals; the fourth and fifth were added in the course of the review.
[38] Ibid, p13
[39] Disclosure: the principal developer of this approach, Prof Richard Allsop, is a Director of PACTS
[40] Allsop, R (2005), "How many deaths are we prepared to accept?", Europäischer Verkehrskongress, Salzburg, p2

Accepting the existence of inherent risk in all activities does not, however, imply acceptance of unreasonable or disproportionate risk of death and injury. In a review for the Motorists' Forum, it is shown that the likelihood of being killed while using the road as a driver, pedestrian or cyclist is 8.5 times greater than in other everyday activities[41]. As using the roads is a necessary part of everyone's daily business it is unacceptable that an ordinary activity leads to such a high level of death and injury. A pragmatic vision for road safety, then, is to 'reduce the risk of death per hour spent using the roads to the average risk while engaging in other everyday activities'[42].

However, compared to other everyday activities, distinguishing characteristics of road use are speed, mass and the level of responsibility placed on millions of road users for the safety of the network. There is also a question about political appetite to undertake the necessary engineering, enforcement and educational interventions that present a challenge to achieving such a vision. It is thus suggested that a more realistic target is to reduce the risk per hour spent using the roads to no more than double the average for the rest of everyday life; this would reduce deaths on the roads to about 1000 per year[43]. This may sound unachievably ambitious but a more rigorous application of the policies set out in a recent European Transport Safety Council report "Raising Compliance with Road Traffic Law" would suggest that a reduction of 40% could be achieved in a generation with current knowledge combined with political will.

Holistic Road Safety

The majority of road safety professionals interviewed for this project admired the aspirational nature of Vision Zero and the commitment of the Swedish Government to achieving it. However, many believed that, at a philosophical level, road use contains inherent risk and an aspiration to remove **all** risk of death and serious injury was not helpful. Importantly, most felt that Vision Zero would not be accepted by either the British people or the UK political system – that it would not fit the 'British psyche'.

In contrast, a combination of Sustainable Safety and the "pragmatic vision" presents a more viable alternative model, building as they do on the UK's long history of using a systematic approach to safety management in other infrastructure-related fields, particularly on the railways, in nuclear power generation and the oil and gas industry. The key feature of systems-based safety management is viewing the undertaking as an interconnected process, within which areas of risk are identified. At the same time, it also intersects with the emphasis within Vision Zero that 'the system' – rather than any individual – is responsible for safe use of the road network by all users.

The UK has excellent road safety interventions, but there was a strong sense amongst consultees of the need for a more integrated and holistic approach. This would enable the issue of road casualties to be better considered in the round, identifying and responding to gaps in terms of our safe interaction with the road environment. Such an approach would go towards ensuring that not only are road safety activities mutually reinforcing, but policies in other fields are assessed for their impact on safe road use. In a virtuous circle, the implementation of a holistic approach to road safety offers the opportunity to engage and involve the wide range of relevant stakeholders. As safety considerations are factored in to their decision making processes, over time a holistic approach is reinforced organically.

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[41] Ward, H, Allsop, R et al (2004), A Review of the Delivery of the Road Safety Strategy: stage 1 a scoping study, Commission for Integrated Transport, London, p41
[42] Allsop, R (2005), "How many deaths are we prepared to accept?", Europäischer Verkehrskongress, Salzburg, p5
[43] Ward, H, Allsop, R et al (2004), op cit, p41

If Sustainable Safety provides the methodology for road-based application of systemic safety management, then the pragmatic vision provides the basis for the long-term target. Interaction with the road entails risks not found in many other areas of everyday activity and so achieving casualties not more than twice the average for the rest of everyday life within, say, 20 years, is indeed a challenge. Supporting this ultimate goal, more immediate targets are also needed to maintain momentum, provide a timely indicator of progress and ensure accountability. And finally, it must be highlighted that efforts to reduce casualties come in the context of sustainable community development, where road safety activities aim to support the achievement of other policy objectives and are a positive contribution to improving the quality of life.

Recommendation: That the next stage of road casualty reduction is based on a holistic approach towards the ultimate achievement of risk on the roads being not more than twice that experienced elsewhere in everyday life.

Achieving the Vision

Leadership

In order for both the vision outlined in the preceding chapter to be adopted and a programme of action implemented to achieve it, a high level of political leadership is required. However, in project consultation interviews, it was frequently remarked that road safety policy has suffered from a lack of leadership at departmental and ministerial levels:

> Lack of leadership from DfT [is a barrier to further progress]. Absolutely. There's never been a permanent secretary who's come from the Road Safety Division in that position. Road safety is not an internal priority, it has not attracted movers and shakers; partly because there's no political will. It's not on the public mind or on the political agenda. [44]
>
> You need to start at the top, for example like in France where the President said something must be done and it became important because the President took an interest. The political will is very important, someone who has status, high profile… We need high profile people in the community to come out in support…There's a lack of leadership [in the UK], they won't be brave and say "this is the problem and this is what we'll do about it". [45]

Other consultees felt that, because reductions in road casualties have been achieved and the targets are on track to be met, it is not an area that attracts political interest: "Because we're reaching the targets, there's not much attention, if we weren't reaching them they'd be more noticed"[46]. It is indeed frustrating that, while reductions have been and continue to be made, so many more deaths and injuries could be prevented if sufficient political pressure existed to introduce known policy, enforcement, educational and technological interventions.

Public opinion

> People are fundamentally inconsistent with muddled thinking. A driver has a view about his neighbourhood and another for where he wants to drive. [47]

There is a two-way relationship between political will and public opinion. Part of the difficulty in generating political leadership is the combination of the public's expressed concern about safety on the roads, at the same time as their ambivalence about some of the actions necessary to reduce casualties, particularly on the issue of speed management.

 The public is indeed concerned about safety on the roads. A recent survey conducted for the Audit Commission showed that, "…around one fifth of people identified speed and

[44] Interviewee 29, Project consultation interviews, July 2006
[45] Interviewee 19, Project consultation interviews, July 2006
[46] Interviewee 26, Project consultation interviews, June 2006
[47] Interviewee 16, Project consultation interviews, June 2006

the volume of traffic among the issues that most need tackling to improve the quality of life for residents"[48]. Additionally, the 2007 **RAC Report on Motoring** highlighted that "driving and safety is by far the greatest area of concern for the vast majority of motorists"[49]. Four out of the top eight 'issues of concern to motorists' were directly related to safety:

Issues of concern to motorists:
- The behaviour of other drivers
- Other people driving without insurance
- The number of accidents on the road
- The roadworthiness of other cars on the road [50]

Further, 59% of RAC focus group participants agreed that the current level of death and serious injury is not acceptable: 30% agreed with the "need to cut deaths by at least a half" with the remaining 29% going a step further, nominating zero as the only acceptable level, following Sweden's model, although this was tempered with scepticism about whether it could be achieved[51].

Despite these high levels of concern, there are contradictions at the heart of drivers' attitudes towards some aspects of improving safety. For example, the RAC report finds that 71% of participants were very concerned about "other motorists driving too fast or speeding"[52], scoring third highest; yet, "driving significantly above the limit in built up areas" [53] comes 17th out of 20 in a list scoring the seriousness of unsafe behaviours and only 53% claim to never speed in built up areas. This compares to drug driving, where 99% of participants claim to never do it and it was rated the most serious unsafe behaviour – yet it is far less common than speeding.

The RAC survey is, by its nature, a snapshot of motorists' views rather than road users in general, but this contradiction is not confined to drivers. Public opinion surveys conducted by the safety camera partnerships show both support for the use and purpose of cameras – and some scepticism of their role. Across the surveys, public support for cameras is very high. Average scores show that:

- 75% agree that "cameras are meant to encourage drivers to stick to the limits, not punish them";
- 71% agree that "the primary aim of cameras is to save lives";
- 82% agree that "the use of safety cameras should be supported as a method of reducing casualties"[54].

And yet at the same time, an average of 55% of those surveyed believed that "cameras are an easy way of making money out of motorists"[55]. Indeed, in one camera partnership, Avon and Somerset, the exact same proportion (67%) agreed with the statement about making money from motorists as agreed with the statement about encouraging drivers to stick to the limit.

Perhaps most telling of the public's 'double-think' in terms of attitudes towards some road law enforcement, is the persistence of the belief that the prosecution of most driving offences and the use of speed cameras are intended to raise revenue rather than improve

[48] Audit Commission (2007), Changing Lanes: evolving roles in road safety, Audit Commission, London p15
[49] RAC (2007), RAC Report on Motoring 2007: Driving Safely?, RAC, Norwich, p5
[50] Ibid, p17
[51] Ibid, p45
[52] Ibid, p19
[53] Ibid, p30-31
[54] PA Consulting Group (2005), The national safety camera programme: the four year evaluation report, DfT, London, charts 5.1 5.6 & 5.5
[55] Ibid, chart 5.3

road safety. Nearly three quarters of RAC focus group participants agreed with this, including around 45% who strongly agreed [56].

With such a complex set of public opinions, combined with a frequently antagonistic national media, it is easy to see why political leadership has not been as robust as it might. But this dilemma is not new to road safety: at the time that two of the most important safety interventions were introduced – roadside breathalysers in 1967 and mandatory seatbelt use in 1983 – public, political and media opinion was similarly mixed. While it is true that drink driving remains a problem, there has been a general shift in attitude across society so that drinking and driving is now widely regarded as socially unacceptable. This shift, as well as the very high compliance rates for seat belt wearing, indicates that leadership in making decisions based on sound evidence can shape initially hostile public opinion.

Political leadership is needed to give greater priority in funding and resources to the whole range of casualty reduction interventions. Nonetheless, it is evident from the preceding discussion and the consultation interviews that, in this era, the issue of greatest contention is speed management, despite its status as one of the key contributors to crashes:

> The next major challenge is to win hearts and minds of people about speed. We've done it for drink driving and seatbelts, but if we could crack public unacceptability of speed that would be a major contributor. [57]

It is thus beholden on not only political leaders, but business, community and local government leaders, to act assertively to implement speed management mechanisms across the three 'E's of road safety. With the benefit of past examples, we can see that such leadership can pay off, not only in terms of reductions in deaths and injuries, but also effecting cultural change towards more safety conscious road use.

Car culture

> The car is the last bastion of freedom. Germans don't think that because they have a car, and they have higher ownership rates, they must use it. The car is an Englishman's chariot. [58]

There is a deeper philosophical issue underpinning these seemingly contradictory opinions and the hesitancy by government to implement known casualty reduction solutions. In a car-oriented culture such as the UK, cars have a status and emotional resonance unlike most other pieces of machinery. At a cultural, if not individual level, car ownership and driving are imbued with the symbolism of independence, spontaneity, wealth and power and so are perceived as much more than merely a convenient means of transport. This has profound implications for road safety policy because it constructs driving as an activity that should rightfully be unimpeded by regulations or the needs of other road users. The late Barbara Castle, minister responsible for the introduction of breathalysers, described the resistance to her decision in an interview with BBC One, highlighting this tension:

> I was interfering, the opposition said, with people's civil rights. I said, I do not recognise anybody's civil right to kill somebody else because they're under the influence...The publication of the first figures of the lives we saved were fantastic. It gave a fantastic

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[56] RAC (2007), op cit, , p12
[57] Interviewee11, Project consultation interviews, June 2006
[58] Interviewee 6, Project consultation interviews, June 2006

From the introduction of the earliest speed limits to drink drive laws, seatbelts and speed cameras, it is this positioning of driving as an individual and independent activity that underlies opposition to safety-oriented interventions. A sophisticated awareness of the car's place in society and how that influences both driver behaviour and attitudes towards interventions will be an important element in successful casualty reduction strategies.

Scandal of tolerance

Similarly, the fact that road use is largely an independent, individual, unmonitored and everyday activity has created a culture in which a far higher level of death and injury is tolerated than in other forms of transport. Whereas on the railways, in air or maritime transport, the bulk of responsibility for safety lies with the operator, on the road, it lies with the user. This individualises the problem and allows deaths and injuries to be characterised as unavoidable, isolated 'only human' errors that are a consequence of road-based transport – as 'accidents' rather than an indication of system failure:

The railways are one extreme, "you are not responsible" and the road is the other, "only you are responsible". The legal system recognises this, blaming, in general, the driver rather than engineers or other professionals. We haven't shared drivers' risk, it is shared between road users rather than with road designers and policy makers." [60]

As many interviewees commented, the gap in expectations about responsibility for safety in the different transport modes is reflected in the public and political anger expressed about rail or aviation crashes compared to those occurring on the road. It is also reflected in the apparatus of the state that exists to regulate and investigate these industries: there is no road equivalent to the Rail Accident and Air Accidents Investigation Branch.

However, this issue is perhaps most clearly shown by the amounts spent to prevent a death. Although since 2003 [61] the same value of preventing a death has been applied to rail as to road (£1.4million[62]), there are differences in the priority given to funding schemes that meet cost-benefit criteria. The House of Lords Economics Committee commented in an inquiry examining the issue of risk that:

...the evidence also indicates that the actual levels of expenditure undertaken on road and rail safety differ substantially in the extent to which they actually reach the "ideal" levels implied by the planning procedures concerned. Thus...the rail industry is required to undertake all safety improvements for which benefits, appropriately defined, exceed costs, there is clear evidence that local and central government budget constraints impose a cut-off on road safety expenditure well before all safety projects for which benefits exceed costs have been undertaken. [63]

While the duty of care on the part of transport operators and the expenditure to uphold it is appropriate, there is no equivalent sense, as there is in the Swedish Vision Zero, of road use as a system within which responsibility for safety is vested in those who design and

[59] http://news.bbc.co.uk/hi/english/static/in_depth/programmes/2001/booze/history5.stm
[60] Interviewee 28, Project consultation interviews, June 2006
[61] Prior to 2003, the value of preventing a multiple death on the railways was about 3 times that of a single fatality on the roads. In this era, train protection and warning system was implemented at a cost of £585m, equating to an average cost per life saved of £15.4m. http://www.cfit.gov.uk/docs/2004/railsafety/railsafety/03.htm
[62] DfT (2007a), Highways Economics Note No. 1: 2005 Valuation of the Benefits of Prevention of Road Accidents and Casualties, DfT, London, p10
[63] HoL Select Committee on Economics Affairs (2006), Government Policy on the Management of Risk, TSO, London p29-30

regulate it as well as those who use it. Rather, there is a strong sense, as expressed by the consultation comment quoted above, that it is the individual at fault. At an attitudinal and cultural level, this privileges deaths in rail, aviation or maritime as 'worse' than road deaths and so undermines the priority that ought to be given to road safety interventions in line with the scale of death and injury. This is the scandal of tolerance for the continuing disproportionately high risk of death or injury while undertaking an everyday activity.

Co-ordinating the campaigners

With a concerned, but also sceptical public, to whom does it fall to generate the political leadership needed? There are many dedicated road safety campaigners within Parliament, but competing ministerial priorities and Whipped votes can make it a challenge to get both Parliamentary time and support. Non-government research and campaign organisations are, however, well placed to advocate safety-enhancing changes to policy and law and campaign to generate the public interest necessary to support them.

The UK has a wealth of organisations involved in promoting road safety locally, nationally and internationally and whose campaigns emphasise different aspects of safe road use. There is scope to better co-ordinate campaigns more closely to raise the profile of road safety and generate both public and political momentum towards a clearly identified end goal. In consultation interviews this issue was described by one consultee:

> There's also a question of NGOs [non-government organisations]. They are mostly small, seen as in competition amongst themselves and seen as single issue and not having great community respect. They need more high profile people to get gravitas, not a Minister because they are not supported, but a group of respected figures to proselytise about road safety. [64]

An interesting case study of how this could be done is the Big Ask campaign, coordinated by the Friends of the Earth[65]. As with road safety, many members of the public are concerned about climate change and, as with road safety, some of the interventions to tackle the causes remain highly contentious. The Big Ask's goal was to pressure the Government via a publicity and letter writing campaign asking for the introduction of a climate change Bill that would require it to cut the amount of carbon dioxide being released by 3% year on year.

A coalition, it drew together established and respected wildlife, humanitarian, energy, research and community organisations and was supported by other alliances, such as the Stop Climate Chaos group whose members were similarly diverse. With initial support from three Parliamentarians from the three major parties, the campaign was launched by the front man of a very popular band and was promoted through the Friends of the Earth website, via cinema ads encouraging viewers to write to Members of Parliament, as well as at festivals and public meetings. In terms of creating political will by generating public interest and activism, the Big Ask was very successful: thousands wrote to their MPs and the Climate Change Bill was included in the Queen's Speech opening the new session of Parliament in November 2006.

Within the field of road safety, the Make Roads Safe campaign [66] has used similar tactics to highlight the ongoing toll that road death and injury take on developing countries.

[64] Interviewee 26, Project consultation interviews, June 2006
[65] http://www.foe.co.uk/campaigns/climate/news/big_ask.html
[66] http://www.makeroadssafe.org/take_action/index.html

To this end, its focus is to put global road traffic injuries on the G8 and UN sustainability agendas. Like the Big Ask, it uses popular bands and well-known personalities relevant to the target country, has a website and online petition to the UN, as well as using viral marketing on social networking sites such as MySpace.

There are occasions when a Minister has a personal interest and necessary will to pursue a particular legislative or policy change. Where this does not exist, campaign work to generate public interest and support is crucial to establishing the conditions for political leadership. These two campaigns show that, with Make Roads Safe, co-ordinated high profile non-government work on road safety is possible and that, as with the Big Ask, having a specific goal and a domestic, electorate-oriented focus is a key element of effectiveness. To continue to achieve casualty reductions in the UK in future years, similarly focused, co-operative and co-ordinated campaigns by a range of non-government organisations will be needed to build support for implementing the necessary interventions.

Co-ordinating the machinery of government

As road use is a highly regulated activity, it is also important that government departments work to support casualty reduction policies and programmes. The title of this report "**Beyond 2010: a holistic approach to road safety**" is perhaps the best description of how road safety policy needs to develop in the years following the expiry of the current set of targets. It was a frequent criticism in the project consultation interviews that, while road safety policy has been effective in reducing casualties, it has been quite insular. Expanding on the core areas, road safety now needs to move out of its silo and actively establish partnerships with other public and non-government agencies for whom improved road safety is not the prime focus, but where improvements support the achievement of their own objectives. As this report argues, such an approach goes towards creating a wider range of organisations active in, and advocates of, improving road safety. The Government similarly made this point in its second three year review of **Tomorrow's Roads**:

> Road safety should not be viewed in isolation from other central and local government objectives. Policies to tackle climate change, social exclusion, obesity and urban renewal, to name a few, can all share our objectives to reduce casualties. We need to develop these connections further through working in partnership within and across organisations.

The current machinery of government does not lend itself well to cross-cutting activity. Building partnerships between the levels of government and communicating the intersections between road safety and other policy objectives is a specific task and a skill and requires dedicated attention. The road safety partnership grants aim to support collaborative projects, but there is scope for a high level body or agency to be responsible for progressing greater co-ordination to achieve casualty reductions. In the second three year review, the Government proposed the establishment of the Road Safety Delivery Board with a remit to do just this:

> Working in partnership is the only way that we can continue to achieve further success. We will therefore set up a new national Road Safety Delivery Board to bring together representatives of our key delivery partners. The Board's task will be to sort out problems and issues, assist in developing closer partnerships and ensure that good practice is widely disseminated. We also intend to help further those local partnerships that are struggling. [68]

[67] DfT (2007), Second Review of the Government's Road Safety Strategy, TSO, London, p10
[68] Ibid

This move is to be supported, but to maximise its effectiveness, the Board's terms of reference should give it a clear mandate to promote and pursue co-ordinated cross-government action on road safety, with a view to leveraging safety benefits from the wide range of government and industry activity. Although on a larger scale, the Neighbourhood Renewal Unit provides an interesting model:

> The Neighbourhood Renewal Unit (NRU) is responsible for overseeing the Government's comprehensive neighbourhood renewal strategy. A strategy that responds to local circumstances rather than directs everything from Whitehall. It aims to harness the hundreds of billions of pounds spent by key government departments rather than relying on one-off regeneration spending. A range of different programmes have been established to determine local needs and to pilot new ways to fight deprivation in our poorest, most deprived communities. [69]

Improving road safety has many similarities with neighbourhood renewal – indeed road safety can be an element in renewal projects. Like neighbourhood renewal, road safety is location and community specific and crosses the boundaries of departmental responsibilities. Encouraging the Delivery Board to play a role in harnessing the "billions of pounds spent by key government departments" in a way that promotes road safety would encourage not only a co-ordinated approach, but offer the potential to leverage greater funding than safety schemes alone have heretofore received.

With such a joined-up focus, it is important that members of the Board have demonstrated partnership-building skills alongside technical expertise. Expanding the membership of the Board to include those in public health, sustainable travel and attitudinal/ behavioural change will work towards ensuring road safety is considered in its widest context.

Another development in terms of public sector administration that holds potential for joined-up action on road safety is local area agreements (LAAs). LAAs are three year agreements that "set out the priorities for a local area agreed between Central Government, represented by the Government Office, and a local area, represented by the local authority and other key partners through Local Strategic Partnerships"[70]. LAAs are structured around four blocks: children and young people; safer and stronger communities; healthier communities and older people; and economic development and enterprise. They aim to encourage co-ordinated responses to community-specific, multi-faceted problems and allow greater flexibility in pooling funding to achieve this. As road safety interventions can contribute to the achievement of other outcomes, in addition to reducing the financial and social toll of deaths and injuries themselves, there is a great deal of scope to build it in to LAA priorities.

> **Recommendation: That members of the Delivery Board are drawn from a wide range of backgrounds, some of whom have championed and led partnerships.**

> **Recommendation: That indicators for safer roads within local areas are established via the Local Area Agreement process. This could include vehicle speeds, number of people/ children walking and cycling, opinion surveys.**

[69] http://www.neighbourhood.gov.uk/page.asp?id=3
[70] http://www.communities.gov.uk/index.asp?id=1163655

The Sustainability Agenda:
linking road safety, obesity and climate change

Tackling the health implications of the rapid rise in overweight and obesity and the consequences of climate change will be two of the Government's most challenging tasks in coming years. Improving road safety has a key role to play in these efforts, as establishing a road environment that is conducive to active travel has both health and environmental benefits. Within the traditional remit of road safety, speed management will be central to this, but provision of information and infrastructure is also important.

Sedentary lifestyles

The way we travel is making us a less healthy nation[71]

In modern busy lifestyles, and with a crowded school curriculum, finding time for organised sport or fitness programmes can be difficult. The Department for Health's recommendation is for 30 minutes of moderate intensity exercise on at least five days a week for adults and an hour a day for children and young people. The Chief Medical Officer reports that only about a third of men and a quarter of women do this amount of activity. 70% of boys and 60% of girls achieve the recommended amount, but 20% do less than 30 minutes activity per day[72]. Building activity into routine transport by encouraging a shift away from default car use to walking and cycling, as well as public transport (often involving walking to it), offers the potential to achieve the recommended activity levels and promote good health.

However, the National Travel Survey shows that in the ten years to 2005, across the population there was a decline of 16% in the number of walking trips and the same percentage fall in distance by bicycle[73]. In 1985-86, 67% of children aged 5-10 years walked to school[74]. By 1995-96, this had fallen to 53% and in 2005, had fallen again to 49% with a corresponding increase in those being taken by car from 38 to 43 per cent[75]. In addition, issues around inactivity apply more widely than just travel choice – there is significant anecdotal evidence that children today do not have the same freedom to play out as previous generations, contributing further to sedentary lifestyles[76].

Concern about traffic

While this shift is the product of a wide range of social changes, fear of traffic and the perceived risk of injury are important factors inhibiting more active lifestyles. As noted earlier, the Audit Commission found that around one fifth of people identified speed and

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[71] DETR (1998), A New Deal For Transport: Better for Everyone, TSO, London p22

[72] Chief Medical Officer (2004), At Least Five a Week: evidence on the impact of physical activity and its relationship to health, Department of Health, UK, p9

[73] DfT (2006), National Travel Survey 2005, DfT, London, p14. Note: due to the relatively small number of cyclists in the sample, figures on travel by bicycle are more volatile than figures for more common modes. Also, much of the fall occurred during the 1990s but it has since levelled off.

[74] Chief Medical Officer (2004), op cit, p16

[75] DfT (2006), National Travel Survey 2005, DfT, London, p29

[76] See: Gill, T (2007), Can I Play Out? Lessons from London Play's home zones project; Living Streets, "Children's play: why parks are not enough", September 2005 http://www.livingstreets.org.uk/news_and_info/feature_articles.php?id=475

the volume of traffic among the issues that most need tackling to improve their quality of life. This mirrors a survey on anti-social behaviour undertaken by the Home Office, which found that speeding traffic was rated the top crime and disorder concern[77].

These concerns are having a direct effect on modal choice: a qualitative study on young people and transport found that, although many were keen to cycle, they were: "put off cycling by what they perceived as poor facilities, fear of crime and fear for personal safety"[78]. The study also interviewed parents, who reported high levels of concern about the children's safety. This was a key factor in determining transport choice:

> Parents were worried about their children cycling, walking and taking the bus at night due to concerns about heavy traffic and personal safety. They therefore restricted their children's use of these modes and were happy to give them lifts in the car...Parents had particularly strong views about cycling and saw it as too dangerous due to dangers from other traffic. [79]

Looking at the casualty statistics, this fear appears to be well founded. Compared to the rate of KSI per billion kilometres travelled by car occupants, pedestrians are 16 times more likely and cyclists 22 times more likely to be killed or injured[80]. It should be noted, however, that walking and cycling groups have frequently commented that because the distances travelled by car versus on foot or on a bike are so different, a more helpful measure of relative risk would be to compare casualties per trip and per hour.

Recommendation: That the DfT undertake to provide KSI per hour and per trip.

The size of the problem

Britain, like many developed nations, is experiencing an epidemic of obesity and overweight that is a significant challenge to both public health services and acute care. Much has been written on this issue, but the facts remain alarming. The House of Commons Health Select Committee found that between 1980 and 2002 the number of adults diagnosed obese increased around three-fold, to 22%[81]. For children, the levels of overweight and obesity were similarly concerning. In 2002, 30% of young people aged 2-15 years were at least overweight, and 16% were obese[82]. If the rapid acceleration in childhood obesity continues at the current levels, by 2020 more than 50% of children will be obese[83]. The Health Select Committee report also commented that if these childhood obesity figures are projected into the future, it is estimated that around one third of adults will be obese by 2020.

Obesity and overweight are risk factors for a range of health issues and diseases including coronary heart disease, type 2 diabetes, sleep apnoea, hypertension, osteoarthritis, impaired fertility and some cancers. As such, their cost to the health service and the wider economy is substantial. The Health Select Committee commissioned research into costs for its inquiry, finding that direct and indirect costs were £3.3 to £3.7 billion[84]. Looking at the wider issue of physical inactivity, the Chief Medical Officer estimated the costs at £8 billion, with the specific cost of obesity due to inactivity an additional £2.5 billion[85]. The future rise in prevalence of type 2 diabetes and

[77] Wood, Martin (2004), Perceptions and experience of anti-social behaviour: findings from the 2003/04 British Crime Survey, Home Office Online Report 49/04, p6
[78] DfT (no date given), Young People and Transport: Understanding their needs and requirements, p12
[79] Ibid, p14
[80] DfT (2006), Road Casualties Great Britain 2005, TSO, London, table 52
[81] HoC Health Select Committee (2004), Obesity, Parliament of UK, London, p13
[82] Chief Medical Officer (2004), op cit, p18
[83] HoC Health Select Committee (2004), op cit, p14
[84] Ibid, p21
[85] Chief Medical Officer (2004), op cit, p19

sleep apnoea is concerning also from the perspective of fitness to drive – due to their potential impact on safe driving, both are included on the Driver and Vehicle Licensing Agency's Guide to the current medical standards of fitness to drive.

Increasing travel-related and on-street activity can have a positive impact on these trends. For example, research by University College London shows, "walking to and from school every day for a week uses more activity calories than two hours of PE and games lessons, the recommended standard... Not only does travelling to an activity by car use fewer calories than walking... the children who walk use more calories when they arrive"[86]. In addition, the ability to play out also has health implications:

> ...it can be seen that going to clubs and tuition tends to be by car whereas children tend to walk when they go out to play. This suggests that the shift from unstructured to structured activities for children is one of the causes of their decrease in walking and that letting children go out to play is one of the best things that parents can do for their children's health. Outdoor play uses as many calories as organised activities and is more likely to be associated with walking. [87]

The House of Commons Health Select Committee, in its report on obesity, commented that, "A generation is growing up in an obesogenic environment in which the forces behind sedentary behaviour are growing, not declining"[88]. Fear of traffic is a frequently cited reason for not walking and cycling more and a reluctance to take up these health-promoting and sustainable forms of transport is one element of the obesogenic environment. If they are to be encouraged, a road environment that 'lets people out of their cars' will be important.

Climate change: the world's biggest challenge

> Climate change is probably the greatest long-term challenge facing the human race. That is why I have made it a top priority for this government, at home and internationally. [89]

At the same time as these concerns about the nation's health, climate change is receiving a high profile in the press and Parliament. The publication of several reports about or related to climate change – the Stern report, the Eddington report, the Inter-governmental Panel on Climate Change review – have propelled the topic further towards the top of the political agenda. Outside the political and policy spheres, public awareness of the issue has grown to the point that there are regular radio, television and press features on 'eco-friendly lifestyles' and reducing household carbon footprints.

Responsible for around a quarter of all UK carbon emissions, transport is a significant source of climate changing emissions. Road transport accounts for 95% of this and must, therefore, play a prominent role in strategies to stabilise and reverse the levels of carbon in the atmosphere[90]. The UK is a signatory to the Kyoto Protocol as well as having set a domestic target to reduce emissions by 20% by 2010 and by 60% by 2050. The UK will probably miss the domestic target, which is not solely due to lack of action in the transport sector. However, transport is the only sector in which emissions have risen since 1990 and it has not made progress compared to other sectors, as the Environmental Audit Committee reports:

[86] Mackett, R & Paskins, J (2004), Reducing children's car use: the health and potential car dependency impacts, EPSRC, London, p3 http://www.cts.ucl.ac.uk/research/chcaruse/
[87] Ibid, p3
[88] HoC Health Select Committee (2004), op cit, p7
[89] Former Prime Minister Tony Blair MP, in DEFRA (2006), Climate Change: the UK Programme 2006, DEFRA, London, piii
[90] HoC Environment, Food and Rural Affairs Committee (2005), Climate Change: looking forward, TSO, London, p19

Certainly, transport is both a major source of emissions and the only sector of the economy from which CO2 has been rising consistently since 1990. Measured in terms of end user emissions, transport within the UK...was responsible for 43.1MtC in 2004 (or around 28% of total UK domestic carbon emissions), a rise in transport emissions of around 10% since 1990[91].

Government projections... are for this trend to continue up to 2015 before starting to decline very gently... with transport making up some 31% of total carbon emissions for 2020. These trends contrast strongly with other sectors of the economy: the "Agriculture, forestry and land management", "Public", "Business", and "Domestic" sectors all saw reductions in carbon emissions in 2004 from 1990 levels—by around 53%, 28%, 12% and 2% respectively.[92]

The rise in transport emissions is closely connected to the growth of the economy as people travel more and buy more goods, which are shipped and transported. In a growing economy, changes in the way people choose to travel will be important to ensuring transport makes its required contribution to reducing emissions. In line with the need to increase physical activity to prevent and tackle obesity and the health implications arising from it, successful strategies to reduce carbon emissions from transport will in part depend on creating an environment conducive to non carbon-dependent travel. Road safety has an important role to play in this.

Speed management

Speed management has been a key element of the UK's approach to road safety. Continuing and expanding on this is necessary to ensure that the desired shift towards non-motorised travel can be made safely and limit the risk of death or injury. One of the most important mechanisms available to achieve such a shift is the greater use of 20mph zones.

The Government recently endorsed their wider use in the new guidelines, **Manual for Streets** (MfS), recommending, "designing to keep vehicle speeds at or below 20 mph on residential streets unless there are overriding reasons for accepting higher speeds"[93]. These guidelines will apply mostly to new developments but many cities across the UK have already implemented 20mph zones[94]. While the number of 20mph zones is increasing in the UK, they remain the exception, rather than the rule. This compares to parts of mainland Europe, where 80% of the network in Munich, 85% in Stuttgart and 76% in Graz are low speed zones[95].

The reduction in limit has a positive effect on casualty levels. A TRL study found that, in a review of 250 schemes across England, Wales and Scotland:
- average speeds fell by 9 mph
- accidents fell by 60% (a year)
- child accidents fell by 67%
- cyclist accidents fell by 29%
- traffic flow was reduced by 27%
- flows on the surrounding boundary roads increased by 12%. [96]

[91] Ibid, p16
[92] Ibid, p16
[93] DfT (2007), Manual for Streets, TSO, London, p13
[94] See: http://www.portsmouth.gov.uk/living/8403.html;
    Kingston Upon Hull City Council, memorandum to the Select Committee on Transport, Local Government and the Regions, http://www.publications.parliament.uk/pa/cm200102/cmselect/cmtlgr/557/557ap80.htm
[95] TRL, in Centre for Integrated Transport (2005), Study of European best practice in the delivery of integrated transport: stage 3 transferability, CfIT, 2005 http://www.cfit.gov.uk/docs/2001/ebp/ebp/stage3/03.htm
[96] Ibid

In this context, the casualty statistics highlight that efforts to limit speeds need to focus on urban residential and shopping streets: according to Road Casualties Great Britain 2005, 92% of all pedestrian casualties; 96% of child pedestrian casualties and 85% of all cyclist casualties are killed or injured on built-up roads (with limits under 40 mph)[97]. These are often characterised by their multiplicity of uses and consequent competition for road space – they pass through mixed areas of shops and houses where extra care is needed because there is considerable interaction between vehicles, pedestrians and cyclists.

Recommendation: That a default speed limit of 20mph in all built up areas is implemented in ways that achieve high levels of compliance.

A more sophisticated approach to speed limits could also bring benefits. For those roads, such as local high streets, where a blanket reduction may not be appropriate, a 20mph limit that can be increased to 30mph at times of lower vulnerable road user activity could be used. This would ensure lower speeds at times of peak pedestrian and cyclist activity and be part of the solution to reducing the over-representation of casualties in these areas. While there are some issues in terms of ensuring such a scheme is clearly comprehensible, the precedent of variable limits outside schools does provide an example of this concept in operation.

Time over distance cameras

One significant impediment to lowering speed limits and expanding the 20mph network is that, at present, standard cameras are not type approved to enforce limits below 30 mph. Traffic humps and chicanes are therefore used and, unfortunately, traffic calming of this type, while effective, can be unpopular, can increase some emissions locally, is expensive to install and can cause inconvenience to service and emergency vehicles:

The British Social Attitudes Survey suggested that around three quarters of people support 20mph speed restrictions in residential areas, including 72 per cent of drivers questioned. However, only 43 per cent of drivers favour speed bumps, which can be necessary to enforce this popular, low speed limit. [98]

Time over distance cameras offer an effective alternative enforcement tool: the former Minister for Road Safety reported in Parliament that:

[Time over distance cameras] were equally as effective in reducing collisions and casualties as other fixed and red-light cameras. They also concluded that time-over-distance cameras have been particularly effective at reducing excessive speeds, which are defined as 15mph over the speed limit. [99]

Many local authorities and TfL in particular, are keen to explore the possibilities of using time over distance cameras. Transport for London has been operating a trial site and initial results show zero casualties since its introduction[100]. However, to ensure the equipment is suitable and reliable enough to be used in prosecutions, it must be "type approved" by the Home Office. This is an important, though lengthy, process. Time over distance cameras are awaiting type approval for enforcement of speed limits lower than 30mph. In its response to the Transport Select Committee's recent report, **Roads policing and technology**, the Government did not indicate a date by which that might be completed. Early type approval of time over distance cameras is a necessary precursor to wider roll out of 20mph zones.

[97] DfT (2006), Road Casualties Great Britain 2005, TSO, London, table 24
[98] Audit Commission (2007), Changing Lanes: evolving roles in road safety, Audit Commission, London, p15
[99] Former Minister for Road Safety Stephen Ladyman MP, Hansard, 18 April 2007, UK
[100] TfL, Evidence to the HoC Transport Committee (2006), Roads Policing and Technology: getting the balance right, London, Ev94

Street design as traffic calming

However, enforcement of this type can never be active in all areas at all times. An important element in effective speed management, then, is to use the road environment itself as a speed limiter. An environment that, through its layout and design, sends a signal to drivers about the appropriate and expected speed is more likely to be self-enforcing or 'naturally' adhered to.

Highways design standards were developed to guide safe road and street development. Unfortunately, some features of highways design that were intended to improve safety can actually lead to less safe behaviour, particularly where there is a range of users on mixed use streets[101]. The recently published Manual for Streets guidance seeks to tackle these anomalies and establish "residential and lightly trafficked streets" as low speed places where pedestrians and cyclists are prioritised over vehicles. Building on earlier research by TRL[102], the MfS recommends using engineering and design features to "create streets that control vehicle speeds naturally rather than having to rely on unsympathetic traffic-calming measures"[103]. The Manual gives detailed advice on the features of psychological traffic calming and their implementation.

This approach can be more difficult in a mixed use environment, where there is competition for road space, but it can also have casualty reduction benefits in this context. In a presentation to the PACTS conference **Planning Safer Streets**, the lead engineer of the award-winning Newland Avenue project in Hull commented that, in the year since this high street's revamp, there had been a 24% drop in road casualties, a 100% drop in pedestrian casualties and a 21% reduction in cycle casualties. These reductions come in a context of a 17% increase in pedestrian footfall, including a 35% increase in the number of children, as well as a 48% increase in cycle flows. While it is too soon to draw concrete conclusions and the statistics are subject to variations in small numbers of KSIs, this is encouraging progress. A similarly positive outcome was achieved through innovative highways design on Kensington High Street. Although not conceived as a safety project, the innovative programme of de-cluttering the street of excess signage, guard railing and street furniture has seen a significant drop in casualties since its implementation.

The past decade has seen a range of projects undertaken to improve safety on complex, high demand streets. These include the DfT-sponsored Safer City project in Gloucester and the Urban Mixed Priority Routes (UMPR) scheme – of which Newland Avenue is one example. There have been calls for a version of MfS for high streets and detailed design guidance would no doubt be beneficial in supporting local authorities and highways engineers to tackle the issue of improving safety on mixed use roads. However, perhaps of more importance is sharing the lessons of Safer City and UMPR projects and, crucially, building in incentives for local authorities to undertake these kinds of schemes.

Recommendation: That, in the next round of LTPs, advice should be given to local authorities to look at extending application of Manual for Streets.

Recommendation: That, in advance of the development of mixed use street design guidance, the DfT should commission a series of events to disseminate best practice findings from the urban mixed priority routes project.

[101] For example, wide roads are required to achieve stopping sight distances that allow drivers to see an approaching road user early. Unfortunately, these tend to encourage higher speeds from drivers. Conversely, narrower streets with reduced sight lines encourage slower speeds.
[102] Kennedy, J et al (2005), 'Psychological' traffic calming, TRL, Crowthorne
[103] DfT (2007), Manual for Streets, TSO, London, p87

Building critical mass

A further important element in improving safety for active travellers is increasing their numbers. The 'safety in numbers' theory holds that, as the number of walkers and cyclists increases, the risk of collision and injury does not increase in direct proportion – effectively lowering their risk. Research compared Californian, Danish and Europe-wide data and found that:

A motorist is less likely to collide with a person walking and bicycling when there are more people walking or bicycling...at the population level, the number of motorists colliding with people walking or bicycling will increase at roughly 0.4 power of the number of people walking or bicycling. For example, a community doubling its walking can expect a 32% increase in injuries. [104]

In response to increased street activity, the presence of pedestrians and cyclists would also seem to promote slower speeds amongst drivers. The researcher reports on three earlier studies showing that, "motorists in the United States and abroad drive more slowly when they see many pedestrians in the street and faster when they see few"[105].

To achieve the benefits of critical mass referred to by Jacobsen, providing inviting and safe spaces to walk through and routes to cycle along are key factors. The discussion above outlined how street design can act as 'natural' traffic calming. Hand in hand with reducing traffic speeds, urban design can also affect the attractiveness of walking and cycling:

...the poor quality of our streetscapes has important effects on communities, travel patterns and lifestyles. As streets become less attractive, people are less inclined to spend time in them for social activities. Walking and bicycling become less attractive, public perceptions of safety decline, and activities such as play transfer from the public realm to private space. [106]

The Manual for Streets aims to encourage a high quality public realm that prioritises non-motorised road users and it comments on the positive impact of this:

The propensity to walk is influenced not only by distance, but also by the quality of the walking experience. A 20-minute walk alongside a busy highway can seem endless, yet in a rich and stimulating street, such as a town centre, it can pass without noticing. [107]

The development of the National Cycle Network (NCN) by Sustrans has been remarkably successful at attracting people out walking or cycling. In 2005, more than 230 million trips were made on the network of no-traffic or low-traffic shared use paths, quiet roads and busier roads with cyclist facilities linking destinations within towns and cities across the country. Looking at the usage patterns of the NCN, while the majority of the network is rural (75%), usage is predominantly urban and off road (for example, along tow paths and through parks)[108]. This is to be supported for its health and environmental benefits, but from a casualty reduction perspective, the key issues are the trips to reach the network and crucially, those trips not made on the NCN. Similarly, horse riders have expressed concern about the link trips to and from dedicated bridle paths.

[104] Jacobsen, P, "Safety in numbers: more walkers and bicyclists, safer walking and bicycling", Injury Prevention, 2003; 9; p208
[105] Ibid, p208
[106] Hamilton-Baillie, B (2006), Building for Health: position statement on streets and the public realm, Hamilton-Baillie Associates, p1 http://www.hamilton-baillie.co.uk/articles.htm
[107] DfT (2007), Manual for Streets, TSO, London, p63
[108] Sustrans (2005), The National Cycle Network Route User Monitoring Report, Sustrans, Bristol, p6

Central to creating active-travel-friendly environments are generous and sustained levels of funding. As mentioned elsewhere, cycling has doubled in London as spending has steadily risen; it was reported as £20m a year in 2005 and was due to rise to £26m in 2006[109]. However, evaluation of the National Cycling Strategy comments that, "the average LTP capital spend on cycling in England is about £1 per head per year, although figures vary from 6p to £7. Evidence from European cities that have successfully increased cycling shows that they have typically spent around £5 per head per year for an intensive period of 10-15 years in order to make cycling the easy, convenient, safe and attractive choice"[110]. The six cycling demonstration towns are a step in that direction, having been given funding of about £5 per head population, which is matched by the local authority to a total of around £10 per person[111]. Although cyclists are a priority group in the Local Transport Plan process, the need for more and sustained investment suggests that a dedicated sum for cycling should be included in the future LTP rounds to encourage this mode of travel.

It can be difficult to successfully prioritise cycling schemes because, according to the National Travel Survey, so little of it goes on. However, it is of concern that an accurate picture of cycling levels is not being captured because the NTS does not include trips made on the national cycle network – it is deemed 'off-road'. While Sustrans reports the 75% of the population lives within two miles of the NCN and 50% within only one mile and most usage occurs, as noted above, on non-trafficked sections, there will still be significant interaction with the everyday road environment and it would therefore be wise to include a less narrow range of cycling locations in the NTS.

Recommendation: That trips made on the national cycling network are included in the national travel survey.

Land use planning can also make a significant contribution to encouraging the levels of active travel that go towards improving its safety. Two miles is the generally recommended limit over which active travel becomes a less viable option, although for cyclists up to five miles can be an acceptable distance. Many towns and suburbs are well served with local shopping streets, schools and other facilities within these distances. However, at a time when government is encouraging active travel, there are contradictory indications of moves in the opposite direction. An illustration of this tension is the announcement in the recent planning White Paper to review the current 'needs test' for out of town shopping centres.

At present, local planning authorities can require a developer to show what effect a new shopping development will have on businesses already operating in the area. The Barker Review of Land Use proposed "removing the requirement to demonstrate need (the 'needs test') as part of the planning application process"[112]. The needs test has underpinned the prioritisation of town centre development in recent years and the Royal Town Planning Institute has expressed concerns over the proposal:

The RTPI believes that...the removal of the test would be likely to compound concerns about monopolistic tendencies and harm the economic, social and environmental health of sustainable and dynamic town centres, whilst also exacerbating unsustainable travel patterns. [113]

[109] http://www.london.gov.uk/view_press_release.jsp?releaseid=5944
[110] DfT (2004), Delivery of the national cycling strategy: a review, http://www.dft.gov.uk/pgr/sustainable/cycling/deliveryofthenationalcycling5738?page=6#a1019
[111] Cycle England, correspondence with the author, 1.8.2007
[112] RTPI, 2007 Planning White Paper http://www.rtpi.org.uk/item/606#TheWhitePaperSaysTowncentresandtheneedtest
[113] RTPI, "Planning White Paper Background" http://www.rtpi.org.uk/item/815/23/5/3#Removal%20of%20the%20Needs%20Test

It is beyond the scope of this report to give a detailed examination of land use planning policy. However, as increased walking and cycling levels have been shown to improve the safety of pedestrians and cyclists, it is important that strategic land use decisions support non-motorised transport.

> **Recommendation: That all new residential developments are subject to a 'pint of milk test' (can a resident reach a shop for a pint of milk in under ten minutes without using a vehicle).**

Infrastructure and information

An attractive, traffic calmed road network supported by extensive on and off-road dedicated walking and cycling routes is central to increasing pedestrian and cyclist numbers and their safety. However, there is a whole range of additional options that could be implemented to make riding easier, more convenient and more of an 'everyday' activity.

Secure storage for bicycles is a significant issue, particularly for potential cyclists in the inner cities, where many residents may lack the space to store a bike. Following the precedent of the car clubs, local authorities working with cycling groups, could subsidise the rental and conversion of spare car parking space (both privately and publicly owned) to secure cycle parking. Once at the destination, it is also important that sufficient bike racks are available; establishing minimum provision levels as a percentage of footfall in areas like shopping precincts or as part of development applications could ensure this is implemented. An additional option that would integrate bikes into the public transport system is that used in Lyon and Paris: the **Velo'v**. Introduced in 2005, the scheme provides 1500 bikes to 15,000 registered users on an inexpensive, timed basis with racks across the city [114].

Provision of information was also emphasised by the pilot sustainable travel towns to achieve impressive levels of modal shift: across Darlington, Peterborough and Worcester, walking increased by 17% to 29% and cycling increased by 25% to 79%. At the same time, car trips decreased by 11% to 13%. All three towns used different forms of individualised travel marketing, including home visits, to help highlight the transport options available to residents[115].

> **Recommendation: That a programme is developed to disseminate the findings of the cycling demonstration and sustainable travel towns.**

> **Recommendation: That cycle-share schemes are supported in the same manner as car-share schemes.**

[114] See: http://www.guardian.co.uk/travel/2007/may/19/saturday.green1
http://lifeandhealth.guardian.co.uk/guides/freestuff/story/0,,1976291,00.html
[115] Gillian Merron MP, 23 May 2007
http://www.gnn.gov.uk/environment/fullDetail.asp?ReleaseID=286415&NewsAreaID=2&NavigatedFromDepartment=False

The Deprivation Effect

It is unfortunately the case that, although tackling poverty has been a focus for the current Government, deprivation levels in Britain are still high[116]. This is of concern from a road safety perspective because deprivation has been found to be a risk factor for casualty involvement, particularly for child pedestrians. Over the past decade the connection between deprivation and casualties has been examined and received significant attention – indeed, as outlined in the opening chapter, an additional target for a faster rate of improvement in deprived areas was included in the Tomorrow's Roads strategy. This was achieved in 2005, with casualties in neighbourhood renewal areas falling 4% more than the rest of England[117]. Despite this welcome achievement, casualties in deprived areas remain disproportionately high and require ongoing attention.

A range of studies dating back to the Black report on health inequalities in 1980 has observed the social class gradient in child pedestrian deaths. This issue was re-examined in the 1990s finding that, although the total level of child pedestrian deaths in England and Wales had dropped between 1979 and 1992, children in the lowest socio-economic group remained five times more likely to be killed as pedestrians as those from households in the highest socio-economic group[118]. In considering why children in these socio-economic groups have a higher casualty rate, Christie found it to be a multi-faceted problem:

> The demographic, social and economic factors which are important in explaining child accident involvement are the age, sex and physical capability (namely, hearing level) of the child, their parents' or adult carers' marital status, ethnic origin, risk and responsibility scores and also the number of children a parent or adult carer has to care for. Exposure in terms of street play, level of adult accompaniment on a school journey and extent of extra-mural activity were also important. The significance of the environment came through as a factor predicting accident group membership, especially where there was a low level of on-street parking... also the age of housing is important with the pre-war (1914) housing development featuring strongly as a high risk environment.[119]

As the problem is multi-faceted, from Christie's analysis it can be seen that solutions must comprehensively range across traffic calming and street design, long term road safety education that includes parental involvement and co-ordinated action across departmental boundaries so that policies mutually reinforce each other.

Neighbourhood Road Safety Initiative

A recent example of how this can be done is the Neighbourhood Road Safety Initiative. Established to find "fresh and innovative ways to reduce road casualties, particularly those involving children"[120], it was part of the Government's 'dealing with disadvantage' programme. It aimed to 'facilitate a joined-up approach and to ensure that road safety is tackled in a multi-disciplinary fashion' and embed road safety in the local authority

[118] Roberts and Power, in Grayling, T et al (2002), Streets Ahead: safe and liveable streets for children, IPPR, London, p10
[119] Christie, N (1995), The high risk child pedestrian: socio-economic and environmental factors in their accidents, TRL, Crowthorne, p2
[120] http://www.nrsi.org.uk/index.php?SectionID=1&SubSectionID=1

planning processes, such as Local Strategic Partnerships. A central team, overseen by a project board and steering group, worked to co-ordinate and involve stakeholders in the 15 authorities. In particular, the central team encouraged multi-agency working groups that included service providers from a wide range of agencies such as Sure Start, neighbourhood renewal officers, local youth services, the Fire Service as well as mosques, residents' associations and women's groups. This approach "has been most fruitful where we have been able to show that other organisations share the objectives of NRSI and of road safety professionals"[121].

The NRSI team developed educational resources and also ran regional publicity campaigns to raise awareness of the project as well as road safety issues. Many of the campaigns were light-hearted and humorous to appeal to younger people. The five campaigns focused on: slowing younger drivers in residential areas, visibility for pedestrians, driver inattention, crossing with the 'green man', and mobile phones. Projects supported by the NRSI included residential camps for future peer educators on a range of issues including safety; conferences for both professionals and young people; a DVD and training package for parents and children; and a 'road show' for young people.

Evaluation of the NRSI pilot is underway but has not yet been published. Nonetheless, it is clear that cross-agency working and the involvement of agencies not traditionally participating in road safety has been achieved. This joined-up approach is the most important aspect of tackling the multi-faceted problem of casualties in deprived areas. In guidance to local highway authorities on reducing casualties in deprived areas, the DfT highlights this:

> ...authorities should not focus on traffic calming solutions in isolation. Targeted intervention will seek to break road accident causal chains at any number of points, so a variety of solutions including a mix of engineering, education, enforcement and health promotion activities will be appropriate.[122]

Mainstreaming a co-ordinated approach

The question, then, is how to maintain the momentum towards better co-ordination with the full range of relevant partners now that the NRSI has disbanded. Road safety is certainly not the only profession to observe the need for a joined-up approach but it remains something which has not been systematically achieved in most fields of social policy. The road safety division in DfT recently let a contract to, "develop and deliver a programme of research dissemination and action learning to share findings from road safety research with road safety practitioners and other stakeholders at selected locations throughout England, produce practitioner-focused evidence reviews and contribute to the development of evidence based road safety policy and practice"[123]. This will support improved communication of best practice, including the lessons learned from the NRSI once the evaluation is published.

In the preceding section on co-ordinating the machinery of government, it was commented that a high level group was needed to progress cross-departmental work and that the Road Safety Delivery Board would be an excellent vehicle to perform this function.

[121] NRSI, Neighbourhood Road Safety Initiative: interim report to project board, June 2006, p7
http://www.nrsi.org.uk/index.php?SectionID=1&SubSectionID=1
[122] DfT (2003), Tackling the road safety implications of deprivation
http://www.dft.gov.uk/pgr/roadsafety/laguidance/tacklingtheroadsafetyimplica4680
[123] http://www.dft.gov.uk/pgr/roadsafety/research/pgerdsaferesdis

In line with the role described for it in the second three year review of Tomorrow's Roads, the RSDB should prioritise assisting the development of closer partnerships and ensuring that good practice is widely disseminated in deprived areas. Similarly, local area agreements were also mentioned in the previous section as a way of tackling complex issues with mutually reinforcing impacts and solutions. The Government Offices are central government's representatives in the LAA process and the DfT should issue guidance to them to highlight the need for road safety's inclusion. Equally, non-government groups could prioritise campaigns in deprived areas to ensure a prominent presence in the public consultation processes that are an integral part of establishing LAAs.

Finally, one thing the NRSI has shown is that, where funding is available, there is no shortage of relevant projects. A continuing focus on providing grants or funding in deprived local authorities and wards which, "impose as few restrictions as possible on how this money could be spent" will be important not only to provide the necessary resources, but allow flexible, community-specific responses.

Recommendation: That the Road Safety Delivery Board prioritise the dissemination of the evaluation of the NRSI.

An Ageing Population

It is not a new observation that the UK's population is ageing. This phenomenon and the implications of an increased proportion of older people have been widely debated, in particular in relation to the effect on revenues and health, social care and pensions spending. An ageing population will also affect the nature of road use and the casualty profile, factors which must be taken into account when considering casualty reduction strategies for the longer term. [124]
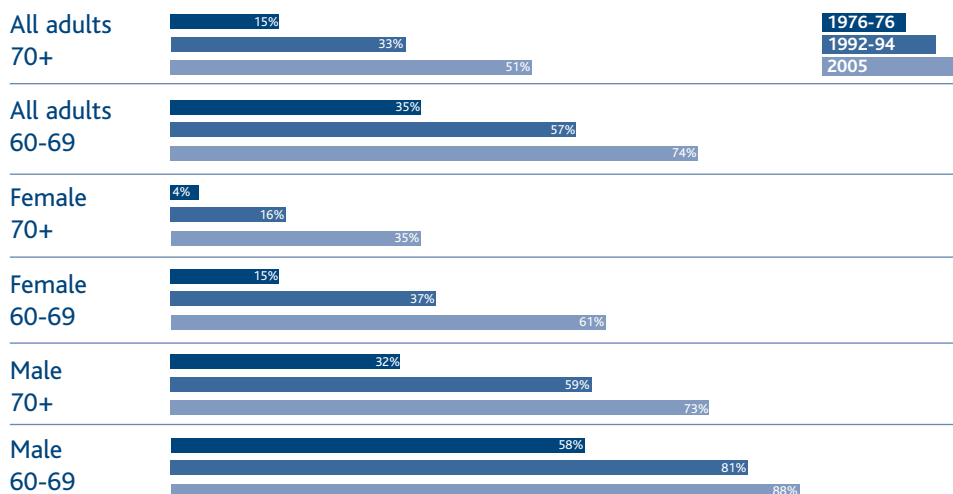
The nature of the shift

The Depression of the 1930s and the death and disruption of the Second World War were followed by a boom in the number of people born in the years shortly after peace was established. Although the characteristics and cultural influence of this generation has been much discussed in the media, the UK actually experienced two baby-booms. The original was quite short lived, but a second, more sustained, increase happened during the 1960s .

The ageing population is a product not only of these spikes in the birth rate, but simultaneous improvements in medical care and a decline in the fertility rate. Due to the combination of these factors, the 2001 census found for the first time that people 60 and over form a larger part of the population than children under 16 – 21% compared to 20%[125]. The older age groups are set to grow and by 2031, the estimated number of people aged 50+ will be 27.2 million, a 36% increase on 2003 figures[126].

With the first generation of baby boomers currently entering their sixties and the second group due to approach that age range from the early 2020s, it is timely to consider the impact of larger numbers of older drivers in the medium to long term. It is clear that there will be larger numbers: the 2005 National Travel Survey (NTS) shows a clear trend in older licence holders:

Licence holding by gender and age (%) [127]

	1976-76	1992-94	2005
All adults 70+	15%	33%	51%
All adults 60-69	35%	57%	74%
Female 70+	4%	16%	35%
Female 60-69	15%	37%	61%
Male 70+	32%	59%	73%
Male 60-69	58%	81%	88%

[124] Office of National Statistics (2006), "Fertility: continued rise in 2005", http://www.statistics.gov.uk/cci/nugget.asp?ID=951
[125] Office of National Statistics (2002)"Census snapshot of the UK's population", http://www.statistics.gov.uk/cci/nugget.asp?id=185
[126] Office of National Statistics (2005), Focus on Older People 2005, HMSO, London, p2
[127] DfT (2006), Transport Statistics Bulletin: National Travel Survey 2005, DfT, London, table 2.3

One of the most significant trends is the large increase in the number of older women holding a driving licence. A consequence of women's large-scale entry into the paid workforce in the past two generations and the more car-oriented lifestyles that have become prevalent over the same period, as well as societal change that has increased women's financial and social independence, commentary in the NTS report observes that:

> The proportion of women aged 60-69 holding a licence increased by a third between 1995/97 and 2005, from 45 to 61 per cent. Over the same period, the proportion of women aged 70 or over holding licences increased from one in five, to more than one in three. Licence holding will continue to increase in these age groups, as women currently in the younger age groups keep their licence as they grow older.[128]

Licence holding indicates only the potential to drive, not the frequency or distance that is driven – that is, the level to which a person is exposed to risk and potential injury on the road as a car occupant. Comparisons over time of trips per person by mode recorded in the NTS show that between 1999/2001 and 2005 there was a marked increase in distance travelled: people 60-69 travelled 7,117 miles, an increase of 12%; and for the 70+ group, there was an increase of 15%[129].

Looking at the mileage **driven** by older people over the longer term, some very large increases become clear.

Average distance travelled per person per year as a car driver (GB)[130] (in miles)

	1995/97	1998/00	2002	2003	2004	2005	95-05 %change
60-69	3106	3327	3767	3669	3922	4068	31
70+	1103	1326	1562	1446	1513	1828	65

The nature of the risk

The implications of these travel patterns for road safety in an ageing population are profound. Although there is little evidence of an increase in the incidence of road traffic accidents, older people are more fragile than their younger counterparts – they injure more easily, their injuries are more severe and heal less quickly. Compared with drivers aged 20-50 years, older people's fragility increases their risk of fatal injury by 1.75 times for drivers aged 60+, by 2.6 times at 70 and by over 5 times for drivers aged 80 and above[131]. People aged 60+ are:

- 10% of all casualties, but 21% of deaths
- 13% of pedestrian casualties and 40% of pedestrian deaths
- 10% of all driver casualties and 20% of driver deaths[132].

While it should be stressed that many older people remain in excellent mental and physical health, it is the case that as we grow older, our vision, hearing, reaction time and physical mobility begin to deteriorate which can affect our abilities as road users. There is a strong correlation between disability and age: two thirds of disabled people are elderly and

[128] DfT (2006), Transport Statistics Bulletin: National Travel Survey 2005, DfT, London, p10
[129] Ibid, table 3.6
[130] DfT, additional statistics derived from the National Travel Survey provided to the author 12.03.2007
[131] Evans, L, in Welsh, R et al (2006) "Crash characteristics and injury outcomes for older passenger car occupants" Transportation Research Part F9, p323
[132] DfT (2006), Road Casualties Great Britain: 2005, TSO, London, table 30a

over half the population aged over 75 have a disability[133]. The DfT summarises problems that can be encountered by some older drivers:

> Amongst the most common problems experienced by older drivers is a loss of motor function, for example caused by joint stiffness, particularly in the neck, and slowness of movement which can cause difficulties with observations at junctions and during parking manoeuvres, and safe operation of the car controls. Reduced visual functions are also common as part of the ageing process. These may include reduced acuity, difficulty adapting to darkness, or recovering from glare. In addition, any reduced visual field from disease processes means that the quality of information gained from the environment may be inadequate, increasing the probability of errors and misjudgements. Age-related decline in cognitive functions such as attention, anticipation, executive functioning and information processing means that older drivers tend to have difficulty in dealing with complex traffic situations and reduced capacity to respond quickly and flexibly to changing traffic situations. [134]

It has been widely commented that many older people 'compensate' by restricting their driving in line with diminished capabilities, which can include avoiding roundabouts, junctions, night-driving, motorways and unfamiliar or congested roads such as town centres[135]. However, considering the trends in travel outlined above, it is not unreasonable to conclude that this may be less evident in future. It must also be remembered that being in a car is not the only way in which to be exposed to risk on the road and around a fifth to a quarter of all trips, across all age groups are on foot[136].

If efforts to reduce road casualties are to be successful, interventions that respond to older people's needs by reducing the severity of injury in the case of a collision and increasing their capacity to travel safely will become necessary.

> **Recommendation: That the next road safety strategy includes a comprehensive sub-strategy dedicated to reducing the rate of KSI experienced by older (60+) people per km travelled.**

Vehicle design

Chief amongst interventions that can assist older road users is improved seatbelt design and operation. Active safety technologies, discussed in the technology section of this report, could also hold potential benefits for older drivers in particular. However, many of these technologies are as yet unavailable to the motoring public at affordable prices. Even when they become more widely available, passive safety features, then, will continue to play a significant role in improving crash survivability and reducing the severity of injuries.

Because older people are more frail, they are more susceptible to injury due to forces exerted onto the body by the seatbelt in a crash. This is especially an issue for older women, amongst whom osteoporosis is relatively common. This can be seen in an in-depth examination of injury statistics derived from the Co-operative Crash Injury Study by Welsh et al:

> The results show that for frontal impacts, there were no statistical differences in head injury rates across driver age groups...However, when chest injuries were considered, major differences in injury rates were observed and the older driver age-group sustained a higher proportion of injuries to the chest region at the [maximum abbreviated injury scale] MAIS 3+ level when compared to the other age groups. [137]

133 Frye, A (February 2006), "Balancing Priorities', PACTS Conference - Driving With A Medical Condition, http://www.pacts.org.uk/conferences.htm
134 DfT (2005) Memorandum to Scientific Aspects of Ageing: Evidence, House of Lords, London, p55
135 See, for example, DfT (2005) Memorandum to Scientific Aspects of Ageing: Evidence, House of Lords, London, p56
136 DfT (2006), Transport Statistics Bulletin: National Travel Survey 2005, DfT, London, table 3.6

Improvements in seatbelt design and operation are the prime method by which chest injuries can be mitigated. More 'intelligent' seatbelts are a key element of advanced or SMART restraint systems, which also include airbags:

> Traditional safety belts and air bags are set up to provide protection for a limited range of occupants and conditions, by deploying or restraining in a fixed manner. Smart restraint systems consider variables such as occupant weight, seating position, safety-belt usage and vehicle deceleration to control belt forces and deploy the air bag optimally. [138]

Some advanced restraint systems are already available[139], but at present are installed in cars towards the top of the price range and so are inaccessible to many drivers. History shows that expensive new technologies eventually trickle through the vehicle fleet to the more modestly priced models. It does take time and before that happens, less expensive alternatives could be installing four point – rather than three point – seatbelts and increasing the width of the standard seatbelt. Ford has undertaken customer research towards installing four point belts in their vehicles. It was reported that in trials, people of different sizes, "perceive four-point belts to be safer, as well as more comfortable and, depending on their design, easier to use than traditional three-point belts"[140]. Tests on a dummy have shown that the advantage for older vehicle occupants is that, "compared with a standard three point belt system with a load limiter, the double diagonal belt system, (also with load limiters), loaded the chest of the dummy in a more even way and the maximum chest deflection was significantly reduced"[141].

Alternatively, wider belts could be used. In a study using a standard 50mm and a 100mm wide belt, the 50mm belt showed "a deeper and narrower deformation on the right hand side of the rib cage compared to that produced by the 100 mm wide webbing"[142]. One difficulty with installing wider seatbelts is that the retractor is currently mounted on the door frame pillar and wider belts would require a wider retractor and a wider pillar, which could have negative implications for visibility.

More sensitive, 'intelligent' deployment and changes in design can, in particular, address the issue of older people sustaining fatal injuries as a consequence of the interaction of traditional seatbelts and frailty. The design and operation of seatbelts, then, will continue to play a major role in reducing deaths of older car occupants.

Medical licensing, advice and information

> An elderly driver whose car crashed into a Sydney pre-school, critically injuring two toddlers, has told a court he would not have driven if he thought he was unfit. Two-year-olds Sophie Delezio and Molly Wood were trapped by the car and spent months in hospital recovering from critical burns...[He] had suffered an epileptic seizure while driving home from Pittwater RSL club. Dr Joffe believed this was the first seizure the 69-year-old had suffered...[143]

[138] Ciglaric, I (2005), State of the Art Report on Technology and Patent Search Data, PRISM, p7
[139] See for example: http://www.autoliv.com/alv/connect/Home/What+We+Do/Seatbelts/Smart+Belt ; http://media.ford.com/products/presskit_display.cfm?vehicle_id=1330&press_subsection_id=424&make_id=92
[140] http://media.ford.com/newsroom/release_display.cfm?release=24145
[141] Haland, Y, "The Evolution of the Three Point Seat Belt: from yesterday to tomorrow", Autoliv Research Vehicle Safety, Chalmers University of Technology, p10
[142] Håland. Y, "The Evolution of the three point seat belt: from yesterday to tomorrow", Autoliv Research Vehicle Safety, Chalmers University of Technology, p10
[143] http://www.smh.com.au/news/National/Preschool-crash-driver-had-epileptic-seizure/2005/04/29/1114635737063.html

A man has been charged over yesterday's car accident that critically injured Sophie Delezio, the five-year-old Sydney girl who received burns to 85 per cent of her body when a car careered into her kindergarten in 2003. Yesterday [5 May 2006], a car struck Sophie as she was pushed in a stroller across a pedestrian crossing at Seaforth in north Sydney…The 80-year-old driver was treated for shock and then charged with dangerous driving, negligent driving and failing to give way at a pedestrian crossing. [144]

The medical licensing system is designed to prevent such awful, but fortunately rare, incidents as those reported in the quotes above. However, these incidents also illustrate the difficulties the medical licensing system must deal with, because biological age and functional age can be quite different. It would, therefore, be wrong to make rules on a rigid age-based approach. The UK licensing system recognises this and does not set an upper age limit on the entitlement to drive; rather, three yearly licence renewals are required after the age of 70. As such, a key feature of an effective licensing system for an ageing population is timely, accessible and engaging information and advice on their ability to drive and on alternatives to driving. It is therefore important to understand the emotional attachment to driving and counter the perception of an unacceptable level of dependence that will come with giving it up.

Driving is fundamental to many people's mobility and access to services, especially outside the large cities. Cars also have a psychological and emotional hold on people that few other everyday pieces of machinery do, in large part because driving is a symbol of independence and a licence can be the only official form of identity a person has. As one road safety officer commented, the revocation of a licence, "is like a bereavement. People get angry and teary about it… They see it as the end of their freedom and independence and the next stop's the old folk's home. They lose that contact with their youth and feel they're seen as no longer capable"[145].

A DfT study looking at older people's transport needs found that current drivers were apprehensive about giving up. One interviewee commented:

Having to give up driving is just part and parcel of getting old. It's going to be dreadful. My father had to give up driving when he was 62 and it really hit him hard. [146]

The issue of dependence is also a significant concern. In consultation interviews for a study examining transport and its relationship to quality of life for older people, considerable reluctance to ask for lifts from family was reported:

It's not so much that it's difficult, but you would rather not ask. I realise that children have their own lives. I don't want to ask them unless it's necessary. [147]

However, the potential negative effect of the lack of a car seems slightly exaggerated by those currently driving. An Economic and Social Research Council (ESRC) study compared responses to statements on giving up driving between people who had already stopped and those anticipating it. On all questions, except on saving money, ex-drivers reported more positive views about the impact of having given up driving than those considering it for the future, suggesting that absence of a car does not have as great a limiting effect as feared by current drivers[148]. This is supported by an earlier study, which also found that, "those who had

[144] http://www.abc.net.au/news/newsitems/200605/s1632109.htm
[145] Interviewee 30, Project consultation interview, April 2007
[146] DfT (2001), Older People: their transport needs and requirements
     http://www.dft.gov.uk/pgr/inclusion/older/olderpeopletheirtransportnee3260?page=7#1031
[147] Gilhooly, M (2006), Transport and Ageing: extending quality of life for older people via public and private transport (full report), ESRC, London, p25
[148] Ibid, p20

given up [driving] seemed more convinced of the advantages of relinquishing their car"[149].

To support people in assessing their driving capabilities and transport needs, active outreach programmes are needed. These would allow a more staged "retirement from driving", as Gloucestershire County Council describes it, and could include driving-related health checks as well as personalised lifestyle and travel advice.

> **Recommendation: That funding is made available to implement older driver assessment and support programmes, including personalised travel planning.**

CASE STUDY

Gloucestershire County Council – Safer Driving With Age
Gloucestershire County Council has developed and introduced Safer Driving With Age (SAGE), a screening programme that works with older people to assess their driving and provide advice and information. Following a referral from a doctor or primary health worker, or occasional self-referral, it is a three stage process, where the driver's health and medication are assessed for their implications on licence ownership and driving, their eyesight is tested and a one hour assessment of the participant's driving is done. Importantly, the participant is assessed driving on their usual roads and routes, in their own car and the driving assessment takes place in and around their neighbourhood and the places they visit frequently.

Should all be well, SAGE will be redone on a three yearly cycle to coincide with the current three yearly licence renewal, although this period can vary depending on the view of the referring medical practitioner. If a training need is identified that cannot be corrected during the available time, then further specific training is offered. If the drive is unsafe and retraining would not be an option then the driver is advised to 'retire' from driving.

An important feature of the programme is its driver focus. It aims to take a holistic view about the driver and their mobility needs and habits while assessing their own safety and potential risks to others. It also uses more positive language, talking about 'retiring from driving'. In this way it takes the approach of engaging with the driver to manage driving risks. SAGE has not yet been evaluated and there are difficulties in the programme, such as drivers ignoring the advice or referring health workers not taking up the advice with the patient-driver. However, it would seem to be a useful model that could have benefits by managing the very personal and variable decline in abilities as a consequence of ageing.

Public transport

Providing viable alternatives to private transport is one effective way of reducing older people's exposure to road-based risk as car drivers and passengers. It is also very important for reducing isolation by ensuring that social contact and daily activities can be maintained when driving becomes no longer possible.

Second only to the 17-20 years age group, people aged 70+ made 10% of all trips on bus or coach and 60-69 year olds made 6%. However, there is a strong gender divide in bus trips: men 60+ make 11% of trips on the bus; for women, the figure is 21%, largely due to lower levels of licence holding. Rail travel was not common across the older age groups, with only 1% of trips being made on this mode[150]. This would appear to be a strong

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[149] DfT (2001), op cit, http://www.dft.gov.uk/pgr/inclusion/older/olderpeopletheirtransportnee3260?page=6#1018
[150] DfT (2006), Transport Statistics Bulletin: National Travel Survey 2005, DfT, London, table 3.6

foundation on which to encourage public transport – with bus use as a mainstay – as a mode of choice. However, mobility difficulties, deficiencies in public transport services and attitudes by current older drivers to giving up their cars are limiting factors on greater use.

With the strong correlation between age and disability, limitations on mobility are a major barrier for older people due to physical difficulties associated with walking and accessing public transport. Common concerns include:

- poor condition of pavements
- inadequate crossing facilities
- boarding/alighting buses and trains
- steps at railway stations[151]

Once on the bus, older people's frailty makes them more vulnerable to inconsiderate driver behaviour and several respondents to the DfT survey reported having fallen when the driver pulled away before they had reached their seat[152]. This causes anxiety and some reluctance to use this mode of transport, as a fall can lead to injury and weeks of recuperation.

In addition to physical mobility issues, older travellers have particular concerns about the provision of transport services. A research study funded by the Economic and Social Research Council found that the top ten barriers to older people using public transport were:

Barrier	Percentage agree
Concerns about personal security	65.1
Difficulties carrying heavy loads	59
Alternatives to public transport are available	54.5
Possibility of cancellations	51.2
Having to wait	51.2
Public transport running late	49.3
Behaviour of some passengers	48.1
Difficulties of travelling where I want to go	43.3
Having to go out in bad weather	41.1
Difficulty of travelling when I want to	40.8

Although the 59+ age group rated satisfaction with public transport higher than younger groups, particularly people aged 45-58, the mean rating was around 4.8 on a 7 point scale, indicating relatively low levels of satisfaction[153]. Compounding this, baby boomers are a generation for whom private transport is the norm and research has suggested they may be very unwilling to give up driving if public transport is not improved[154].

Recommendation: That the design of bus interiors is reviewed to ensure maximum levels of safety and comfort for older people.

Improving public transport to address the top concerns of older passengers and potential passengers is an important element of encouraging greater patronage. However, some public transport providers hold unhelpful attitudes towards older passengers that may limit the likelihood of such improvements being made. The ESRC project interviewed 19 transport providers as part of their study, finding that:

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[151] DfT (2001), Older People: their transport needs and requirements,
http://www.dft.gov.uk/pgr/inclusion/older/olderpeopletheirtransportnee3260?page=2#1004
[152] Ibid
[153] Gilhooly, M (2006), Transport and Ageing: extending quality of life for older people via public and private transport (full report), ESRC, London, figures 12-14
[154] Ibid, p13

older people were seen as 'gumming up the works', indicating that transport provision is still seen as providing transport for rush hour passengers who need to get to paid work. Retired people and especially people with concessionary cards were seen as peripheral to their concerns…it was overwhelmingly obvious that the older generation was viewed as requiring special attention for which there was simply no time. [155]

A large part of the hostility reported in the interviews with officials working in transport stemmed from the belief that bus operators were not being adequately reimbursed for carrying older people as non-cash paying concessionary passengers. This is too complex an area of transport policy to discuss in detail at this point; suffice it to say that reimbursement levels are likely to remain a contentious issue. Nonetheless, some companies are making investments to improve the bus fleet in ways that will benefit older passengers: for example, North Somerset Council and First Bus have drawn up a bus quality partnership agreement, which will provide additional low-floor buses, better bus shelters, more raised kerbs and better timetable information[156]. These kinds of improvements are an important contribution to making buses an attractive and viable alternative mode of transport.

Recommendation: That PTAs and PTEs, in co-operation with bus companies and with local and non-government bodies, implement education and awareness sessions for bus drivers and bus company managers regarding the needs of older passengers and people with mobility difficulty.

The UK population is both ageing and likely to keep driving, further, in larger numbers and for longer than previous generations. To improve safety while maintaining mobility will require a multi-faceted approach, encompassing vehicle design, vehicle safety technology and the provision of more comfortable, reliable public transport as an attractive alternative. Underpinning these changes will be the provision of engaging and clear information about ageing and driving. With their increased frailty and potentially declining capabilities, an older population poses a significant challenge to the road safety profession and the early implementation of a co-ordinated strategy is important to address these issues.

[155] Ibid, p24
[156] Transport Times, "Quality partnership announced", 2 March 20007, Issue 36, page 1

Young Drivers

> After the test I drove like a bit of a prat really. I passed first time, was a bit arrogant and thought I was a very good driver. I then had a crash. I thought I was excellent until I had the crash. (male, 21) [157]

The United Kingdom has a long history of effective interventions to reduce death and injury caused by road traffic accidents, which has led to its position as one of the best-performing countries for road safety. However, the reduction in casualty levels has not been uniform and there is still an unacceptably – and disproportionately – high number of young people who kill and injure themselves and other road users each year.

The scale of the problem

The recently published House of Commons Transport Select Committee's report on novice drivers provides a summary of several statistics to illustrate the problem:

- in 1998, drivers aged 17–21 accounted for 7% of the total driving population, but they comprised 13% of drivers involved in collisions;
- one in eight driving licence holders is aged under 25, yet one in three drivers who die in a collision is under 25, and almost one in two drivers killed at night is under 25;
- 27% of 17–19 year-old males are involved in a road collision as a driver in their first year of driving;
- 1,077 people died in 2005 in crashes involving a driver aged 17–25 (of whom 377 were drivers aged 17–25). [158]

This is particularly concerning given that the National Travel Survey 2005 shows that the proportion of young people with a full driving licence has been declining: in 1992-94, 48% of people aged 17-20 held a full licence; after a low in 2004 of 27%, it rose to 32% in 2005. With almost 1200 young drivers aged 16-19 killed or seriously injured in 2005 – more than three every day – the levels of death and injury are grossly disproportionate to the number of licence holders[159]. It is also important to note that there is a strong gender imbalance. The table below shows the gap in the number of 17-19 year old male versus female drivers killed and seriously injured[160]:

KSI (17-19 drivers)	2005	2004	2003	2002
Male	869	830	918	929
Female	276	288	274	251

The large differences in casualty numbers are not a function of differing licensing rates. Looking at the number of licences held by 17-20 year olds between 2002- 2005, the largest

[157] Christmas, S (2007), The Good, the Bad and the Talented: Young Drivers' Perspectives on Good Driving and Learning to Drive, Road Safety Research Report 74, p30
[158] HoC Transport Select Committee (2007), Novice Drivers, TSO, London, p5-6
[159] DfT (2006), Road Casualties Great Britain 2005, TSO, London, p.96
[160] Ibid, p.69-70

difference between the genders was only 10% in 2005: in that year 37% of young men held a licence compared to 27% of young women.[161]

Learning and licensing

Taken together, the statistics above indicate that a significantly different approach to learning and licensing is needed as an immediate intervention to improve young people's safety on the road. In recent months this serious issue has received substantial attention. The DfT's second three year review emphasised the need to tackle the casualty rate of novice drivers, announcing a review and overhaul of learning to drive:

> The time has come to reform fundamentally the way people learn to drive. We need to do more than tinker with the particular elements, we need to overhaul the current system for learning, including pre-driver education, testing and maintaining driving skills through life. We need a comprehensive package of reforms: education to influence attitudes long before people reach 17, a thorough training process and a reformed testing process which tests that learners can drive safely, not just master how to control a car. We also need to do more to help drivers develop and maintain high standards for life, especially if they drive for work. [162]

In the review, the Department outlines how reform will be based on a three point framework:

- A new competency and knowledge framework setting out what a candidate must know and be able to do;
- A modern training syllabus setting out what a candidate needs to learn; and
- A systematic set of assessment criteria setting out how the testing stage will establish that a candidate has covered the syllabus properly and can demonstrate the required level of competence.[163]

The Transport Select Committee, as mentioned above, also recently examined the issue of young drivers. In their wide-ranging consideration of the issue, the Committee supported the concept of a more structured approach and recommended robust measures to achieve it. In particular, the report gave a detailed description of how learning, testing and licensing might be reformed to reduce casualties. Without being overly repetitive, it is helpful to outline the policy options discussed in the report as it is the most recent and comprehensive analysis.

Learning

In recognition of the important role driving instructors play in preparing young people for safe independent driving, the report recommends mandatory continuing professional development to improve the quality of instruction. This reflects evidence taken by the Committee that driving instruction needs to be professionalised to "extend the skills and knowledge base of approved driving instructors so that they can deliver some of these new interventions, some of these ways of getting drivers to understand what the risks are..."[164].

The report also recommends a minimum 12 month learning period and – crucially – within that time learners are to follow a structured syllabus. This combination works together to tackle the dual risk factors of age and, particularly, inexperience. Some driving instructors already use log books to track students' progress across different road situations; making their use mandatory would, "spread the development of driving skills and abilities over the

[161] DfT (2006), National Travel Survey 2005, p11
[162] DfT (2007), Second Three Year Review of the Government's Road Safety Strategy, TSO, London, p40
[163] Ibid, p40
[164] Dr L Dorn, in HoC Transport Select Committee (2007), Novice Drivers, TSO, London, Ev83

year... [ensuring that] the learner has consistently achieved the required standard"[165]. The need to encourage a wider range of driving experiences before being licensed to drive unsupervised is shown by unpublished research from the current TRL cohort study, which found that 12% of drivers who had recently passed the test had never driven in the dark. This lack of experience is a likely contributor to the very high rate of night-time casualties. Anecdotal evidence suggests that many have never driven in bad weather either.

However, the ultimate goal of a reformed learning process should be to move from vehicle handling to self assessment of skill, context and risk. The current mode of instruction was criticised for failing to do this:

> ...we do quite a good job in the UK at delivering car skills, teaching them how to handle a car, when to go and when to stop; we teach them how to integrate with traffic quite well. But what we do not do is to give them any training on issues that will affect how they deploy those skills outside of the learning environment...we do not get them to recognise thrill seeking is an issue for them; we do not get them to recognise peer pressure is an issue for them; we do not get them to recognise that even small amounts of alcohol for young drivers is an issue for them. We do not give them training on that; our training is limited to "This is how you turn left and right".[166]

The Committee's report picked up this theme and included evidence submitted by PACTS highlighting how Sweden has recently re-examined its learner driver regime. Its approach uses a matrix outlining driving tasks and correlates them with driver skills/ competencies. The aim is to "make learner drivers realise their own limitations and thus counteract overestimation of own ability and skill. A second aspect is to become aware of the influence of personal preconditions, social norms and motivational factors on driving behaviour and risk. Yet another aspect...is the concept of risk perception and risk awareness"[167]. The table below illustrates how the matrix moves across mastery of the vehicle and traffic handling to awareness of risk factors and then self assessment of driving skills and driving style:

	Knowledge and skill	Risk increasing aspects	Self assess
Preconditions and ambitions for life	Relations, lifestyle, age, group etc, and driving behaviour	Sensation seeking Group norms Peer pressure	Introspective Competence Own preconditions Impulse control
Transport and driving	Modal choice Choice of times Role of motives	Alcohol. fatigue Low friction Rush hours	Own motives influencing choices Self critical thinking
Driving in traffic	Traffic rules Co-operation Hazard perception Automisation	Disobeying rules Close following Low friction Vulnerable road user	Calibration of driving skills
Vehicle construction and control	Car functioning Protection systems Vehicle control Physical laws	No seatbelt Breakdown of vehicle systems Worn out tyres	Calibration of control skill

The Committee's recommendation to introduce a structured syllabus for learner drivers did not go so far as to draft modules, but in seeking to generate a sophisticated self awareness as a driver, the matrix outlined above offers a useful template.

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[165] HoC Transport Select Committee (2007), op cit, p20
[166] I Edwards, in HoC Transport Select Committee (2007), op cit, Ev77-78
[167] http://www.dft.gov.uk/pgr/roadsafety/drs/novicedrivers/conference/changestothelicensingsystemi4662

Testing

The **Novice Driver** report also made recommendations to make the driving test more stringent. The inquiry took evidence that suggested that "the current practical driving test is a poor indicator of driver safety and subsequent crash involvement"[168]. A key criticism of the test is that it provides insufficient time to assess a candidate's driving on the complete range of roads – as distinct from the ability to execute manoeuvres on a largely urban network. Witnesses made a powerful case for extending the test to an hour to allow longer scrutiny by examiners and to include high speed road driving. Additionally, the Committee recommended that further consideration be given to the number of faults candidates may make before failing to screen out those with the highest crash liability.

Licensing

> If you would like three straightforward recommendations that will work, one is that we need to extend the supervised training that novices receive; we need to apply night time restrictions because that is when they have their crashes; and we need to apply passenger restrictions. They work; they have been proven to work around the world. [169]

The period immediately after gaining a licence is also critical to young drivers' safety, as it is in the first year that the most are involved in crashes. Graduated licensing is a way of helping young people become mature and experienced solo drivers in a more staged way. Key issues graduated licensing systems seek to tackle are drinking and driving, driving at night and carrying passengers, as these factors increase young drivers' crash risk. As noted above, nearly half the drivers killed at night are under 25; additionally, young men under 21 are persistently around 12% of people found guilty of drink driving[170]. The effect of carrying passengers is illustrated both in the casualty statistics and by comments made in a recent study on young people's attitudes to driving: "I get distracted when [my friends] are there...I'm safe when I'm by myself"[171].

The Committee's report strongly supported the concept of graduated licensing, recommending that novice drivers should be prohibited from carrying any passenger aged between 10 and 20 between the hours of 11pm and 5am and that the permitted blood alcohol level should be lowered to zero. This is a controversial recommendation in that it has implications particularly for young people's social life, and for their employment, and raises the question of safe alternative routes home after social events at night. Options not discussed in the report include allowing only one passenger or leveraging the insurance system and pay-as-you-drive technology to charge higher fees to discourage night driving.

The report also recommends that, in the light of research finding that Pass Plus participants have only marginally lower collision rates than non-participants, Pass Plus be reviewed to assess its effectiveness.

A question of attitude

These reforms to the learning and licensing regime are to be supported for their role in reducing the unacceptably high casualty level for young drivers within the next few years. However, a substantial body of research indicates that the attitudes young people hold

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[168] HoC Transport Select Committee (2007), op cit, p26
[169] Prof F McKenna, in HoC Transport Select Committee (2007), op cit, Ev78
[170] Home Office, Motoring Offences and Breath Test Statistics 2004, Home Office, London, p32
[171] Christmas, S (2007), The Good, the Bad and the Talented: Young Drivers' Perspectives on Good Driving and Learning to Drive, Road Safety Research Report 74, p18

towards driving are a significant contributory factor to their high casualty rate[172] and that their attitudes are formed at an early age. To reduce casualties in the longer term, tackling young people's attitudes to driving will be a key element.

Research by Reading University showed that attitudes towards road use are formed long before learning to drive: the study found that from a pre-teen age, young people – and boys in particular – report an affinity for speed, think driving will be easy and make them popular. The children surveyed indicated that friends' expectations will influence their driving as well as showing a level of acceptance of violations like speeding and running a red light[173].

Once licensed, young people's attitudes to driving have a significant impact on their levels of crash involvement, informing behaviour and risk taking on the road and their consequent errors and violations. Many young drivers, especially men, "tend to be over confident and are more likely to drive in risky ways. They consistently rate their own skills as above average. They commonly see 'good driving' as the ability to master the controls of the car at higher speeds"[174].

In research presented at a conference on novice drivers, Drs Stradling and Meadows observed that young drivers gain a strong sense of their identity from driving and see it in terms of personal empowerment. In focus groups, 17-20 year olds responded positively to these statements that driving:

- is a way of projecting a particular image of myself
- gives me a feeling of pride in myself
- gives me the chance to express myself by driving the way I want to
- gives me a feeling of power
- gives me the feeling of being in control
- gives me a feeling of self-confidence
- gives me a sense of personal safety[175]

These feelings of control, confidence and power are reflected in the finding that nearly half of young drivers nominated their driving as 'a bit better' or 'much better' than average compared to all other drivers a year after passing the practical test [176] - despite their far higher their crash risk. And they are reflected in behaviour on the road: young people 17-19 are the fastest drivers, at 4-5 mph faster than the slowest group (+60 years)[177]. Drs Stradling and Meadows go on to observe that young drivers report they prefer to drive at speeds higher than the average for motorways, other main roads, suburban roads and rural roads. Younger novice drivers are also less likely than their older counterparts to believe that following too close or breaking the speed limit is an important cause of accidents[178].

Perhaps the clearest illustration of some young drivers' attitude to driving is given in the words of a participant in recent focus group research:

I spent a good time thinking I was really good, but really I was rubbish. I couldn't believe it when I had an accident, but then I got much better. My awareness might have gone down but I am not driving like a nutter anymore, so it kind of balances out. I used to think I was a great driver. I was always asking to drive, I was desperate to drive – I just really liked driving. Looking back, I was pushing the boundaries when I first passed. It wasn't a conscious decision

[172] See for example: Clarke, D et al (2002), TRL 542 In-depth accident causation study of young drivers; and Christmas, S (2007), op cit.
[173] Waylen, A and McKenna, F (2002), Cradle attitudes - grave consequences: the development of gender differences in attitudes and behaviour in risky road use, AA Foundation for Road Safety Research, p2
http://www.iam.org.uk/NR/rdonlyres/3CB04728-6245-4925-AEBEDFA7E58B665E/0/AA_foundation_FDN33.pdf
[174] Royal Society for the Prevention of Accidents, in HoC Transport Select Committee (2007), Novice Drivers, TSO, London, Ev138
[175] http://www.dft.gov.uk/stellent/groups/dft_rdsafety/documents/page/dft_rdsafety_611011.hcsp
[176] Grayson, G et al (no date given), Cohort study of learner and novice drivers II: preliminary results, TRL, Crowthorne, p32
[177] Quimby A et al (1999), The factors that influence a driver's choice of speed, TRL, Crowthorne, p9
[178] Maycock G (2002), Novice driver accidents and the driving test, TRL, Crowthorne, p35

but it's just that it's lucky I had a small accident to make me realise. I thought I was in control all the time, but I didn't know the limits before…My instructor was always telling me how good I was, and I probably believed it too much.' [Male, 20] [179]

In a car-oriented culture in which many people, not only young people, have beliefs that run counter to safe road use behaviour, attempting to change long-held and possibly unconscious attitudes towards driving at the point that a young person starts learning to drive will be a challenging task. The process of educating people about safe and responsible road use must, therefore, start much earlier with a more integrated and staged approach.

An integrated approach to road user education

In evidence to the Transport Select Committee's inquiry, one witness highlighted the need to start roads education early and continue it throughout school attendance:

…I think we have got to take this holistic approach. This is why I do not like this term "pre-driver training". I actually think it is about road-user training throughout the life of somebody. "Pre-driver" tends to suggest it is all about, "How do I get to actually getting this vehicle?" For me it is about how you educate youngsters from a very, very early age… So I think we should be starting very early on and progressing that through. [180]

Despite its central role in promoting a culture of responsible road use, throughout the project consultation interviews, it was commented that there is a strong tendency for road safety education to be reliant on an enthusiastic individual – a teacher, traffic police officer or local authority road safety officer. Interviewees also commented on the lack of prominence road safety receives at some schools and suggested that roads issues could be woven into the teaching of other subjects:

There is road safety in education, but it is squeezed and up to the individual teacher's enthusiasm. Education is more limited than it was when there was more involvement from local authority RSOs and schools due to a more flexible curriculum. [181]

We could also use roads examples in schools but not strictly road safety education, like using road examples in maths, chemistry and physics and include it in teacher training. [182]

Additionally, there seems to be a gap in provision of safety related material in early secondary school – between child-oriented pedestrian and cyclist training and young adult pre-driver training. A Scottish study found that, "Relatively little else was done [at secondary school] until, and if, the school undertook pre-driver training for older S6 pupils. Where this was being undertaken it consisted of driving practice and talks on driving responsibilities. Sixth year was perceived as the most relevant time to do this due to the age of pupils, and space within the curriculum"[183].

Safe road use as a pedestrian, cyclist or motorist is a key life skill and it is of concern that a co-ordinated approach, with each year's learning building on the last, is not applied nationally. A "nursery to novice" continuum of road user education activities and interventions should be developed and delivered far more consistently and comprehensively

[179] Christmas, S (2007), op cit, p34
[180] N Cunliffe, in HoC Transport Select Committee (2007), Novice Drivers, TSO, London, Ev132
[181] Interviewee 28, Project consultation interviews, June 2006
[182] Interviewee 19, Project consultation interviews, July 2006
[183] ODS Ltd (2004), Parental Attitudes to Road Safety Education: Final Report, Scottish Executive
http://www.scotland.gov.uk/Publications/2004/10/20117/45447#4

than is the case at present. The Department for Transport has acknowledged the need to begin the education process before young people start learning to drive:

> We will start influencing attitudes early and young people should leave school with a better understanding of the risks of the road…We will develop a package of better quality materials that we can market effectively to teachers to allow road safety to be taught as a stand alone subject, and also as part of other existing mainstream subjects. [184]

Although it would be ideal if road safety education was included in the national curriculum for each year group, in a busy school programme this is unlikely. Using road safety examples as illustrations of the core subject presents an opportunity to highlight issues otherwise not covered and reinforces road-safety specific messages communicated elsewhere. One criticism of educational interventions is that their effectiveness is not entirely certain; this is indeed the case, but rather than simply seek to measure the impact of one programme in one local area, such an integrated and sustained approach aims to contribute to generational change across the country.

Parental involvement

Parental involvement is also an important factor in shaping attitudes towards road use. As the person with whom children walk, cycle and drive most frequently, the parental or carer example has a significant bearing on learned behaviour in and around the road environment. This was supported by focus group research where, "most parents felt that road safety was ultimately the responsibility of the parent…parents were seen as the main influence on the initial development of road safety knowledge. However, once a child begins school, parents often viewed their role as reinforcing what children were learning in the classroom"[185]. Unsurprisingly, the role of parents and carers in teaching children safe road use practices tends to taper off as they enter teenage-hood. At that stage, a "significant proportion of parents of older teenagers consider it counterproductive to "go on about road safety" to older children"[186].

In terms of shaping attitudes to driving specifically and forming a sense of what constitutes a 'good' driver, parents and carers are often the role models for their children, as the family car is where they observe approaches to driving:

> For the youngest respondents, an important influence on driving style and attitude was often said to be the way in which their parents drive. Good and bad habits are noted, assumed to be normal, and picked up; this is the first suggestion of what is seen as acceptable.
> - "Parents. You can pick up bad habits from them."
> - "I would say family. You are picking things up before you are driving."
> - "Up until you have passed your test, it is your family, but as soon as you get behind the wheel you are on your own." (males, 17-24) [187]

However, parents interviewed in the focus groups showed a mixed response to the question of whether their driving style would have an influence, with 56% of those who drive indicating that it would, while 44% saying that it did not or they did not know, although there was a significant difference in the responses of parents of younger versus older children[188].

[184] DfT (2007), Second Three Year Review of the Government's Road Safety Strategy, TSO, London, p41
[185] ODS Ltd (2004), Parental Attitudes to Road Safety Education: Final Report, Scottish Executive
    http://www.scotland.gov.uk/Publications/2004/10/20117/45447#4
[186] Ibid
[187] DfT (no date given), Respect on the Road, section E(2),
    http://www.dft.gov.uk/pgr/roadsafety/research/related/respectontheroad?page=6
[188] ODS Ltd (2004), op cit

This suggests that there is a need for information and awareness campaigns aimed at parents, highlighting their position as role models for driving behaviour.

While parents and carers may step back from general road safety instruction when their children enter their teens, this reverses when the time comes to learn to drive. With this in mind, Lancashire County Council developed the **Pre Pass Support Scheme** (PPSS) and the **Perfect Partner** CD ROM, "to assist accompanying drivers in their task of supervising a learner driver so they can structure their driving and help prepare their learners properly, enhancing skills and safe driving attitudes and behaviours in conjunction with their professional tuition"[189]. The PPSS includes a theory element outlining statistics about novice drivers, areas of greatest risk and establishing a parent/ learner agreement. This is followed by a practical in-vehicle session and debrief. The Scheme is being evaluated and following this analysis, there is potential for similar programmes to be implemented.

> **Recommendation: That programmes to support accompanying drivers, such as the Perfect Partner Pre-Pass Support Scheme piloted by Lancashire County Council, are evaluated for wider application.**

Road safety and youth culture

> Driving is also an expressive activity – what you drive and how you drive expresses your individuality on 'the theatre of the road' – and this is especially important to young people and particularly young men in its associations with masculinity, feeling positive, powerful and in control. Attitudes towards driving and the benefits young people expect from it – autonomy, independence, freedom, excitement – are present from a young age and most drivers bring these attitudes with them when they drive – 'people drive as they live', and the young are no exception. [190]

It is well understood that cars and driving form a key element of many young people's identity, and, as noted above, particularly young men. This tends to manifest itself in risky behaviour such as attempted displays of prowess in handling vehicles at speed, disregard for safety precautions like seatbelts and anti-social behaviours like accelerating away from traffic lights in unofficial races with neighbouring vehicles. As important as schools and parents are in shaping young people's ideas about road use and helping them become safer drivers, it is a defining characteristic for teenagers to rebel against authority figures. At this age, "children's attitudes to their parents change and the influence of their peer group becomes more important"[191]. This has profound implications for tackling young people's perceptions about road use and driving.

In **The Good, the Bad and the Talented** report, risky driving was articulated by focus group participants as a deliberate act which aims "to position themselves in a particular way in the shared space of driving"[192]. Argument, facts and evidence are likely to have less effect in this model, in part because the dangers of such behaviour may well be not only understood but sought out and also because the origins of the behaviour relate to the peer group's codes of acceptable and desirable behaviour. As this is a question of how youth culture and peer approval influence behaviour, road safety messages need to tap into the social norms prevalent amongst young people.

Road safety is not alone in trying to educate young people away from harmful behaviour:

[189] HoC Transport Select Committee (2007), Novice Drivers, TSO, London, Ev119
[190] Holder, in Christmas, S (2007), The Good, the Bad and the Talented: Young Drivers' Perspectives on Good Driving and Learning to Drive, Road Safety Research Report 74, p35
[191] ODS Ltd (2004), op cit
[192] Christmas, S (2007), op cit, p37

many programmes exist to warn against and discourage excessive drinking and drug taking and to promote safe sex. The continuing high levels of binge drinking, drug taking and sexually transmitted infections indicate just how difficult it is for educational agencies to operate in youth cultures that construct these behaviours as the norm and as desirable. The key to effective interventions is to co-opt the culture and generate disapproval within the peer group:

> ...for many young people in particular, the risk of being thought a prat, something of which most will have plenty of experience, is a far more important motivator than the rather abstract idea of killing or injuring oneself. Finding new ways for people to be thought of as prats – that happen to coincide with genuine risk behaviour – is a potentially powerful tool for change. [193]

The recently publicised television advert by the Road Traffic Authority in New South Wales (Australia), aims to do this. The "Speeding: no one thinks big of you" advert shows three different sets of young men driving in anti-social or risky ways. In response, the bystanders, including attractive young women and fellow young male passengers, make a hand gesture that is commonly understood to indicate that the drivers have small penises – undermining the connection between cars, aggressive driving and masculinity[194].

It is very difficult for those not inside a youth culture to co-opt it successfully for educational purposes. However, as a significant aspect of risky driving is related to identity and image, this is an important avenue to explore to reposition safe driving amongst this cohort.

Peer to peer

A further area for consideration is peer to peer education. Again, this is a method used in health education, particularly covering sex, drugs and alcohol. Peer education is, "young people imparting information to others of a similar age. It is not a new approach and there is considerable variation in the ways that it is used – one-off sessions, theatre presentations, conferences and a series of sessions"[195]. Given that as children enter their teens they tend to become less receptive to messages delivered by parents and authority figures, peer to peer education, "draws on the credibility that young people have with their peers [and] leverages the power of role modeling [sic]…"[196].

However, evidence is mixed on the effectiveness of this form of education:

> Peer education in schools has been shown to be more helpful to the pupils carrying it out (the "educators") than to the target group. No evidence has been found that suggests that peer education is more effective in transmitting knowledge to the target group than traditional adult teacher/ pupil systems of education.[197]

Nonetheless, conducting a pilot programme including road safety in other peer education schemes dealing with issues like risk awareness and personal safety would be appropriate. It was observed earlier that there is a gap in road safety education provision in the early to mid years of secondary school. Involving these cohorts as peer programme leaders may have the benefit of educating them just when they are at their most vulnerable as pedestrians and also providing early ground work before becoming a learner driver.

Recommendation: That peer-to-peer schemes are investigated for their potential applicability to safe road use education.

[193] Ibid, p43
[194] http://www.rta.nsw.gov.au/roadsafety/advertisingcampaigns/speeding_pinkie.html?hfid=pinkie
[195] Pringle, S and Sudlow, D (2005), Peer Road Safety Education in Scottish Secondary Schools, Scottish Executive, Edinburgh, p4
[196] Advocates for Youth in, Pringle, S and Sudlow, D (2005), op cit, p14
[197] Pringle, S and Sudlow, D (2005), op cit, p26

Sex and drugs

Throughout this chapter there have been several references to young men and the danger they can pose to themselves and others on the road and any effective young driver casualty reduction strategy must target interventions specifically. While it is true that young women do not in themselves pose as significant a risk, reporting stronger pro-safety opinions and not violating traffic law as frequently, they are killed and seriously injured as passengers in young men's cars. It can be difficult for young women to negotiate to drive or find alternative transport home after a night out if they are uncomfortable travelling with a friend or boyfriend who has been drinking or while risky driving is occurring. Indeed, they themselves may have been drinking and not be a responsible passenger, causing distraction and concern to even a sober driver. Programmes should be put in place to help young people, young women in particular, recognise unsafe road use and gain the skills to deal with these situations.

The over-representation of young people in prosecutions for drink-driving is well known and many campaigns have aimed to highlight the dangers to this age group. Although not as prevalent as drink driving, concern has been expressed in recent years about increasing drug driving. TRL research in the late 1990s found that medicinal or illicit drugs were present in nearly a quarter (24.1%) of road traffic deaths, a threefold increase on a study a decade earlier[198]. The study showed the majority (78.3%) of medicinal drug users are aged over 40 and that most illicit drug users (75.3%) are under 40. Cannabis was the single most common illicit drug and its use was heavily skewed to younger people, at nearly 85% of users.

The difficulties of policing drug driving are outlined in the chapter discussing enforcement issues. While improved enforcement is indeed a key element in tackling drug driving, recent focus group work suggests that the risks of drug driving are not well understood:

> He thinks he's a better driver when he smokes cannabis because he drives slower. It's safer to smoke cannabis and drive than drink-driving. He's been told this by some of his friends. Drink-driving you're more stimulated, while cannabis is more of a depressant. You're not eager to overtake people, you're quite chilled out. [Male, 21] [199]

In addition to mistakenly believing that some illegal drugs can actually improve driving, research commissioned by the Scottish Executive indicated that knowledge of the law on this issue was poor - 12% of respondents aged 17-39 thought someone could not be prosecuted for driving after taking illegal drugs, while 23% were unsure whether someone could be prosecuted or not[200]. These findings suggest that information campaigns are needed to tackle the issue of drug driving, particularly in terms of correcting the assumption that it is safer to take drugs and drive than drink and drive.

Becoming licensed to drive is a significant rite of passage into adulthood for many young people, symbolising, as it does, the potential for social and economic independence. Currently, however, as a society we are not equipping young people with the skills and support to make that shift safely and too many novice drivers kill and injure themselves and others each year. A twin track strategy is needed: with changes to the learning and licensing regime to reduce casualty risk in the immediate future, coupled with long term work to achieve generational change in attitudes.

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[198] Tunbridge, R, et al (2001), The incidence of drugs and alcohol in road accident fatalities, DETR, p1
[199] Christmas, S (2007), op cit, p19
[200] Ormston R, Evaluation of the drug driving TV advert, No.159/2003, Scottish Executive
    http://www.scotland.gov.uk/Publications/2003/02/16456/18654

Economy and employment

In developing future casualty reduction strategies, it is important to be alert to trends in the economy and employment as these have a direct impact on road use. Ensuring that transport supports continued economic growth will be a feature of future transport policy and with moves to encourage road pricing as a mechanism towards this, consideration of road pricing's potential safety consequences will be important. At the same time, new emphasis must be placed on safe driving at work, with the 'white van man' phenomenon and the strong service sector character of the UK's employment profile seeing a rise in employees out on the roads.

Congestion

A personal priority will be to advance the debate about a national system of road pricing in this country - moving the debate from "why" to "how" we might make a national system work in practice...doing nothing is not an option. We need to take action now, and for the longer term. [201]

Road pricing seems to have been 'a decade away' ever since the 1964 Smeed Committee report first examined the issue. Subsequent consideration of its potential "has been marked by flirtations, studies [and] cold feet – pricing interruptus"[202]. However, on the appointment of the previous Secretary of State for Transport, Douglas Alexander, in May 2006, the then Prime Minister wrote to him saying that,"[m]anaging demand for road transport and ensuring we get the best out of our existing network are vital" and that a particular challenge to focus on would be to, "advance the debate on the introduction of a national road-user charging scheme"[203].

In addition to achieving a high political profile in the previous Government, a range of factors now converge to make pricing a very likely feature of transport policy in the mid to long term: two successful charging schemes have already been implemented in London and Durham; congestion is set to rise by 30% by 2025[204], resulting in 15% of business traffic and 16% of commuting traffic experiencing very congested conditions[205]; encouraged by the Transport Innovation Fund, local authorities are looking into piloting pricing schemes and legislative changes have been introduced in the Local Transport Bill to provide additional powers to support them. Added to that, the Eddington report on transport strongly endorsed charging to maximise transport's contribution to national economic performance and it is also seen as an effective tool to reduce individual motorised transport on environmental grounds.

While endorsed by many, the implementation of road pricing could have unintended negative road safety consequences. These will need to be managed to ensure that the effort

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[201] Former Secretary of State for Transport Douglas Alexander MP, Speech, 10 May 2006
http://www.dft.gov.uk/press/speechesstatements/speeches/bettertransport
[202] Prof Phil Goodwin, "Solving Congestion", Lecture, University College London, October 1997
http://www.cts.ucl.ac.uk/tsu/pbginau.htm
[203] http://www.number-10.gov.uk/output/Page9455.asp
[204] Eddington, Sir Rod Transport's role in sustaining the UK's productivity and competitiveness, TSO, London, 2006, p98
[205] Ibid, p100

to reduce the economic and environmental burden of congestion does not increase the risk of death or injury on the roads.

Chief amongst these concerns is the potential to price drivers onto riskier roads and riskier times. Motorways are the safest roads in Britain: only 5% of people killed, seriously or slightly injured on the roads each year are on a motorway; this compares to 28% on urban A roads and 17% on rural A roads[206]. Looking at the rate of death per 100 million vehicle kilometres confirms these concerns: for motorways the rate is 0.2 deaths per 100m vehicle kilometres. By way of comparison, the rate for rural A roads is 0.8 and on urban A roads, the rate is 0.4[207]. A road pricing scheme that targets motorway driving on congestion grounds could lead to traffic dispersing to the surrounding road network, which, as the figures outlined above show, do not have as good a casualty record.

It is likely, however, that pricing will not be limited to motorways, but will be area wide and include parts of the surrounding strategic road network. If this leads to avoidance behaviour from drivers and dispersal onto the more minor roads, it would be of concern because these also present a risk, with 36% of all severity casualties occurring on 'other roads' (C and unclassified). The rate of death is of particular concern on 'other' rural roads, at 0.9 per 100m vehicle kilometres . The DfT commented on the issue of re-routeing in its 2004 study on road pricing feasibility:

> The impact of re-routeing, if it were to occur, could in certain places and at certain times result in an increase in accident levels. This is due to the increased number of vehicles using smaller roads, not built for a high level of demand, which could lead to higher accident rates.[209]

It is important, then, that the pricing structure is sensitive to the potential outcome of vehicles shifting to riskier roads that are not necessarily built for such levels of traffic.

Recommendation: That all road pricing proposals must include a specific risk analysis of potential traffic dispersal.

There is an additional concern in terms of dispersal – over time rather than the road network. By its nature, road pricing seeks to encourage travel outside the peak demand periods. Driving at night could thus become more attractive as charges would be lower, but there could be an increased risk of collisions due to fatigue and reduced visibility. It would be wise to develop additional publicity on the dangers of driving tired to coincide with the roll-out of any pricing scheme. In particular, working with employer and employee groups will be important to ensure any shift in business travel to earlier or later in the day to avoid or reduce the charging costs is undertaken in a safe way.

Recommendation: That the publicity strategy for road pricing zones includes the dangers of driving tired, with a particular emphasis on driving while at work.

A third area where safety needs to be considered is in terms of modal shift. Congestion charging particularly aims to provide an incentive to swap to public transport, but shifts to cycling would also be expected. In addition, if the London congestion charging model were followed, with powered two wheelers being exempt, it is probable there would be a surge in motorbike and scooter use.

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[206] DfT, Road Casualties Great Britain 2005, TSO, London, 2006, table 26
[207] Ibid, table 26
[208] Ibid, table 26
[209] DfT, Feasibility Study of Road Pricing in the UK; a report to the Secretary of State for Transport, TSO, London 2004, p143

Evidence from London suggests this to be the case, with post-charging levels building on the trend of increased cycling and use of P2Ws. On the back of significant investment in cycle facilities as well as the impact of congestion charging, recorded cycle journeys on London's key roads have doubled in the five years to 2005, to 119,000[210]. Research by TfL into P2Ws shows that there has been a steady increase in the number of P2Ws licensed in Greater London from the mid-90s, to around 110,000 in 2005[211].

While such a shift to walking, cycling would be beneficial for a range of health, environmental and congestion reasons, and P2W use can be beneficial for congestion, these modes do present increased road risk compared to being a vehicle occupant or using public transport. In London, while there has been a welcome drop in the casualty level at the same time as the number of P2Ws licensed rises, P2Ws still account for 23% of all KSIs[212]. The picture for cyclists is more serious: although subject to fluctuations across already small numbers, it is nonetheless concerning that recent years have seen both fatal and serious injuries to cyclists rise[213]. It is important, then, that there is a programme of concerted activity prior to, during and following the implementation of pricing schemes to provide the facilities and awareness needed to minimise any increased risk associated with modal shift.

Recommendation: That a high profile cyclist and motorcyclist awareness campaign aimed at car and HGV drivers is launched in the road pricing zones to limit the increased risk of any modal shift.

Recommendation: That a set amount of revenue from pricing is dedicated to safety improvement schemes for pedestrians, cyclists and users of Powered Two Wheelers.

Driving at work

That the risk of death or injury at work is very low in the UK is a credit to the efforts of employee organisations, employers, policy makers and legislators over many years. Unfortunately, for the thousands of employees who drive in the course of their work, the same approach to risk management and upholding a duty of care has not been applied in this area.

The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) record around 450 deaths annually that involve regulated vehicles such as heavy goods vehicles, buses and coaches. However, this reporting system fails to record work-related road deaths in non-regulated vehicles such as cars and light vans and the actual figure for people killed while driving for work is much higher. Research undertaken by the work-related road safety task group, convened by the Health and Safety Executive (HSE), found that between a quarter and a third of all road traffic incidents involve someone who was at work at the time [214]. Based on 2005 figures, this would be between 800-1100 deaths a year. This compares to 226 fatal injuries to workers in the "traditional" workplace[215].

Such figures are serious in themselves, but are doubly so when considering the twin trends of the UK's predominantly services-based economy and mobile technology. The service sector often relies on building a customer base and relations of trust, which emphasises the "importance of travelling to meet clients on site and face-to-face to provide the personal

[210] GLA, "Mayor announces doubling of cycle journeys in London", 26 October 2005, http://www.london.gov.uk/view_press_release.jsp?releaseid=5944
[211] London Road Safety Unit (2007), Powered two wheeler casualties in Greater London, TfL, London, p7
[212] Ibid, p1
[213] London Road Safety Unit (2006), Casualties in Greater London 2005, TfL, p2
[214] Work-Related Road Safety Task Group, Reducing at-work road traffic incidents, HSC, London, p4
[215] HoC Work and Pensions Select Committee (2004), The Work of the Health and Safety Commission and Executive, TSO, London, p62

touch"[216]. These phenomena have given rise to 'mobile working', where the car becomes a de facto office, greatly increasing the scope for employees to be on the road both as a regular feature and a sporadic aspect of their work.

At the same time, "white van man" has entered the nation's vocabulary as shorthand to describe aggressive and dangerous light goods vehicle drivers with poor road manners[217], one hand gesticulating at traffic and the other clutching a mobile. The DfT's campaign to improve the safety record of this group observes that, in the last 10 years, the number of vans in the UK has increased by around one third and van traffic by 40%. It goes on to note that there are now three million vans on Britain's roads, and the annual volume of new registrations is around 320,000. A large part of this rise is a consequence of the home delivery sector, which has seen phenomenal growth recently due to internet shopping demands[218].

These trends indicate that new impetus must be given to highlighting road safety for people driving in the course of their employment. While the 2007 THINK! driving for work campaign highlighting the impact of road casualties on small 'white van man' businesses is commendable, a more systematic approach is required in the longer term. In the first instance, further involvement of those employer groups targeted in the DfT's campaign is needed. Training organisations can also play a key role: in this context, safe driving is an important workplace skill and should be conceived of as such. Road safety, and the pro-safety eco-driving principles, should be included in relevant training schemes. Combined, this would work towards improving safety in the short to medium term as well as generating cultural change in the longer term.

> **Recommendation: That central and local government agencies develop partnerships with non-government bodies to continue their publicity campaigns highlighting road risk to LGV drivers.**

> **Recommendation: That the DfT works in partnership with the Learning and Skills Council to introduce road safety and eco-driving to relevant formal training and apprenticeship schemes.**

In addition to awareness and training, achieving compliance with both traffic law and company policy has an important role in ensuring safe road use while driving for work. Previous PACTS research found there are high levels of non compliance amongst employees who drive for work frequently – particularly speeding by men:

> Company car drivers and drivers with high mileage are not only more likely to have a speeding conviction; they are also more likely to be involved in crashes than other drivers. Reports have consistently found that company car drivers and high-mileage drivers who drive for work are 50% more likely to be involved in injury accidents than other drivers, even after differences in exposure due to miles driven have been taken into account.[219]

Along with fatigue and in-car distractions such as phones, personal organisers and navigation aids, pressure to speed contributes to these figures, highlighted by research into mobile workers:

> It is noticeable that all of the sales related workers…felt under pressure to perform at speed. Their performance was not just measured in quantity, or even quality, it was also measured

[216] Laurier, E & Philo, C (1999), Meet you at junction 17: a socio-technical and spatial study of the mobile office, ESRC, http://web.ges.gla.ac.uk/~elaurier/texts/esrcrep.htm
[217] BBC Scotland, "Safety drive for white van man", http://news.bbc.co.uk/1/hi/scotland/5108348.stm
[218] DfT, THINK! http://www.thinkroadsafety.gov.uk/campaigns/drivingforwork/index.htm
[219] PACTS (2003), Speed Cameras: 10 criticisms and why they are flawed, PACTS & SSI, London, p4

in its quickness... Several of the transnational companies keep client call sheets which allow them to monitor the number of clients visited and the duration of each visit. And they will reprimand mobile employees who are not mobile enough. [220]

The research also comments that, "5am starts and 11pm arrivals at home are still not formally treated as work hours by their employers", indicating potential failure to consider fatigue as a risk factor. Moving a management culture away from such an alarming emphasis on 'quickness' and towards an understanding of the car journey as work is a fundamental step in improving road safety for workers. It is a long term process that will be supported by both continuing the campaign work already undertaken by many employer, governmental and road safety organisations and changes in regulatory approach – outlined below. However, in the more immediate future, reducing the ability of workers to speed, and thus reducing the pressure to speed, can be beneficial. Installing speed limiters in company vehicles is one option that begins to mitigate these known risks.

Recommendation: That Intelligent Speed Adaptation is introduced into all fleet cars.

Role of the Health and Safety Executive

PACTS has previously campaigned for the Health and Safety Executive (HSE) to take on responsibility for investigating road deaths that are suspected to have occurred while at work. In its statutory role to assist, encourage and enforce the health, safety and welfare of staff at work, its remit extends to such situations. However, the HSE currently states on its website that:

While HSE will continue to promote sensible advice to employers, in line with its workplace health and safety strategy to 2010 and beyond, work-related road safety is not a priority for HSC/E. [221]

In addition, the Chair of the Health and Safety Commission commented in a parliamentary committee inquiry that:

To be blunt, if HSE were to engage in a major enforcement and accident investigation role in this area, that would be a major distortion of our resources. We would not be able to do that and meet all the other things that we would like to do in the construction industry, migrant workers and elsewhere. [222]

Such a position fails to acknowledge the legitimate role of the HSE to actively monitor those hazards that contribute to a work-related road death or injury but which are not covered by traffic law enforcement, including:

- the general risk management processes for driving at work,
- the impact of shift work and rostering on fatigue levels,
- the implications of targets for delivery times and penalties for lateness on speeding,
- the use of vehicles as 'mobile offices' and the use of mobile phones while driving,
- the presence or absence of a driving hours policy.

On this issue the HSE has an inconsistent approach: whereas it has a commendably strong role in upholding health and safety laws in other sectors, it chooses to overlook work-related road safety issues and it should take up its rightful role overseeing this area as a matter of priority.

Recommendation: That the HSE establish and resource a road deaths investigation unit.

[220] Laurier, E & Philo (1999), C, Meet you at junction 17: a socio-technical and spatial study of the mobile office, ESRC, http://web.ges.gla.ac.uk/~elaurier/texts/esrcrep.htm
[221] http://www.hse.gov.uk/roadsafety/index.htm
[222] HoC Work and Pensions Committee (2004), The Work of the HSC/E, TSO, London p67

Powers of the Coroner

An additional option to deal more systematically with work-related road deaths is to provide the Coroner with additional powers to investigate. At present, when a person dies an 'unnatural or violent' death in England, the Coroner holds an inquest, either with or without a jury. This includes all deaths following road collisions. The coronial inquest process is designed to ascertain the cause of death without apportioning blame.

From the perspective of action on work-related road deaths, there are significant differences in the process of investigating deaths in Scotland. Section 1 of the **Fatal Accident and Sudden Deaths Inquiry (Scotland) Act 1976** provides that following the death of an employee in the course of their employment, a sheriff must hold a public fatal accident inquiry (FAI) into the circumstances of the death. The role of the sheriff in this process is similar to that of an English Coroner. However, crucially, the sheriff is instructed to determine:

> 6   (1)   (c) the reasonable precautions, if any, whereby the death and any accident resulting in the death might have been avoided;
> (d) the defects, if any, in any system of working which contributed to the death or any accident resulting in the death; and
> (e) any other facts which are relevant to the circumstances of the death.

Although the Health and Safety Act applies in Scotland and FAIs are not commonly used to investigate road deaths, in the past six years there have been three FAI reports into work-related road deaths, one of which gave in-depth consideration of factors contributing to the collision[223].

The Sheriff, in undertaking an FAI, is similarly barred from making any findings of fault or blame against individuals [224]. As such, it does not appear that such additional investigatory powers would be inconsistent with the current limitation on not determining either criminal or civil liability. To provide expanded scope for investigation, the **Coroner's Rules 1984** would need to be amended and the suggested text could read:

After section 36 (1) (c) insert –

> (d) in the case of a death while driving in the course of undertaking employment duties, the reasonable precautions, if any, whereby the death and any accident resulting in the death might have been avoided;
> (e) in the case of a death while driving in the course of undertaking employment duties, the defects, if any, in any system of working which contributed to the death or any accident resulting in the death; and
> (f) in the case of a death while driving in the course of undertaking employment duties, any other facts which are relevant to the circumstances of the death.

This would extend and expand the current role of the Coroner to ascertain "how" a death occurred, and would act to highlight the importance of preventing work-related road deaths.

> **Recommendation: That Coroners in England and Wales are given powers to investigate fatal collisions where they have involved a person driving in the course of employment.**

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[223] See Scottish Courts FAI determinations: http://www.scotcourts.gov.uk/opinions/fai_forsyth.html
http://www.scotcourts.gov.uk/opinions/macrae_fai.html
http://www.scotcourts.gov.uk/opinions/irvine.html
[224] http://www.crownoffice.gov.uk/About/roles/pf-role/investigation-deaths/fatal-accident

Recruitment and retention

Effective road safety is a product of well trained and committed staff implementing robust interventions. Recruitment and retention of qualified staff is an issue for many industries. However, the shortage of highways engineers to plan, design and implement safety related engineering schemes is of particular concern because these are recognised to provide very good cost-benefit returns. Indeed, the specific contribution of roads engineering to the achievement of the 2010 KSI reduction targets was calculated at 7.7%, with additional gains to be made via other schemes with an engineering component, such as rural safety programmes and measures for speed reduction[225].

In project consultation interviews, this was seen as partly a consequence of an earlier decline: "we need good experienced staff for accident remedial schemes and designers generally. It is getting better, but 15 years ago people didn't go into transport"[226]. The view that not enough young people are studying engineering was recently highlighted by the Royal Academy of Engineering in its research on university education of engineers:

> Between 1994 and 2004 the entries to university engineering courses remained stubbornly static at about 24,500 even though total university admissions went up by 40 per cent in the same period. [227]

In part this is a result of fashions in preferred jobs changing and the creation of new industries and with it, fewer young people studying maths and sciences to university entrance level. The widely examined shortage of specialist maths and science teachers is both a cause and a consequence of these student subject choices, as well as being affected by attractive salaries in industry[228].

For those who do choose to take engineering courses at university, an infrastructure of summer placements, career fairs and graduate recruitment programmes does exist. Nonetheless, research into recruiting and retaining transport engineers undertaken by the Hay Group commented that establishing links with engineering faculties by supporting student engineers financially and through work placements, as well as encouraging more women into the profession are important to increase the 'talent pool'[229].

Another current pressure is London winning the Olympics. The Games are an opportunity to substantially enhance the transport infrastructure of the capital, but in the construction phase, they also place demands on the current pool of transport engineers, potentially drawing them away from other projects and other parts of the country:

> There is already a skills shortage of transport planners and related professions in the United Kingdom. The [IHT] is aware that highway engineers, transport planners and other skilled staff will be involved in preparing for the Olympic Games and it is understood that resources for the Olympics will be prioritized to meet a set deadline... This is likely to divert resources away from other essential projects in the regions and probably throughout the United Kingdom. [230]

To get a clearer picture of the nature of the shortage, Transport for London, with the DfT and the London Development Agency have commissioned a research project. It will examine

[225] Broughton, J et al (2000), The numerical context for setting national casualty reduction targets, Transport Research Laboratory, Crowthorne, table 6
[226] Interviewee 12, Project consultation, July 2006
[227] http://www.raeng.org.uk/news/releases/shownews.htm?NewsID=397
[228] See: http://www.mathsinquiry.org.uk/report/index.html
   http://news.bbc.co.uk/1/hi/education/4650748.stm
[229] http://peopletorque.haygroup.co.uk/e_article000621055.cfm?x=b11,0,w
[230] HoC Transport Select Committee (2006), Going for gold: transport for London's 2012 Olympics, TSO, London, EV173

where shortages exist, their causes and what might be done to improve recruitment and retention. This will be an important step in understanding the issue and we encourage the DfT and local authorities to work with professional bodies (IHT, IHIE, ICE etc) to promote highways engineering as a discipline.

Although salary and benefits tend to be the first area for consideration when aiming to attract staff, this is not the only factor considered by existing or potential employees. Indeed, "the application of 'pay market premium' payments for some engineering roles was seen to be only a short-term fix"[231]. In the longer term, career management and progression are key. Graduate recruitment and development programmes have become common. However, for those staff who did not enter the profession through university or are beyond graduate level, structured training and development programmes, secondments and ensuring a variety of work go towards progressing through the qualification levels and, more generally, provide a rewarding working environment. In consultation interviews for this project, there were comments that local authorities have traditionally provided these kinds of training programmes, but have placed less emphasis on it in recent years. Re-establishing these programmes can play an important role in developing and retaining the 'talent pool'.

In short, a co-ordinated approach is needed to attract young people to studying or working in highways engineering, supporting them during their first years and, at the same time, providing development opportunities for established engineers and highways professionals.

> **Recommendation: That the DfT and local authorities work with professional bodies (IHT, IHIE, ICE etc) to promote highways engineering as a discipline, building on the findings of the skills shortage survey.**

[231] http://peopletorque.haygroup.co.uk/e_article000621055.cfm?x=b11,0,w

Offending and policing

In recent years there have been a number of reports discussing various aspects of roads policing in detail, including two Transport Select Committee inquiries and a previous research project undertaken by PACTS. This chapter will not repeat all those debates, but rather seek to highlight trends in offending and policing relevant to the further reduction of road casualties. These trends include, at the global level, tackling the threat of terrorist activity and, at the very local level, the safer neighbourhoods and respect agendas. While maintaining an emphasis on casualty reduction within roads policing may prove a challenge in an environment of competing high profile priorities, there is scope to build on the new interest in neighbourhood policing and ensure road safety is a key element.

As one of the three 'E's of road safety, enforcement underpins efforts to achieve compliance with traffic law and support safe road use. Human error contributes to the vast majority of casualties and, as traffic enforcement "concentrates on combating and preventing illegal or irresponsible driving behaviour [it] therefore has a major potential to reduce these types of casualties"[232]. Despite this important role, in the Transport Select Committee inquiries and the PACTS report, Policing Road Risk, the real and perceived decline in traffic law enforcement activity was commented on:

> ...there has been a long-term marginalisation of roads policing within the police as a whole. As policing changes to match changes within society and reconfigures its methods, priorities, discourses and strategies, roads policing has lost the prominence and position that it previously held. There are fewer dedicated roads policing officers; a smaller proportion of resources being dedicated towards roads policing; less priority at both national and local levels and a progressive shedding of roads policing tasks to other groups and agencies. [233]

This finding is supported by comments made in project consultation for this report by both interview subjects and online survey respondents:

> Now that traffic policing is merging back into general policing, it's not seen as important. People say 'you don't see police on the roads anymore, because they all use cameras now'. Cops in traffic departments feel like they're the Cinderella department, big ticket crime like robbery and murder get the attention. [234]

> The reduction, and in some Police forces, the complete removal of traffic officers was the worst political blunder in modern times. Not only did traffic officers over the years put a lid on say drink/driving, but they were also responsible for many arrests for crime. Restore traffic officers to their previous numbers and status and you will see a reduction in KSIs and crime. [235]

[232] Gaventa, J (2005), Policing Road Risk: enforcement, technologies and road safety, PACTS, London, p6
[233] Ibid, piii
[233] Interviewee 11, Project consultation interviews, June 2006
[234] Project online consultation

Tackling terrorism

In part, the shifting of attention away from roads policing is due to other pressures on the Police. At national and local level, initiatives have been developed to tackle anti-social behaviour, street crime and, in the larger cities, gang-related gun and knife crime. At a global level, people-trafficking is an issue that has gained a high public profile. Since the attack in New York in 2001and the Tube bombings of July 2005, terrorism has also become a major public and governmental concern. This continuing threat was again highlighted by the two failed bombings in central London and the incident at Glasgow airport in late June 2007. The head of the Metropolitan Police, Sir Ian Blair, has commented on this shift: "Britain remains a target of the highest possible priority to al-Qaeda and its affiliates; we are in a new reality"[236]. Counter-terrorism activity has thus become a significant priority area for the Police and will continue to be in future.

In the Roads Policing Strategy of 2005, tackling terrorism is listed as one of five focus areas[237]. The incidents of June 2007 bring home the potential for the road network and vehicles to be used in terrorist attacks and may lead to a new emphasis on the need for active, in-person roads policing. From a casualty reduction perspective, additional visible roads police is to be supported. Without wishing to repeat the detailed commentary on this topic made in other reports, the comments made by the House of Commons Transport Select Committee remain relevant:

> It is a matter for concern that the emphasis of roads policing has to some extent transferred from road casualty reduction work to tackling terrorism. Both objectives are clearly extremely important. The need to deal with terrorism should not reduce efforts or resources in what should be a core policing function that includes tackling the driving offences most likely to result in a collision; such as speeding and impaired driving.[238]

Neighbourhoods policing

At the other end of the scale, neighbourhoods policing has become prominent in recent years as an important element of tackling crime in the context of its impact on quality of life:

> [Neighbourhoods policing] is a real opportunity to better tackle crime and anti-social behaviour, help instill respect and decency in local areas and build more cohesive communities.[239]

Neighbourhoods policing aims to reduce crime and improve the perception of safety within a community through high visibility, sustained policing that tackles issues relevant to the local area, with a particular focus on anti-social and nuisance behaviour. It places strong emphasis on seeking out and responding to community concerns. To do this, teams of uniformed police officers work with police community support officers, special (volunteer) constables and other neighbourhood wardens (e.g.: housing association staff) to build relationships with individual members of the community as well as businesses and local groups.

In a parallel, and complementary, development, the Respect initiative has received widespread coverage for its programme of active intervention to deal with anti-social behaviour. The Respect drive "is about central government, local agencies, local communities

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[236] Sir Ian Blair, Dimbleby Lecture 2005, http://news.bbc.co.uk/1/hi/uk/4443386.stm
[237] ACPO, DfT, Home Office (2005), Roads Policing Strategy, TSO, London, p2
   http://www.dft.gov.uk/pgr/roadsafety/drs/roadpolicingcommitment
[238] HoC Transport Select Committee (2006), Roads Policing and Technology: getting the right balance, TSO, London, p25
[239] Charles Clarke MP, in Home Office (2005), Neighbourhood Policing: your Police; your community; our commitment, Home Office, p1

and ultimately every citizen working together to build a society in which we can respect one another – where anti-social behaviour is rare and tackled effectively, and communities can live in peace together"[240].

Although neither initiative is specifically roads-oriented, both offer the opportunity to highlight the need for roads policing. Concern about traffic, particularly speeding traffic, features prominently in surveys on anti-social behaviour. The 2003-04 British Crime Survey found that concern about speeding traffic was the most frequently mentioned problem anti-social behaviour at 43%[241]. More recently, as noted in an earlier chapter, around one fifth of people identified speed and the volume of traffic among the issues that most need tackling to improve the quality of life for residents[242]. With their emphasis on responding to local community concerns, there is scope to include roads policing as a consideration for neighbourhoods policing and Respect teams.

There is evidence of this happening: in London, the safer neighbourhoods teams aim to deal with the most commonly identified areas of concern raised by local residents: youth crime, anti-social behaviour – including by motorists – drug dealing and drug use[243]. The Northumbria Safety Camera Partnership explicitly positions its efforts within a 'respect on the road' approach:

> Our agenda is based upon the Government's 'Respect Agenda' which seeks to rid communities of all anti-social behaviour…Motorists interact with hundreds of other road users every day and as we see far too often in the media – a lack of respect for the road itself and other users can have tragic consequences. [244]

Roads policing has declined as a priority over time. While there is some evidence of renewed interest[245], the need to tackle terrorism, in particular, will continue to place demands on police resources. Articulating the benefits of increased roads policing within the framework of neighbourhoods policing and the Respect agenda and in terms of responding to community concerns offers additional support for increased activity.

Recommendation: That perceptions and experiences of road risks are included in all consultation and opinion surveys undertaken towards setting neighbourhoods policing priorities.

Technology

The impact of competing priorities on resources for traffic policing has been mitigated by the use of enforcement technologies, which will continue to be a feature of police work. Devices including speed and red light cameras, as well as automatic number plate recognition (ANPR) support the efficient execution of roads policing. For example, assessment showed that, "there was a 31% overall reduction in the proportion of vehicles breaking the speed limit at new camera sites. This was most noticeable at fixed camera sites, where the number of vehicles exceeding the speed limit dropped by 70%, compared to 18% at mobile sites" [246]. Additionally, "an ANPR-enabled police officer makes about nine times the number of arrests usually expected and may contribute over three times more offenders

[240] http://www.respect.gov.uk/article.aspx?id=9054
[241] Wood, M (2004), Perceptions and Experience of Anti-social Behaviour: findings from the 2003/04 British Crime Survey, Home Office, London, p6
[242] Audit Commission (2007), Changing Lanes: evolving roles in road safety, Audit Commission, London p15
Home Office (2005), Neighbourhood Policing: your Police; your community; our commitment, Home Office, 3
[244] http://www.safespeedforlife.co.uk/road_respect.asp
[245] See the letter from the Road Safety and Home Office Ministers to Chief Police Officers http://www.timesonline.co.uk/tol/news/uk/crime/article1929284.ece
[246] PA Consulting (2005), The Safety Camera Programme: four year evaluation report, DfT, London, p5

brought to justice"[247]. More recently, portable computers that provide roadside and real-time access to licensing and insurance information have proved to be very helpful in identifying unlicensed, unregistered and uninsured driving.

There is something of 'the-chicken-or-the-egg' about commentary on roads policing and technology – did technological advances cause a decline in traffic policing or support a higher level of enforcement than would otherwise have been the case. Chief Constable Med Hughes argued that the fall in traffic police numbers, "is down to other pressures of policing, not cameras. Without those cameras we still wouldn't have the traffic officers but we wouldn't be enforcing the speed limit either"[248]. There is a long-running debate on the balance between the use of officers and technology, best outlined in the reports cited above; suffice it to say here that, the Police need the wide range of technology to enable them to efficiently enforce some aspects of traffic law. Nonetheless, as important a tool as technology is to modern roads policing, it does not remove the need for officers to undertake visible, in-person policing.

> **Recommendation: That all forces have hand held computers available for efficient checking of driving licences and of vehicle licence, roadworthiness and insurance records.**

> **Recommendation: That guidance on best practice implementation of ANPR is developed and circulated by the National Police Improvement Agency to all Chief Constables.**

Drink and drug-driving

The benefit of in-person traffic policing is its role in preventing and detecting offences that devices cannot, including dangerous overtaking, risky and anti-social driving and vehicle roadworthiness checks, reinforcing road safety educational messages, discouraging lawlessness through monitoring and testing for drink and drug-driving. This last item is particularly important because evidence shows that alcohol-related deaths are not declining – although they do fluctuate – and make up just under 20% of all road deaths [249]. Evidence also suggests that drug driving is increasing. Research undertaken by TRL found, "a six fold increase in the number of collisions involving drivers who had taken an illegal substance, from 3 per cent to 18% (mainly cannabis)" between 1985-87 and 1996 and 1999 [250].

Much has been written on the need to tackle the drink-driving issue. Without overly repeating earlier commentary, it is important to note in this context that, if significant progress is to be made in reducing future casualty levels, a reinvigorated approach will be needed. In particular, young drivers are over-represented in both KSI and failed breath test statistics. This issue of young drivers is discussed further in detail in an earlier chapter.

Part of the difficulty of increasing the enforcement of drink-drive levels is, as outlined above, staffing and part is technical. It is indeed frustrating that we must yet again recommend the type approval of roadside evidential breath-testing devices as a priority to assist the Police in quickly and accurately measuring impairment. We also second the Transport Select Committee's recommendation, made in Roads Policing and Technology: getting the right balance, that the Home Office and ACPO ensure the field impairment test is used across all police authorities as an effective procedure to detect drug-driving.

> **Recommendation: That evidential roadside breath testing devices are approved as a priority.**

[247] HoC Transport Select Committee (2006), Roads Policing and Technology: getting the right balance, TSO, London, p27
[248] http://www.timesonline.co.uk/tol/news/uk/crime/article1929284.ece
[249] DfT (2006), Road Casualties Great Britain: 2005, TSO, London p25
[250] HoC Transport Select Committee (2006), Roads Policing and Technology: getting the right balance, TSO, London, p47

However, the impediments to greater action on this issue are also administrative: the successful prosecution of 'sanctioned detections' is a key way in which Police performance is measured. Unfortunately, neither drink nor drug-driving is included in this register of offences and so its priority suffers because, as one consultee put it, "what gets measured, gets done". Within the profession there is a strong sense that if drink and drug-driving were included as a sanctioned detection, it "would encourage forces to devote more resources to tackling them, with a positive effect on road safety"[251]. Recently, Chief Constable Hughes emphasised the need for their inclusion in these performance management processes:

We have been calling for over two years for drink driving and driving while disqualified to be given the same status in our policing statistics as the theft of a Kit Kat from a corner shop.

The previous Ministers for Road Safety and the Home Office acknowledged that drink and drug driving, as well as other serious offences such as disqualified driving, do not currently feature in the offences brought to justice target and "are considering how their importance can be adequately reflected in future performance frameworks"[252]. This is welcome news and we urge the Government to incorporate these offences into accountability processes at the earliest opportunity.

[251] Ibid, p15
[252] Stephen Ladyman MP and Vernon Coaker MP, http://extras.timesonline.co.uk/word/letter.doc

The Changing Vehicle

Technology

You're driving down the road when your baby suddenly turns cranky. With the press of a button, a camera beams the image of your upset infant from its rear-facing child seat in the back seat onto the dashboard in front of you. The child camera is just one of the future technologies we are developing to enhance your vision when you're in the driver's seat. Other future features incorporate cameras to help you back up safely, enhance your night vision or check your blind spot as you change lanes.[253]

No discussion of future road casualty reduction strategies would be complete without considering the role of technology, both in creating road risk and in mitigating it. The increasing popularity of nomadic devices and the introduction of driver hazard alert systems raise the issues of human-machine interface and distraction while driving. In considering how best to respond to the road safety implications of these, devising a reliable assessment procedure and providing accurate and accessible information to drivers will be important. At the same time, developing an integrated plan to manage the safe and effective introduction of technology-based safety interventions is necessary to maximise the benefits.

Attention and distraction

NEW! Garmin Nuvi 670T FM World Beater best on the market!!!!! Now in stock Garmin's nüvi™ 670 is the answer to everything..... nüvi 670 includes a colorful widescreen, hands-free calling, traffic alerts and FM transmitter, then takes it to the next level with even more maps[254]

In recent years, in-vehicle information systems (IVIS) that provide drivers with guidance, communication or entertainment have become very popular. These 'nomadic devices' include satellite navigation, hands-free mobile phones and personal music players and tens of thousands are in use every day[255]. At the same time, advanced driver assistance systems (ADAS) that alert the driver to hazards and, in some cases, subsequently take independent action are coming onto the market. Individually and in combination, these increase the array of lights, sounds and instructions the driver must respond to while executing the task of driving. With thousands of nomadic devices already in use and ADAS features now being included in top-range vehicles, managing the interaction between these systems and drivers is important for safe road use.

IVIS and ADAS driving aids have the potential to support drivers in the task of driving and improve safety levels. However, they also represent additional devices to be attended to by the driver and so present a risk of driver overload. Driving is already a complex task and the way in which these systems operate must be developed with a clear understanding of how the human interacts with the machine:

[253] http://www.ford.com/en/innovation/safety/futureVision.htm
[254] http://www.mynewcheap.co.uk/products/car-sat-nav/font-color-ff0000-face-verdana-strong-satnav-offers-strong-font/
[255] Carsten, O et al (2005), HASTE Final Report, Institute for Transport Studies, Leeds, piii
see also http://www.aide-eu.org/for_nomadic.php

In order for such systems to be most effective, the design of the driver interface (i.e., the controls and displays) and operating characteristics need to be compatible with driver capabilities to process the warning information. Driver failures to comprehend the information, select an appropriate response, or perform the response can lead to an ineffective system. [256]

This point is shown clearly by the findings of the HASTE project. In its investigation into the effect of IVISes on driving, the researchers devised tasks to accurately measure the impact of changing task difficulty in the simulator and also conducted on-road field tests using branded IVIS devices. In both the laboratory and real-world situations, HASTE found that:

The visual task, not unexpectedly, led to poor steering behaviour and degradation of lateral control of the vehicle. By contrast, with the cognitive task, the major negative effect was more on longitudinal control, particularly in car following, rather than on lateral control...although eye-movement patterns showed that this was coupled with greater concentration of gaze towards the centre of the road, at the expense of the periphery.[257]

One of the groups identified as particularly at risk of dangerous driving behaviours due to divided attention was older drivers:

...there would be severe problems for elderly drivers [60+] in using IVIS while driving, particularly at higher levels of task demand. "Average" drivers were not always able to manage the trade-off between primary and secondary task, and there were many indications of driving performance being poorest when the secondary task demand was the highest. But elderly drivers were particularly poor at this task management, so that there was more interference from IVIS use with their driving performance and safety, particularly in terms of higher order aspects of driving such as managing interaction with pedestrian at crossings while subjected to cognitive load from an IVIS. [258]

Despite these findings on the impact of splitting attention between driving and attending to an IVIS, alarmingly, there is no HMI assessment procedure that can be applied to judge the safety of a technology, alone or in combination:

[There are] no criteria which could be used by a manufacturer, a system supplier, consumer organisations or public authorities to determine whether a particular system meets a minimum threshold of safety in actual use, or for that matter, to rate or rank different products in terms of their safety while in use. [259]

This quote refers to IVIS technologies, but could equally apply to the HMI aspects of driver assistance systems. Most people are familiar with, or have seen, IVIS devices like satellite navigation and hands free mobile phone headsets which require visual and/ or cognitive attention. To give a more complete illustration of the range of technology that a vehicle may be equipped with in future, a brief overview of the various ADAS technologies is helpful. It is important to remember that each intervention on its own will likely have safety benefits, but "it is quite possible that where a variety of advanced technologies are introduced together in a vehicle, there will be negative effects on safe driving behaviour"[260].

[256] Perel, M, "Helping Older Drivers Benefit From In-Vehicle Technology", National Highway Traffic Safety Administration, USA, p441
[257] Carsten, O et al (2005), HASTE Final Report, Institute for Transport Studies, Leeds, piv
[258] Ibid, p51
[259] Ibid, piii
[260] HoC Transport Select Committee (2004), Cars of the Future, TSO, London, p36

Advanced Driver Assistance Systems

Adaptive cruise control and collision warning

Primarily for motorway driving, ACC uses, "a forward-scanning radar to monitor the time interval between the car and the vehicle in front. The driver chooses a cruising speed and the system maintains it—slowing slightly to maintain distance to the car in front when necessary"[261]. It uses both a light and a buzzer to alert the driver and the system is capable of acting if the driver fails to do so:

> If the driver does not react when the car approaches another vehicle from behind, a red light is reflected on the windscreen and a buzzer sounds... To increase the margins even more, the brake pads are automatically placed against the discs. When the driver brakes, the system monitors the pedal pressure. If the pressure is assessed as being too light, the braking power is amplified by the system" [262].

Further development is being made on this intervention so that the warning is activated at a very early stage and if the driver does not hit the brakes when needed, the system brakes automatically to slow the vehicle down.

Lane change collision warning

Another functionality is the blind spot warning system, also described as lane change collision warnings. This uses digital cameras to monitor traffic on either side of the car, illuminating a light inside the front door post when a vehicle enters the car's blind spot[263]. As this report's earlier section on the UK's ageing population showed, more older people will continue driving in future. In an American study, 35% of elderly drivers reported problems with arthritis, of which 20% claimed difficulties turning their head to look behind while driving [264]. Notwithstanding the comments above on divided attention, this technology could have particular benefits for older drivers by providing additional information in complex or heavy traffic conditions and supporting their reduced capacity to check the blind spot due to stiffness.

Vision enhancement systems

One system that is not yet available is vision enhancement systems (VES), junction assistance and specialised route guidance. VES operates in one of two ways: using a specialised infra-red camera and a head up display (HUD), night vision systems project an intensified image of the forward scene to either augment reduced nocturnal acuity or to extend the range of sight[265]. Alternatively, ultraviolet vehicle headlamps are used to illuminate the roadway with radiation, which causes fluorescent objects to emit visible light[266]. Objects in or near the roadway, such as lane markings and highway signs, can be made more visible with certain fluorescent pigments that reflect UV light and common clothes are made of fabrics that contain fluorescent materials.

Junction assistance

The European Community vehicle technology project PReVENT is undertaking research into intersection safety. The "Intersafe" project aims to develop sensor systems that can provide accurate information about the driver's vehicle and path prediction of other road users. Combining this with signal status communication, it will be possible to warn the driver of

[261] http://www.volvocars.co.uk/models/s80/FeaturesOptions.htm
[262] http://www.automotoportal.com/article/Volvo_previews_new_generation_collision_warning_system
[263] http://www.volvocars.co.uk/models/s80/FeaturesOptions.htm
[264] Yee, in Shaheen, S & Niemeier, D (2001), Integrating Vehicle Design and Human Factors: Minimizing Elderly Driving Constraints, Institute of Transportation Studies, California, p167
[265] OECD (2003), New Transport Technology For Older People, OECD – MIT International Symposium, Massachusetts, p9
[266] Cognitive Ergonomics Laboratory (1998), A Design Guideline and Evaluation Framework to Determine the Relative Safety of In-vehicle Intelligent Transportation Systems for Older Drivers, University of Calgary, Canada, p69

potentially hazardous situations [267]. An OECD report notes that tests of this technology have been done in Sweden. Interestingly, the report found that drivers used the system to confirm a suitable gap in the day time, but at night, when it is more difficult to judge distances to the bright headlights of oncoming traffic, drivers tended to watch the alert for the "OK" indication and then glance at traffic for confirmation[268].

While the literature generally finds that older people can have difficulty with in-car technology, they are also over-represented in collisions executing turns across traffic where they report not having seen the other vehicle[269]. This is largely a consequence of declines in vision, cognition and reaction times and the junction assistance technology outlined above could help drivers estimate safe gaps in traffic.

Personalised route guidance

A further in-car safety support system is specialised route guidance. Such a tool would be "a navigation system that not only provides route information, but also gives timely information about crucial elements of the next traffic situation"[270]. This would assist drivers to negotiate complex junctions or avoid traffic difficulties. A key benefit of such a system is its ability to "provide the motorist with step by step information in time to anticipate coming events. The motorist can visualize what is coming when the task load is still low"[271].

Ergonomics

The discussion above outlines a vehicle of the near-future that beeps, lights up or otherwise instructs a driver on their surroundings, fellow vehicles and route. As such, a scenario of a hands free mobile ringing while the sat-nav issues visual and verbal route guidance instructions and traffic condition information, the blind spot warning light illuminating while the cruise control function buzzes is not unfeasible. In such an overwhelming, information and signal-dense situation, attention paid to the driving task is very likely to suffer.

As noted above, there is no set of standards to ensure the safe installation and use of individual IVISes and ADASes, nor guidelines on their combined effect. Research is being undertaken around these themes – in addition to HASTE, there are several European Commission projects examining aspects of the driver-vehicle-technology interface. For example, the IN-SAFETY project aims to "use intelligent, intuitive and cost-efficient combinations of new technologies and traditional infrastructure best practice applications, in order to enhance the forgiving and self-explanatory nature of roads"[272]. IN-SAFETY bases its conclusions on a number of sub-projects that range across standardising ADAS, integrating information provision to the driver and assessing driver warning systems. Despite the range of research into the issue, manufacturers, public authorities and, importantly, consumers continue to have little or no information available to them to assist design, regulation or product choice decisions.

The HASTE project developed both an assessment test for the use of IVISes while driving and a procedure for designers to ensure HMI issues are considered at product development stage. However, the conclusions recommended further research into the test reliability and its application to specific driver groups such as older drivers. This research should be commissioned as a priority to allow a reliable assessment procedure to be implemented at the earliest opportunity. There is also scope to use this test as one element of the primary

[267] http://www.prevent-ip.org/en/prevent_subprojects/intersection_safety/intersafe/
[268] OECD (2003), op cit, p10
[269] Ibid, p10
[270] SWOV (2006), Fact Sheet: The Elderly and Intelligent Transport Systems, SWOV, Leidschendam, p3
[271] Ibid, p3
[272] http://www.insafety-eu.org/index.html

must be incorporated into the assessment. Such a move is to be supported as providing a more holistic picture of a vehicle's safety.

> **Recommendation: That the primary New-Car Assessment Programme ratings include HMI aspects of the driver assistance systems individually and in combination with other in-vehicle information systems.**

> **Recommendation: That an audit of use of vehicle performance/safety features be undertaken, to assess the extent to which they work, and are understood and used by drivers.**

Integrated implementation

The preceding discussion examined the potential implications of the lack of regulatory oversight in an area that has significant implications for road safety through driver distraction. It also highlighted how fragmented the overall approach to introducing new technologies into vehicles is. To maximise the casualty reduction benefits and minimise unintended negative safety outcomes, a more integrated approach encompassing evaluation, implementation and infrastructure is needed.

A first step would be a comprehensive evaluation process to ensure that all technologies deliver the expected safety benefits and do not increase risk. The HASTE and EC research projects outlined above are one example where assessment processes are being developed. Additionally, the DfT's 2006-07 research programme included themes on cross-cutting vehicle technology and primary and e-safety. Such initiatives should be pursued to deepen the knowledge of this sector.

While research and evaluation can be commissioned and undertaken by UK-based agencies and organisations, regulatory action arising from the findings occurs at European level. As a leader in the field of road safety, it is appropriate for the UK to pursue regulation on installation and use of technology-based safety features within the Commission as a key element of an implementation strategy. A twin aspect is implementing the primary safety EuroNCAP. One advantage of such an assessment programme would be encouraging the introduction of these features into a wider range of vehicles and accelerate the process of new technologies filtering down from top of the range to more modestly priced vehicles. Unfortunately, after several years of research, primary safety is still not included as part of the EuroNCAP and this work should be progressed as a matter of priority.

A further stage in implementing safety technology is promotion. For example, one of the most important interventions that has not yet been introduced to vehicles in this country is intelligent speed adaptation (ISA). A major trial of the system has been held and the final report submitted to the DfT. A report to Transport for London found that different 'versions' of ISA would achieve at minimum an 18% fatal accident reduction and up to 59%[273]. There are no regulatory impediments to its immediate introduction and so promotion of its benefits could encourage implementation. This is the approach taken by the Swedish Roads Administration:

> The goal should be that most of the transport industry is motivated to adapt speed to improve road safety and that vehicles are equipped with support systems for speed compliance. The SRA should be at the forefront of this call and by 2006 all of its vehicles should be equipped with such systems, after which other public bodies and ultimately the rest of the transport sector should be encouraged to do the same. [274]

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[273] Jamson, S et al (2006) Intelligent Speed Adaptation: literature review and scoping study, TfL, London, p33
[274] Swedish Roads Administration (2005), National ITS Strategy for 2006-09, no page number given

This approach has the advantage that, as public authorities and large fleets are encouraged to use the system, this provides further evidence to encourage other members of the public to consider it, towards a wide-spread acceptance of its use.

Finally, the underlying element in any strategy to reap the benefits of technology-based safety is provision of the infrastructure to support it. The case of ISA highlights this difficulty - although the technology has been proven to work and is being implemented in other countries such as Sweden and Norway, ISA cannot begin to improve road safety in the UK until a national digital speed limit map is available and maintained. Other technologies require beacons or other changes to the road environment. Planning to provide for this is an integral aspect of any safety-oriented intelligent transport systems plan.

It is appropriate that both the UK Government and the European Commission actively pursue the implementation of safety-related vehicle technologies. However, in a sector that develops fast, it would be unhelpful for government or Commission policy to be tied to any one technology; their roles are to provide the framework for the assessment and staged introduction of technologies to improve safety within the vehicle fleet.

Recommendation: That an integrated plan be developed to guide the introduction of information, driver assistance and primary safety technologies.

The changing vehicle fleet

It is not only the way the vehicle operates that is evolving; the vehicle fleet itself is changing. Although the mid-sized sedan remains the dominant model, at the two extremes the number of 4x4s and mini/ superminis is increasing: between 1997-2002, the number of 4x4s and people carriers in the new car fleet increased by 74% and the number of minis and superminis increased by 19% [275]. This is of concern because these large vehicles tend to 'export' the injuries caused when involved in a crash.

A TRL report from 2005 found that occupants of heavier vehicles are at lower risk of injury in a collision than those in a lighter one. Compared to a collision between two 'typical' cars, "when a mini/ supermini collides with a 4x4/people carrier, then on average, well over twice as many occupants of the smaller car die and one-fifth as many occupants of the larger car die"[276]. These larger vehicles also cause greater injury to pedestrians because the bumper is higher, causing injuries to the pelvis and thorax, as well as the lower limbs and head. Tackling the casualty implications of this shift in the character of the fleet is difficult, arising as it does from consumer choices. It is therefore important that those pricing mechanisms within the scope of government control are used to achieve road safety policy ends. An example of this is the use of VED as a tool to achieve lower vehicle emissions.

Earlier sections of this report highlighted the recent attention paid to the impact of transport on the environment. In line with this concern, the Budget 2007 increased the vehicle excise duty (VED) for band G vehicles to £300 in this financial year, rising to £400 in 2008-09 [277]. Subject to much discussion in the press, the move was an acknowledgement of the detrimental environmental effects of vehicles in this class, which include 4x4s and large people carriers, and an attempt to encourage car buyers towards less polluting vehicles. On its own, the Budget 2007 VED increase is unlikely to alter vehicle purchases – the Low Carbon Vehicle Partnership commented that consumers "normally require about £1000 to £1700 incentive before they are willing to downsize

[275] Broughton, J (2005), TRL629, Car occupant and motorcyclist deaths 1994-2002, DfT, London, p42
[276] Ibid, p43
[277] HM Treasury, Budget 2007, TSO, London, p185

their vehicle and select a smaller vehicle"[278] – but it does provide an example of factoring in the externalised costs of individual choice.

There is widespread agreement that graduated VED has a legitimate role in influencing consumer choices towards vehicles with lower emissions. With a changing vehicle fleet potentially leading to more and more serious injuries, and with all the attendant economic and social costs of road crashes, there is scope to use VED as a tool to influence consumer choice as a contribution to the policy goals of improving road safety.

[278] HoC Environmental Audit Committee (2006), Reducing Carbon Emissions from Transport, TSO, London, p35

Conclusion

This report has taken a broad view of some of the trends evident across society, examining them for their impact on road use and potential casualties. In this way, casualties are seen as a function of road-based mobility, but, crucially, not an inevitable or acceptable one.

This report has looked at the use of visions in other jurisdictions and the current move away from the use of targets in public service provision in the UK; at how political leadership for casualty reduction might be achieved, how resources might be directed to areas of greatest need and the impact of growing interest in personal and planetary sustainability. It has also looked at demographic issues like an ageing population and the continuing risk experienced by younger road users. And it has discussed trends in economic activity, the roles of employers and enforcers and how technology can assist in both those roles as well as aiding the individual.

Considering road casualties in their widest context and in relation to other events and changes in society allows a full and systematic analysis of causes and possible interventions. This is the message woven through this report: that a holistic approach, involving the widest range of relevant stakeholders, should underpin road safety strategy beyond 2010.

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Appendix 1

Consultation interviewees

Amy Aeron-Thomas	RoadPeace
Keith Bailey	Association of Chief Police Officers
Jeremy Broughton	Transport Research Laboratory
Nick Brown	Motor Cycle Industry Association
Alain Chiaradia	SpaceSyntax
Kevin Clinton	Royal Society for the Prevention of Accidents
Adam Coffman	CTC
Phil Cook	TMS Consultancy
Karen Cooke	Motor Cycle Industry Association
Richard Cuerden	Transport Research Laboratory
Robin Cummins	British School of Motoring
Chris Feltham	Transport for London
Brian Goodwin	Essex County Council/ County Surveyors' Society
Garry Handley	Gloucestershire County Council
Richard Hebditch	Living Streets
Andrew Howard	The AA Trust
Ben Johnson	Transport Research Laboratory
Alistair Kennedy	Risk Solutions
John Lepine	Motor Schools Association of Great Britain
Kate McMahon	Consultant
Dave Miller	Birmingham City Council
Andrew Morris	Ergonomics and Safety Research Institute, Loughborough University
Ute Navidi	London Play
Richard Olliffe	British Motorcyclists' Federation
Tony Sharp	Institute of Highway Incorporated Engineers
John Smart	Institution of Highways and Transportation
Bill Smith	Scottish Accident Prevention Council
David Smith	Retired DfT civil servant
Pat Wells	Transport Research Laboratory
Ruth Welsh	Ergonomics and Safety Research Institute, Loughborough University

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