



Report

# The political economy of road safety

A policy-oriented literature review

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# Acronyms

|             |  |
|-------------|--|
| <b>AIDS</b> | Acquired Immunodeficiency Syndrome       |
| <b>BAC</b>  | Blood Alcohol Content                    |
| <b>CBA</b>  | Cost Benefit Analysis                    |
| <b>DALY</b> | Disability Adjusted Life Year            |
| <b>GDP</b>  | Gross Domestic Product                   |
| <b>GNP</b>  | Gross National Product                   |
| <b>GRSF</b> | Global Road Safety Facility              |
| <b>GRSP</b> | Global Road Safety Partnership           |
| <b>HCA</b>  | Human Capital Approach                   |
| <b>HIV</b>  | Human Immunodeficiency Virus             |
| <b>IADB</b> | Inter-American Development Bank          |
| <b>ICD</b>  | International Classification of Diseases |
| <b>iRAP</b> | International Road Assessment Programme  |
| <b>NGO</b>  | Non-Government Organisation              |
| <b>ODI</b>  | Overseas Development Institute           |
| <b>SDG</b>  | Sustainable Development Goals            |
| <b>UN</b>   | United Nations                           |
| <b>UNEP</b> | United National Environment Programme    |
| <b>VoSL</b> | Value of a Statistical Life              |
| <b>WHO</b>  | World Health Organization                |
| <b>WRI</b>  | World Resources Institute                |
| <b>WTP</b>  | Willingness to Pay                       |

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# Executive summary

Road safety is a major international health issue, but one that rarely receives the attention it merits. Every year, an estimated 1.25 million people are killed on the world's roads and up to 50 million people incur non-fatal injuries. This makes road traffic collisions the ninth leading cause of death across all age groups globally and the main cause of death among those aged 15-29 years. On current trends, collisions will become an even more prominent global health challenge, rising to become the seventh leading cause of death by 2030.

Some 90% of road traffic fatalities occur in low- and middle-income countries, where pedestrians, cyclists and motorcyclists make up the bulk of those affected. Working-age males make up a large proportion of those killed and injured; but children, adolescents and the elderly are also disproportionately affected in many contexts. The effects of road traffic collisions are particularly felt by households from poorer socio-economic groups. They are both more likely to have a member fall victim to a collision and less able to bear the considerable costs of a funeral, medical treatment and lost income resulting from extended periods of recovery or permanent disability. For some households, the loss or injury of a member in a road traffic collision can be the difference between financial stability and poverty. At a national level, the economic costs of road traffic collisions alone are substantial – estimated at 5% of gross domestic product (GDP) in low- and middle-income countries, and totalling up to 3% of global GDP. The estimated costs of initiatives to improve road safety are dwarfed by the scale of economic and social damage currently caused by road traffic collisions.

The scale of the challenge represented by road safety is now beginning to be recognised. It was specifically addressed in two of the Sustainable Development Goals (SDGs). SDG 3 contains a commitment to halve the number of global deaths and injuries from traffic collisions by 2020. While SDG 11 contains a further commitment to improve road safety, particularly for vulnerable groups. The UN has focused attention on these issues at the highest level, resulting in the 2015 Brasilia Declaration. The Declaration called for action on a wide range of road safety issues and particularly recognised the need for multi-sectoral cooperation to address road safety and the dangers facing vulnerable road users. A number of initiatives and resources have been put in place to begin to tackle the issue through advocacy, piloting, scaling and financing. The larger of these include the UN Decade of Action for Road Safety (2011-2020), the Road Safety Fund, the Global

Road Safety Facility (GRSF) and the Global Road Safety Partnership (GRSP), while prominent smaller initiatives include Share the Road, #SaveKidsLives and the Initiative for Global Road Safety.

Historically, initiatives to improve road safety have often been structured around the collision itself. Broadly, initiatives aimed to either (i) reduce the incidence of collisions; or (ii) reduce the severity of collisions – generally with a strong focus on changing user behaviour – whether through public information campaigns (e.g. on drink driving), legislation (e.g. speed limits) or the physical road infrastructure (e.g. speed bumps). However, there has been increased recognition that the immediate causes of road traffic collisions, fatalities and injuries cannot be viewed in isolation from each other or the broader context, and that combinations of interventions demonstrate greater cost-effectiveness. This has resulted in a growing focus on system level issues and the use of simultaneous interventions at multiple levels to address the causes of road traffic collisions in an integrated and coherent manner. The 'Safe Systems' approach that underlies the UN Decade of Action for Road Safety is based on this broader understanding of how to improve road safety.

Interventions to reduce road traffic collisions, deaths and fatalities are therefore broad and involve initiatives that focus not only on roads and road design, but other issues within the broader transport system and beyond. These can be broadly divided into five groups:

1. Improvements in land use and the built environment (e.g. land zoning, traffic calming measures, cycle paths)
2. Improvements in education, legislation and enforcement of traffic regulations (e.g. speed limits, advertising public campaigns to reduce drink driving)
3. Improved vehicle and safety standards (e.g. regulations on manufacturing standards, compulsory safety features)
4. Improved availability and quality of public transport
5. Improved post-collision emergency response and care

This shift towards a 'Safe Systems' approach has also helped to highlight the importance of politics and state capacity to the successful creation and implementation of road safety policies. Successful implementation requires political momentum to initiate a range of policies to promote road safety, but also the enforcement of regulations and laws carried out in practice, as well as coherent and coordinated action between the different

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agencies and organisations at national and local level that have influence over road safety. This approach requires improving the functionality and coordination of a wide range of actors and so the task is of a different order than more traditional, technical interventions. There is strong empirical evidence that countries with well-functioning and capable state institutions experience lower levels of road traffic collisions, deaths and injuries compared to those that are weaker and less coherent.

This literature review demonstrates that there is a lack of detailed evidence on the politics of road safety. A small number of case studies of transport reforms at the city level provide some useful material and insights. The three city case studies of the political economy of road safety reforms in Mumbai, Bogotá and Nairobi will be carried out during 2017 and will provide important evidence to inform future implementation of ‘Safe Systems’ road safety approaches.

The existing literature does highlight a range of technical characteristics of education that are important from a political perspective. A key finding is that the political salience of road safety is generally low, especially when given the high number of deaths due to road traffic collisions. Most interventions have tended to focus on preventing injuries to vehicle occupants, despite pedestrians being more likely to be victims and to be severely injured or killed. These trends are partly due to many interventions originating in high-income countries where vehicle occupants make up a higher proportion of victims. They are also related to challenges of mobilisation due to collective action and coordination issues, poor data availability and the challenge of attributing causes. This is particularly the case where the individuals involved in collisions may be blamed for causing them, or where there

is no clear individual, institution, policy or design feature whose impact or negligence can be mobilised around. This is further exacerbated by the fact that road safety is a peripheral responsibility for a range of institutions, resulting in challenges with coordination and poorly aligned incentives. For example, the costs of collisions (e.g. health expenditure and reduced economic activity) are not necessarily felt by the agencies responsible for road design or law enforcement. Reducing road traffic collisions remains challenging without strong state capacity or sustained political focus from actors with wide ranging authority over state agencies (e.g. the national government or a city mayor).

A number of potential strategies have been proposed. These include advocacy campaigns to improve knowledge and build political will around improving conditions for vulnerable road users; mobilising and linking strategic stakeholders at a range of different levels; lateral approaches involving ‘Good Samaritan Laws’ or improvements to emergency medical care to increase survival rates from collisions, or integrating road safety considerations into projects and programmes whose primary focus is on improving economic development.

Despite these proposed options, there is still a need for more detailed evidence on how reform strategies emerge at the city level and what allows these to be successful. This policy-oriented literature review concludes with a framework for analysing the political drivers behind road traffic collision patterns and the enabling factors behind successful examples of reform. The objective is to provide a substantive contribution to the continuing work of global initiatives to reduce the global crisis of casualties from road traffic collisions.

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# 1. Introduction

This literature review synthesises the main messages from existing literature on the challenge of ensuring road safety – including: the overall scale of the problem, the main elements of the global response, the state of evidence on interventions to resolve the challenges and the political economy challenges underlying these issues and reform attempts.

The review focuses particularly on ensuring road safety in urban areas and outlines a conceptual framework for approaching three city case studies. These case studies will be undertaken in 2017 by the Overseas Development Institute (ODI) and the World Resources Institute (WRI).



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# 2. Situation overview

## 2.1. Who is affected and where?

Every year, an estimated 1.25 million people are killed on the world's roads and up to 50 million people incur non-fatal injuries. This makes road traffic collisions the ninth leading cause of death across all age groups globally and the main cause of death amongst those aged 15-29 years. On current trends, collisions will become an even more prominent global health challenge, rising to become the seventh leading cause of death by 2030 (WHO, 2015a).

Road traffic deaths average 17.4 per 100,000 globally, but there are significant disparities between countries by income level. Road traffic deaths are more common in low- and middle-income countries. Traffic deaths in these countries account for almost 90% of the world's road traffic deaths, despite having only 82% of the world's population and 54% of the world's registered motor vehicles. Africa is by far the worst performing WHO region, with an average of 26.6 deaths per 100,000. Overall, there has been little change in regional death rates since 2010 (WHO, 2015a). However, a systematic review of data from Africa suggests that between 1990-2015 there has been a fall in the number of deaths resulting from road traffic collisions (from 126,000 in 1990 to 106,000 in 2015), but a substantial increase in the number of injuries (from 260,000 in 1990 to 1.1 million in 2015) (Adeloye et al., 2016). The extent of road traffic injury rates varies considerably across different states. Data from Nigeria finds death rates of 160 per 100,000 and road traffic injury rates of 4,120 per 100,000. This contrasts sharply with data from Algeria and Ghana, where injury rates stood at 700 and 938 per 100,000 (ibid.). Analysis of how deaths and injuries from road traffic collisions varies by the number of vehicles on the roads would be pertinent to this discussion, but are hard to accurately estimate as available data covers only registered vehicles and not absolute numbers.<sup>1</sup>

Globally, almost half of all deaths on the world's roads are among those with the least physical protection – motorcyclists (23%), cyclists<sup>2</sup> (4%) and pedestrians

(22%), as opposed to occupants of cars and four-wheel light vehicles (31%)<sup>3</sup> (WHO, 2015a).<sup>4</sup> This is partly due to these road users being at greater risk of death and severe disability in any given collision, compared with those in cars (Ameratunga et al., 2006). However, fatality and serious injury ratios by road user type vary by WHO region. The Africa region has the highest proportion of pedestrian and cyclist deaths at 43% of all road traffic deaths (39% and 4% respectively). However, it is notable that the Africa region also has a high proportion of deaths amongst occupants of cars and four-wheel light vehicles (40%), as compared to The Americas (35%), South East Asia (16%) and the Western Pacific (22%) regions (see figure 1) (WHO, 2015a). This is partly attribute to collisions involving formal and informal modes of public and mass transport – including privately owned mini-buses, converted pick-up trucks and taxis – which are a particular feature of road traffic collision figures in Africa (Adeloye et al., 2016; Ameratunga et al., 2006). Despite the higher prevalence of road deaths in low- and middle-income countries, there is no clear linkage between country development level, the prevalence of crashes and their economic costs – particularly as a result of missing data for many low-income countries (Fletcher, 2014). The broad relationship between country income and road traffic fatalities is found in studies to resemble an inverted 'U' – with the frequency of fatal road traffic collisions rising with income at low levels of income; as the number of vehicles per head of population rises, before plateauing at moderate levels of income and then declining with increased income above that level (Grimm and Treibich, 2010). However, the underlying factors driving this pattern are not well understood. It is unclear whether they are the result of a direct income effect on road crashes, the extent of motorisation or whether, above a certain level, income becomes a proxy for wider institutional effects. The latter could include the tendency for wealthier, more developed countries to have better health systems (reducing fatality rates among those injured) or a higher degree of

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1. However, in the cases of Nigeria, Ghana and Algeria, the number of registered vehicles per head of population does not appear to be driving these trends. Analysis of data from the World Health Organization (2015) finds that Nigeria has 0.03 registered vehicles per head of population, compared to 0.06 in Ghana and 0.19 in Algeria.

2. The term cyclist refers to users of two- or three-wheeled pedal cycles, but does not include those riding motorcycles or E-bikes.

3. This would include vehicles such as mini-buses and vans, but not buses, coaches or heavy trucks.

4. Remainder is accounted for by 'Other'.

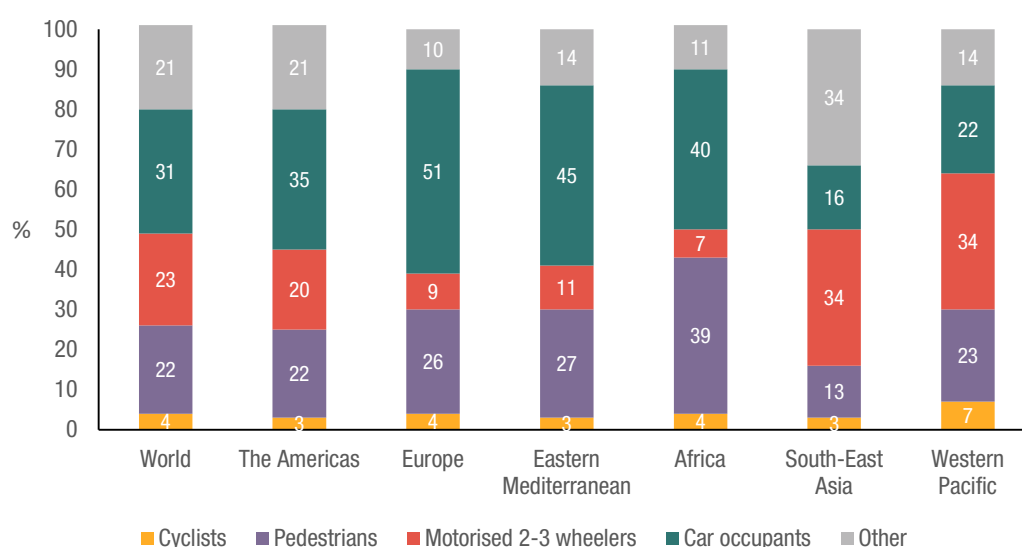
capacity and coordination across government departments (allowing more effective measures to reduce the prevalence of road traffic collisions) (ibid.). Variations in injury rates across high-income countries suggest that a direct income effect is unlikely, and therefore support the need for an improved understanding of the political economy of road traffic collisions.

The distribution of road traffic collisions and their costs by socio-economic status is also uneven. It is generally those who are poorer who are both more likely to be the victims of road traffic collisions and face severe economic consequences from the loss or injury of a family member. The poor are generally overrepresented among higher risk road users – particularly pedestrians due to the cost of transport, but also passengers of buses, trucks, motorcyclists and bicyclists – all of whom have higher risk levels and tend to be from lower socio-economic groups (Naci et al., 2009). Detailed global data on traffic collision incidence by socio-economic group is lacking, but survey data collected in a variety of locations suggests that the poorest are disproportionately affected. Research in high-income countries finds that the poor in these societies are also at more risk of road traffic collisions than the wealthy, and that the poor suffer from higher rates of morbidity and fatality from them – findings that are mirrored in some low- and middle-income countries (Aeron-Thomas et al., 2004; Ameratunga et al., 2006; Azetsop, 2010; Global Road Safety Partnership, 2004; Hajar et al., 2001, 2003).

People of working age (15-44 years), and particularly working-age males, are the demographic group most likely to be injured and killed in road traffic collisions in a number of settings, including Bangalore (India), Bangladesh, Kenya, Mexico, urban South Africa and Tanzania (Aeron-Thomas et al., 2004; Ameratunga et al., 2006; Azetsop, 2010; Hajar et al., 2003; Komba, 2007; Mabunda et al., 2008). Analysis from Mexico suggested that the road traffic mortality rate in males is nearly three times as high as that in females, with the higher male death rate being found across all types of road users (Hajar et al., 2012). This has important implications in terms of household welfare, which are explored in Section 2.2.

Children, adolescents and young adults generally make up a smaller proportion of total victims than those of working age. Nevertheless, they remain notable victims of road traffic collisions. Estimates suggest that around 186,300 children under 18 years are killed in road traffic collisions every year and globally, traffic collisions are the leading cause of death amongst children aged 15-17 years. Children in low- and middle-income countries are three times more likely to die in road traffic collisions than those in high-income countries. Boys are also more at risk than girls, with almost twice as many boys dying from injuries sustained in traffic collisions (WHO, 2015b). Children are particularly vulnerable for a number of reasons, including the fact that their specific needs are rarely taken into account in roads planning. Children are overrepresented among pedestrians, cyclists, motorcyclists and users of

**Figure 1: Transport mode of road traffic collision victim by region (percentage)**



Source: WHO, 2015a.

public transport, and a significant proportion are injured in collisions on highways. Many injuries occur after school hours in the afternoon or evenings, particularly where children are involved in productive activities such as street selling (Porter and Blaufusssm, 2004; Komba, 2007; Mabunda et al., 2008; McMillan, 2013). Children's short stature make it harder for them to see traffic and for drivers to see them. In the event of a collision, children are more at risk of serious injury. Children's limited cognitive and social development also creates risks – they find it more difficult to judge vehicle proximity and speed; younger children are impulsive and have short attention spans; and adolescents are more prone to take risks (Guerrero et al., 2011; Komba, 2007; Mabunda et al., 2008; WHO, 2015a, 2015b, 2007). However, it should also be noted that detailed data on child safety and injury rates from road traffic collisions are patchy, and mainly from studies of specific locations, rather than national level data sets.

Those who are affected vary from context to context, however. For example, female and elderly pedestrians made up almost a third of pedestrian fatalities in research conducted in four cities in South Africa. However, male, working-aged and young people were still more significant proportions of overall pedestrian fatalities (Mabunda et al., 2008). Similarly, analysis of road traffic collision fatalities in Mexico conducted by Hijar et al. (2012) found that the highest mortality burden was among those over 60 years old. This complements earlier research, specifically on pedestrian fatalities, that showed girls under 5-years and women over 50 were the most vulnerable pedestrian groups (Hijar et al., 2001).

It should also be noted that road traffic fatalities data is not robust in many countries. Definitions of what constitutes a serious injury or collision – as well as how well this data is collected – varies significantly. In many African countries, police data is the main source of traffic crash data and there is a lack of effective vital registration and active surveillance systems focused on road traffic collisions (Adeloye et al., 2016). Discrepancies often arise when comparing published police statistics and survey evidence, suggesting likely underreporting in official statistics. These are driven, in part, by poor traffic police response and poor follow-up on injured victims, as well as varying definitions of traffic fatality for real-time and chronologic data capture (Adeloye et al., 2016; Aeron-Thomas et al., 2004; Ameratunga et al., 2006; WHO, 2015a). A lack of reliable information and data on road traffic collisions is a major challenge, with limitations to reported data including underreporting of injuries to vulnerable road users, poor linkages between reporting agencies, inadequate sampling techniques,

varying case definitions and exemptions from reporting requirements.<sup>5</sup> The true pattern of road traffic collisions, injuries and death are, therefore, difficult to establish, as are comparisons of patterns across contexts (Adeloye et al., 2016). This is a challenge even in developed countries – data from the early 2000s suggest that almost one in three road-crash injuries needing hospital admission are not reported to police in the UK and New Zealand. However, this still compares favourably with Ghana, where surveys suggest as little as 8% of pedestrian injuries were reported to police (Ameratunga et al., 2006).

## 2.2. What are the costs?

### 2.2.1. Estimating economic costs

Analysis of the economic costs of road deaths and injuries are used for two main purposes: (i) to estimate the losses that are incurred by countries and regions in terms of GDP per capita; and, (ii) to make economic judgements as to the value of interventions, generally through cost-benefit analysis (CBA). These are often framed in terms of the Value of a Statistical Life (VoSL), although attempts at analysing the costs of road crashes should incorporate all possible costs to any party involved in, or affected by, the event in any way.

Two approaches are used to determine the costs: the Human Capital Approach (HCA) and Willingness to Pay (WTP) approaches. The differences between these methodologies often have a significant impact on the magnitude of costs.

**Human Capital Approach** – This involves identifying all the costs for a sample of crashes and for those that are killed or injured in them. The foregone earnings of those killed is one of the largest components and is calculated based on the mean age at which persons die in road traffic collisions, the average life expectancy or retirement age, and average wage figures. This can lead to particularly low estimates of VoSL in low-income countries, as both average wages and life expectancy will be low (Fletcher, 2014). Additional elements reflecting intangible losses (pain, grief, suffering etc.) are sometimes incorporated, but are problematic in terms of calculating justifiable cost levels.

**Willingness to Pay** – These approaches usually incorporate the values that are estimated through the HCA, but include an additional sum derived from the amount that a representative sample of the population is willing to pay to reduce the risk of injury in a road traffic collision. A questionnaire approach is usually used, based on stated preference or revealed preference methods. The sum is then adjusted to represent willingness to pay to prevent a road death. Implementing this methodology in a standardised

5. Hijar et al. (2012) analysed non-specific International Classification of Diseases (ICD) coded deaths in Mexico between 1999-2009. They found evidence of significant underestimations of the number of fatalities from road traffic collisions. Revised numbers showed an increase of between 18% and 45%, depending on the year and methodology. Fatality rates amongst male pedestrians showed particularly high levels of underestimation.

manner across contexts is challenging and estimates generally produce higher costs than those found using the HCA. This is partly a result of double-counting, as the production or income loss elements of HCA calculations will likely be factored into individuals' willingness to pay under WTP approaches.

A major challenge in using either of these approaches to estimate the global costs of road traffic collisions is that many countries do not, at present, have robust costing estimates. This has resulted in the International Road Assessment Programme (iRAP), developing an estimation method or 'rule of thumb' that can be applied to countries where there is currently no costing data. This estimation is based on the observation that VoSL estimates for a range of countries – derived from a combination of HCA and WTP calculations – are correlated with their individual country GDP per capita values. This allows iRAP to use GDP and population figures to estimate a VoSL for any given country, which can then be used to calculate the economic costs using data on the prevalence of collisions and the ratio of serious injuries to fatalities (McMahon and Dahdah, 2008).

The cumulative cost estimates produced using this approach are substantial, amounting to 5% of GDP in low- and middle-income countries and 3% of GDP globally (McMahon and Dahdah, 2008; WHO, 2015a).<sup>6</sup> However, estimates vary significantly by methodology, with World Health Organization (WHO) (2011) citing estimates of between 1% and 3% of country GNP (totalling over \$500 billion) and earlier estimates suggesting direct costs might be lower in low-income countries (1% of GNP) compared to middle-income countries (1.5% of GNP) and high-income countries (2% of GNP) (Ameratunga et al., 2006; WHO, 2011).<sup>7</sup>

Overall, there are strong reasons to believe that these figures are inaccurate and underestimate the global cost of road traffic collisions. Firstly, the challenges of data accuracy identified in the previous section make it highly likely that cost estimates are based on underestimates of total injuries and fatalities. Secondly, extrapolating estimates of costs across contexts – particularly from high-income countries to low-income countries – has severe methodological limitations and cannot be a substitute for accurate contextual data. Many of the assumptions behind this method are untested and so the estimates produced are likely to be inaccurate. Thirdly, the iRAP 'rule of thumb' assumes a linear relationship between the VoSL and GDP, which may not be a true reflection of reality – especially as much of the data used to derive it comes from high-income

countries. The fact that the data used also came from a combination of HCA and WTP studies also creates further methodological issues (Fletcher, 2014). Nevertheless, despite these issues, the 'rule of thumb' provides a useful set of benchmark figures that can be used with the caveat that they are likely to be underestimates and do not represent statistical certainties.

The effects of non-fatal road traffic collisions also need to be borne in mind. Analysis from high-income countries suggests that non-fatal events are responsible for a substantial proportion of the costs associated with road traffic collisions – with 2% of non-fatal crashes accounting for 44% of lifetime medical costs. The effect of non-fatal injuries in lost productivity is estimated to far outweigh that of fatal injuries globally, and result in a double burden on families from both loss of income and the costs of prolonged care. However, the full scale of these costs is difficult to judge given a lack of reliable data on the prevalence and costs of longer term health impacts of injuries and disability resulting from road traffic collisions, particularly in low-income and middle-income countries (Ameratunga et al., 2006).

The economic costs of road traffic collisions at the national level are important figures in themselves. Understanding the political reasons for action or inaction requires examining the distribution of these costs in society and their impact at the household level. Road traffic collisions disproportionately affect those in economically active age groups and so the direct economic cost of road traffic injuries can be devastating for affected households. These households will temporarily or permanently lose an active bread winner and may then take on additional burdens in medical expenses, funeral expenses or the challenge of caring for family members who are disabled as a result of a collision (Ameratunga et al., 2006; Azetsop, 2010; Jacobs et al., 2000; Prinja et al., 2015; WHO, 2015a).

Studies generally find that working-age males are the most common road fatalities. While these individuals are often not the head of the household, they typically provide the main source of household income and so the shock of their unanticipated death has severe financial repercussions (Aeron-Thomas et al., 2004; Ameratunga et al., 2006). These impacts are often particularly severe for the poor, who spend a much greater proportion of their income on funeral and/or medical costs than the non-poor. For example, a detailed study conducted by Kumar et al. (2012) found that the poorest group of road traffic collision victims spent around half of their annual

6. See iRAP website for graphical representation and breakdown by country income level: <http://www.irap.org/en/about-irap-2/a-business-case-for-safer-roads>

7. The inconsistency between cost estimates rising with levels of development and the fact that the prevalence of car collisions first rises and then falls with levels of development (the inverted 'u'-shaped curve) may be related to longer life expectancy in high-income countries. This means that even though proportionally fewer people are killed in high-income countries, their foregone earnings represent a higher proportion of GDP/GNP than in low-income countries.

household income on medical care as a consequence. There are also a number of indirect costs – including recovery days and time spent looking for new work. These, again, are disproportionately severe for the poor, who have less job security and so are less able to return to their previous employment, often having to accept new jobs at lower salaries.

Different households adopt different forms of coping strategy – poor households frequently borrowed money to cover additional costs, sold assets or took on extra work where possible. Research in Nigeria found that 30% of people who experienced a road traffic collision were permanently disabled and 14% were unable to return to work. Coping strategies varied, but centred around reallocations of labour between household members. The effectiveness of these strategies was also limited, with one-third of households experiencing an overall income loss and children missing school days in 5% of households (Julliard et al., 2010). The combination of direct and indirect costs leads to reduced household income and reduced food consumption for the victim's family. A mixture of research across contexts suggested that road traffic collisions can push families from a non-poor position of relative economic security to being poor (Aeron-Thomas et al., 2004; Ameratunga et al., 2006; Azetsop, 2010; Nyugen et al. 2016).

Analysis of the economic cost of fatal and non-fatal road traffic collisions in the Guadalajara metropolitan area and Jalisco, Mexico during 2007 concluded that the direct cost represented more than 30% of reported income in 8% of the emergency room users and 80% of those hospitalised. Total economic cost was almost \$330 million for the Guadalajara metropolitan area – nearly 51% of the state total (\$651 million or 1.3% of state GNP). However, the authors also noted that if WTP approaches had been used then costs could be expected to be 2 to 3 times higher (Pérez-Núñez et al., 2011). However, there is still not enough robust information available on the specific social and financial impacts of road deaths and injuries on individuals and families in low- and middle-income countries. Costing estimates often produce relatively low values, as a result of lack of data availability and inexperienced survey staff failing to fully account for costs (Fletcher, 2014).

The lack of accurate and full data on the economic cost of road traffic collisions may be one factor that contributes to low political saliency and a failure to fully implement reforms in some contexts. Politicians, policy-makers and citizens may lack an understanding of the scale of the loss and how its distribution affects the population as a whole. This reduces the understanding of the potential gains that could be made from resolving the challenges and so further minimises the urgency or pressure to do so.

## 2.2.2. Other non-economic costs

Economic evaluations of the costs of road traffic collisions attempt to incorporate a wide range of impacts. However, there are many that are hard to capture or that may have significant impacts beyond their immediate economic costs.

These include the burden on public health care caused by collisions – both in terms of providing initial treatment to those injured, but also the longer term costs of providing care to those who are disabled. In many countries where universal health coverage is lacking, these costs may fall directly to the household and particularly on women, who bear a disproportionate share of the burden of caring for sick or disabled members of the family (Ferrant et al., 2014; Hoff, 2015). In either case, they represent a significant and unnecessary burden on societal resources.

The same is true, to a lesser extent, for policing costs. Only a fraction of road traffic collisions are logged or responded to by police in many developing countries; and where police are present, they are not addressing other crime. Similarly, if roads design is poor and encourages or enables reckless driving, this may also result in an unnecessary allocation of traffic police to these areas as a deterrent. The form of police activity also matters – their active involvement in directing traffic and in controlling traffic signals can be a more efficient form of deployment than enforcement or responding to collisions. Estimates from the UK suggest that eliminating all road traffic collisions would reduce policing costs by £217 million annually (3.85% of UK spending on crime and policing between 2011-2012) – almost entirely through reductions in time spent in attending and recording collisions (The Guardian, 2012; UK Department for Transport, 2012). However, again, there is an absence of strong empirical analysis of these costs in low- and middle-income countries.

The impact on children – identified as a vulnerable group to road traffic collisions – also goes beyond foregone earnings. Serious injuries can lead to children being out of school for an extended period, as well as leaving them with considerable trauma, damaging their education and future prospects (Making the Link, 2014). Parents may also be reluctant to allow children to attend school if it involves significant dangers from unsafe commutes by foot or substandard public transport, although this is not well documented. These can amount to a serious loss of potential for the individual child involved and wider society. Again, strong empirical evidence on these losses is largely lacking for low- and middle-income countries. Theoretically, some of these costs should be captured as foregone earnings in Human Capital analyses of costs. However, in many cases, this is likely to depend on the specific model used and how sophisticated the approach to modelling the impact of education on earnings is.

Another significant issue associated with road traffic collisions is the level of traffic congestion within cities. This is linked to poor urban design, a failure to follow



or enforce traffic regulations, and the rapid growth in motorised transport outpacing attempts at management. The frequency of traffic collisions in turn contributes to traffic jams and congestion. Although establishing the extent to which congestion causes collisions and vice versa is empirically challenging, estimates suggest that the direct financial and welfare costs of congestion is considerable – accounting for as much as 3.4% of GDP in Buenos Aires, 2.6% in Mexico City and an average of 1% within the EU (The Global Commission on the Economy and Climate, 2014).

Rising levels of urban air pollution also have significant impacts, with pollution-related health costs reaching as high as 5% of GDP in some cities in developing countries. While in the case of Beijing, the total social costs of motorised transport – including air pollution and congestion – are estimated at between 7.5–15% of GDP. Almost 90% of these costs can be attributed to vehicle emissions and linked to congestion. Urban air pollution is set to be the top environmental cause of premature mortality by 2050, with poor urban development planning contributing to an estimated 730,000 premature deaths (The Global Commission on the Economy and Climate, 2014).

## 2.3. What global commitments are in place?

Two of the Sustainable Development Goals (SDGs) relate to issues of road safety:

- SDG 3 contains a commitment to halve the number of global deaths and injuries from traffic collisions by 2020 (United Nations, 2015a).
- SDG11 also makes a notable commitment regarding transport:

*Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons. (Ibid.)*

Prior to the agreement of the SDGs, an initiative that established the UN Decade of Action for Road Safety (2011-2020)<sup>8</sup> agreed a global plan for achieving improvements in road safety (WHO; 2015a, 2011). This aims to save 5 million lives, prevent 50 million serious injuries and reduce the cost of road traffic collisions by \$5 trillion, over 2011-2020. In order to achieve this, five ‘pillars’ of activities at the national and international level were proposed:

1. Road safety management
2. Safer roads and mobility
3. Safer vehicles
4. Safer road users
5. Post-crash response

The UN has also increased its focus on issues of transport and road safety in recent years. In 2014, the UN Secretary-General announced the creation of a High-level Advisory Group on Sustainable Transport and followed this by the appointment of a Special Envoy for Road Safety in 2015. There have also been two high-level ministerial conferences on road safety in the last decade: in Russia in 2009 and Brazil in 2015. The Brasilia Declaration (2015) called for action on a wide range of issues, while recognising the need for multi-sectoral cooperation to address road safety and the dangers facing vulnerable road users in particular (UN, 2015b). These actions have raised the international profile of road safety, with the aim of increasing the momentum behind reform attempts.

The major international resources for pursuing this agenda include:

- **The Road Safety Fund** – A ring-fenced fundraising initiative at the FIA Foundation, managed in partnership with the World Health Organization, which supports the implementation of the SDG road safety targets and the UN Decade of Action for Road Safety. It works by building alliances between private sector donors and NGOs to support advocacy and design and deliver evidence-based capacity building projects and injury prevention pilot programmes.
- **The Global Road Safety Facility (GRSF)** – A global partnership programme established in 2006 that is administered by the World Bank. It provides funding, knowledge and technical assistance to low- and middle-income countries, as well as working through the World Bank’s global transport practice.
- **The Global Road Safety Partnership (GRSP)** – Initiated by the World Bank Group in 1999 and hosted by the International Federation of the Red Cross and Red Crescent Societies. Its members are leading multi and bilateral development agencies, governments, businesses and civil society organisations. It aims to create and support multi-sector road safety partnerships through capacity building and training road safety practitioners, engaging actively in advocacy at all levels, providing global coordination and a recognised expert source on road safety knowledge and good practice. Its current road map runs over 2016-2020.

Other global initiatives have also been launched with participation from the UN, with major financial

8. See General Assembly resolution 64/255.

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support also coming from organisations such as the FIA Foundation and Bloomberg Philanthropies.

- ‘Share the Road’ was co-founded by the United Nations Environment Programme (UNEP) and the FIA Foundation in 2008 to combine environmental and safety agendas around urban transport. It focuses on ensuring that government policies and donor agencies make systematic investments in walking and cycling infrastructure, and link them with public transport systems.
- #SaveKidsLives was launched by the FIA Foundation, in cooperation with UNICEF. It focuses on the dangers that children face when travelling to and from school. It aims to draw attention to the high death and serious injury toll faced by school-aged children and to improve policy and road design around these issues (Silverman and Bilingsley, 2015). It is pushing governments to adopt a series of measures through its 2020 Action Agenda and Child Declaration for Road Safety.
- The Initiative for Global Road Safety is financed by Bloomberg Philanthropies, in partnership with a range of actors – including the WHO, GRSF and GRSP. It has dedicated funds of \$250 million for a 12-year period to implement interventions to reduce road traffic fatalities and injuries in low- and middle-income countries. It emphasises partnerships, data and evaluation, and local actions to improve road safety. Over 2007-2009, it funded pilot programmes in Cambodia, Mexico and Vietnam to test a number of interventions. From 2010, it then expanded these efforts to finance interventions in the 10 low- and middle-income countries that account for half of global road crash fatalities.<sup>9</sup> In 2015, a second phase was launched, addressing road traffic safety in 10 cities,<sup>10</sup> five countries<sup>11</sup> and three vehicle market regions.<sup>12</sup> The Initiative focuses on what it considers to be five proven intervention areas: (i) behavioural interventions, (ii) infrastructure, (iii)

sustainable urban transport, (iv) vehicle standards, and (v) policy strengthening.

Despite this increasing focus internationally, the level of demonstrated commitment remains relatively low. Initial cost estimates for the UN Decade of Action for Road Safety (2011-2020), put the required funding for national activities at around \$200 million per year, amounting to \$2 billion for the whole decade. This is a fraction of the annual estimated costs of road traffic collisions per annum and annual expenditure on road infrastructure by the world’s road authorities – both of which are around \$500 billion. Despite this, the combined effort of the international community on funding road safety stands at only \$10-25 million per year, leaving a considerable funding gap to be closed (WHO, 2011). What are the underlying challenges and proposed solutions? Historically, initiatives to improve road safety have often been structured around the collision itself. Broadly, initiatives aimed to either (i) reduce the incidence of collisions; or (ii) reduce the severity of collisions – generally with a strong focus on changing user behaviour – whether through public information campaigns (e.g. on drink driving), legislation (e.g. speed limits) or the physical road infrastructure (e.g. speed bumps). However, in recent years there has been increased recognition that the immediate causes of road traffic collisions, fatalities and injuries cannot be viewed in isolation from each other or the broader context, and that combinations of interventions demonstrate greater cost-effectiveness (see analysis in Chisholm et al., 2012). This has resulted in a growing focus on system level issues and the use of simultaneous interventions at multiple levels to address the causes of road traffic collisions in a coherent manner. This requires a stronger focus on system level factors and city design, with the degree of coordination between different bodies being important determinants of whether or not initiatives can be effectively and successfully implemented (WHO; 2015a, 2011).

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9. Brazil, Cambodia, China, Egypt, India, Kenya, Mexico, Russia, Turkey, and Vietnam.

10. Accra, Addis Ababa, Bandung, Bangkok, Bogotá, Fortaleza, Ho Chi Minh City, Mumbai, Sao Paulo, and Shanghai.

11. China, India, the Philippines, Tanzania and Thailand.

12. Latin America, India and Southeast Asia.

# 3. What are the underlying challenges and proposed solutions?

Historically, initiatives to improve road safety have often been structured around the collision itself. Broadly, initiatives aimed to either (i) reduce the incidence of collisions; or (ii) reduce the severity of collisions – generally with a strong focus on changing user behaviour – whether through public information campaigns (e.g. on drink driving), legislation (e.g. speed limits) or the physical road infrastructure (e.g. speed bumps). However, in recent years there has been increased recognition that the immediate causes of road traffic collisions, fatalities and injuries cannot be viewed in isolation from each other or the broader context, and that combinations of interventions demonstrate greater cost-effectiveness (see analysis in Chisholm et al., 2012). This has resulted in a growing focus on system level issues and the use of simultaneous interventions at multiple levels to address the causes of road traffic collisions in a coherent manner. This requires a stronger focus on system level factors and city design, with the degree of coordination between different bodies being important determinants of whether or not initiatives can be effectively and successfully implemented (WHO, 2015a; 2011).

The ‘Safe Systems’ approach that underlies the UN Decade of Action for Road Safety is intended to adopt this approach and the focus away from changing user behaviour alone. It is described as follows:

*“Road users, vehicles and the road network/ environment are addressed in an integrated manner, through a wide range of interventions, with greater attention to speed management and vehicle and road design than in traditional approaches to road safety. This approach means shifting a major share of the responsibility from road users to those who design the road transport system. System designers include primarily road managers, the automotive industry, police, politicians and legislative bodies. However, there are many other players who also have responsibility for road safety, such as health services, the judicial system, schools, and nongovernment organizations.”*

*“The individual road users have the responsibility to abide by laws and regulations.” (WHO, 2011)*

This section lays out some of the challenges of implementing the systems approach and then outlines the evidence for interventions that can be integrated into this approach. These are broadly categorised as:

1. Improvements in land use and the built environment (e.g. land zoning, traffic calming measures, cycle paths).
2. Improvements in education, legislation and enforcement of traffic regulations (e.g. speed limits, advertising public campaigns to reduce drink driving).
3. Improved vehicle and safety standards (e.g. regulations on manufacturing standards, compulsory safety features).
4. Improved availability and quality of public transport.
5. Improved post-collision emergency response and care.

A major challenge surrounding a variety of proposed interventions is that most have been developed for road conditions in high-income countries and there is a lack of strong, empirical evidence and raw data from low and middle income countries as to how effective these measures have been in different contexts (Ameratunga et al., 2006; Fletcher, 2014). The sections below give an outline of the different types of strategies that have been proposed and evidence on their effectiveness, drawing on evaluations from low- and middle-income countries wherever possible.

## 3.1. Challenges in implementing a systems approach to road safety

The implementation of a systems approach to road safety faces a number of serious challenges in practice. This is particularly the case in countries where the state lacks coherence and actors at different levels are responding to a range of different mandates and incentives. In these contexts, two challenges predominate. First, ensuring enforcement of regulations and laws is carried out in practice. Second, ensuring coherent and coordinated

action between different agencies and organisations at the national and local level that have an influence over road safety – whether through city design, law enforcement, regulatory actions, post-collision care, etc. These require a focus on improving the functionality and coordination of a number of actors, meaning the task is of a different order than more traditional, technical interventions.

Andrews (2014) argues that the complex task of reducing high level of road deaths – requiring a variety of agents to engage in a multiple overlapping interventions to improve the many causes behind road traffic collisions – is best understood as a governance challenge, rather than a technical problem. Improving functionality and coordination across government bodies, private organisations, NGOs and citizens is key to reducing deaths from road traffic collisions. It also makes it a fundamentally different task than, to use Andrews' example, running a postal service. Andrews argues that improvements in road safety should therefore be used as a major indicator of the state of governance in a county, as part of a shift from 'means' targets (i.e. the form that laws and institutions take) to 'ends' targets (i.e. where governance institutions are producing effective results, regardless of their form).

Andrews also argues that there are likely to be spillover effects from concerted efforts to make improvements on issues such as road safety. For example, improved policing of roads could result in lessons on improving policing generally, as well as similar effects for contracting construction and maintenance processes, and engaging with citizens to reduce harmful and antisocial behaviours. The close link between governance and road traffic collision levels is also supported by empirical analyses of cross-country data; higher levels of corruption (proxied by an international country risk guide) are significantly correlated with higher levels of road fatalities in relatively poor countries. The influence of corruption could operate through a variety of channels, including forged driving licenses, low levels of enforcement for rules and regulations, as well as low vehicle maintenance and security. However, these are all elements that are closely related to state coherence and the effectiveness of the bureaucracy, and so this may be the underlying driver of the observed correlation (Anbarci et al., 2006).

Despite these challenges, there are a number of emerging examples of the systems approach being applied at the city level. In 2013, the Life Protection Program (PPV) was introduced in São Paulo by Mayor Fernando Haddad. This focused on improving road safety, particularly for vulnerable groups, and involved a number of measures. These included city-wide reductions in the speed limit, both on arterials roads and in 11 select areas ('Area

40s') with high pedestrian and commercial activity, and the introduction of diagonal crossings, new cycle lanes and pedestrian-only zones. These measures resulted in a substantial reduction in the number of road deaths, which fell by 20.6% over 2014-2015 translating into 257 lives saved.<sup>13</sup> The 'Areas 40s' appear to have been particularly effective, with the first 'Area 40' implemented recording 71% fewer road fatalities and injuries (Silverman, 2016). Similar results are hoped for the Vision Zero policy introduced in Mexico City in 2015 by Mayor Miguel Mancera. The city experiences 1,000 deaths from road traffic collisions every year. A major aim of Vision Zero is to reduce pedestrian fatalities and injuries, with an initial goal of cutting pedestrian deaths by 35%. Its approach involves a combination of reducing speeds on major roads, introducing traffic calming measures and improving intersection design (Silverman, 2016).

The following sections examine particular forms of interventions, and the challenges of implementing them, in more detail. These are then followed by explicit examination of the political characteristics of road safety and how they intersect with attempts to implement a systems approach.

## 3.2. Improvements in the built environment and land use

Interventions related to the design of the built environment generally focus on shaping road user behaviours to reduce the likelihood of traffic collisions occurring. Some interventions will also reduce the severity of collisions when they do occur. There are several broad classes of intervention within this grouping. The first group consists of traffic calming measures that are designed primarily to reduce vehicle speed (e.g. speed bumps, chicanes and chokers), which will reduce both the frequency of collisions and their severity. These are mainly associated with lower risks to pedestrians. Research on the introduction of speed bumps in Ghana, for example, found a 55% reduction in all deaths and a 51% annual reduction in crashes in which a pedestrian was hit (Ameratunga et al., 2006). Studies in high-income countries suggest that area-wide traffic calming measures tend to be most effective (Mabunda et al., 2008).

The second group are interventions designed to reduce the frequency of collisions by separating vulnerable road users from other vehicles (e.g. raised pedestrian crossings, cycle paths, pavements, exclusive motorcycle lanes). Roads without pavements, for example, are associated with double the risk of a collision compared to those with pavements (Ameratunga et al., 2006). These typically involve some form of physical separation, but in most cases

13. These reductions were particularly strong for cyclists (deaths dropped by 34%, from 47 to 31) and pedestrians (deaths dropped by 24.5%, from 555 to 419). Declines were also seen among drivers (deaths dropped by 16.9%, from 207 to 172) and motorcyclists (deaths dropped by 15.9%, from 440 to 370).

they will require a degree of enforcement (e.g. keeping four-wheel vehicles from using motorcycle or cycle lanes) or behaviour shaping measures to elicit cooperation from road users (e.g. clearly marked pedestrian crossings). These will help to reduce collisions amongst vulnerable road users (e.g. the elderly and children), although benefits are often felt by all types of road users (Mabunda et al., 2008).<sup>14</sup> Effective planning that involves, for example, observing pedestrian and cyclist flows before design and implementation, may be particularly effective as it will ensure that cycle paths and foot paths are integrated and meet the needs of these road users. Citizens will find it easier to use these safe spaces, rather than making their own shortcuts that may place them in greater danger. Certain elements also have dual purposes. For example, crash barriers and crash cushions separate different types of road users but also reduce the severity of vehicle crashes. However, the impact of these measures on other road users such as motorcyclists is unclear (Ameratunga et al., 2006). It is also important to note that different interventions are appropriate in different contexts. Measures that will be effective on highways are not necessarily appropriate in urban areas and vice versa.

A third group consists of interventions to generate non-speed behavioural changes in drivers to reduce collision risk. Examples include improved intersection design (e.g. clear road markings, dedicated lanes and slip roads) to allow traffic to flow more easily and reduce the potential for collisions between road users; the removal of blind turns on roads and improvements in street lighting to improve visibility; and features on roads for long distance travel to keep drivers alert (Mabunda et al., 2008; WHO, 2015a; Welle et al., 2015).

Many of these measures are possible to integrate into pre-existing roads, but the most effective measures can be put in place more easily and cheaply if they are designed into new roads before construction. Mechanisms such as road safety audits at the design stage may help facilitate these forms of intervention and should be integrated into the initial stages of all town planning and civil engineering projects (Mabunda et al., 2008; WHO, 2015a). There are three principle challenges to planning in this manner. The first is that in the design of transport systems and road networks there may be clashes between approaches that maximise safety and those that seek to minimise infrastructure costs and construction time, along with attendant disruption. Safety issues may therefore be treated as a secondary priority due to the dominance of fiscal considerations. Second, transport and commercial interests may be opposed to particular forms of intervention that, while promoting road safety, may lead to disruption or

are perceived as creating commercial disadvantages (e.g. pedestrianized zones, bicycle/bus lanes, pedestrian bridges that limit vehicle height etc.).<sup>15</sup> Where these lobbies are well organised and influential, it may be harder for road safety measures to be prioritised.

The third is that rapid urbanisation is associated with informal growth and unplanned settlements that occur almost entirely without the involvement of civil engineers or considerations of issues such as road safety. These will often have high population densities, a lack of separation of different types of road users and very few, if any, improvements in the built environment focused on safety (Mabunda et al., 2008; Suffla and Van Niekerk, 2004). Analysis of data from across a range of countries found that the rate of urbanisation and population density were major explanatory factors for the level of road traffic fatalities (Grimm and Treibich, 2010). These rapid expansions can also create governance challenges in ensuring cities and towns have sufficient powers, as well as appropriate jurisdictions and resources, to adapt as urban areas expand. Strategies will, therefore, have to be developed as to how best to integrate these features into the existing road network or encourage informal settlement construction to take these issues into account.

The risk of traffic collisions is also shaped by land use patterns, which determine whether individuals are active on the roads in particular areas and how they are behaving in these areas. Petty trade on highways has been linked to high injuries rates among young men in Tanzania (Komba, 2007). Children are also frequently injured while travelling to or from school along highways, due to the distances between their homes and school, or the lack of other adequate transport options (Guerrero et al., 2011). Understanding the perspective and needs of the road user is important and failure to do so can have perverse impacts. For example, studies in Brazil, Mexico and Uganda have found that pedestrians will not necessarily use overpasses if they involve taking a longer route, particularly if they are perceived as being high-risk areas for crime. Pedestrians may instead respond by creating their own routes through traffic, increasing the risk of a collision with a vehicle and injury to themselves (Ameratunga et al., 2006). These issues are explored at length in work by the World Resources Institute Ross Center for Sustainable Cities, who examine the urban and street design issues around a number of features, including traffic calming measures; arterial corridors and junctions; pedestrian spaces and access to public space; bicycle infrastructure; safe access to transit stations and stops; and broader urban design elements (Welle et al., 2015). Linked to this are the dangers associated with 'urban sprawl' – planned developments

14. See, for example, research on the impact of protected bicycle lanes introduced in New York that finds reductions in injury rates across pedestrians, cyclists and vehicle occupants: <http://nyc.streetsblog.org/2014/09/05/new-dot-report-shows-protected-bike-lanes-improve-safety-for-everybody/>

15. It should be noted that while opposition on these grounds is common, there is strong evidence that introducing bicycle lanes and pedestrian zones can generate increased economic activity. See, for example, Tolley (2011) and a case study on Istanbul (Corek Oztas and Aki, 2014).



that are low density and characterised by large block sizes, strong separation between work, leisure and home areas, and a design focus on cars as the primary mode of transport. These are associated with more car journeys and an increased level of fatalities from road traffic collisions compared to denser and more mixed land use patterns (see Ewing et al., 2003 for an example from the USA).

### 3.3. Improvements in education, legislation and enforcement of traffic regulations

The behaviour of individual road users is the focus of a range of initiatives aimed at both reducing the incidence of road traffic collisions and their severity. The majority of these types of intervention concentrate on the changes that an individual can make to reduce risks directly, as opposed to utilising the way that the wider environment shapes behaviour and individuals' transport choices.

The root of these forms of intervention is that road users may not always act in a manner that preserves their own safety or that of others. They may engage in a range of risky behaviours that increase their chance of being involved in a collision. Drivers may drive at unsafe speeds, use vehicles that are in poor condition, or behave in an erratic or unsafe manner if under the influence of alcohol or drugs (WHO, 2015a). Equally, pedestrians may cross roads in unexpected places, behave erratically under the influence of alcohol or drugs, or fail to take counter-measures that will improve their visibility. Over half of pedestrians killed in traffic collisions in four South African cities tested positive for alcohol<sup>16</sup> (Mabunda et al., 2008) and pedestrian deaths increase markedly in the evenings, during the winter months and in the rain when they are less visible to drivers (Komba, 2007; Suffla and Van Niekerk, 2004). Road users may also fail to engage in behaviours that will reduce their chances of injury in the event of a collision – such as wearing motorcycle or cycle helmets, using seat belts or fitting adequate child restraints (WHO, 2015a).

Addressing these issues usually involves a combination of legal regulation (e.g. speed limits, criminalising drink/drug driving, driver licensing, and regulations on motorcycle helmet usage) and public awareness campaigns to encourage compliance (e.g. cyclist visibility, use of protective clothing etc.) (WHO, 2015a).

Regulatory measures to restrict the actions of high risk individuals on the roads have had success in both the UK and Malaysia. In the UK, these measures involved restricting the power and engine size of motorcycles used

by learner drivers; in Malaysia, these involved raising the legal age for gaining a licence alongside other restrictions. Indeed, graduated licensing schemes have been associated with falling injury and crash rates for young people across many developed countries (Ameratunga et al., 2006).

There is also strong evidence for a range of interventions that protect individuals in the event of a crash. Use of seat belts and child restraints have led to substantial reductions in deaths and moderate-to-severe injuries; bicycle helmets are consistently effective in reducing head and brain injuries by between 63% and 88%; and motorcycle helmets can reduce head injuries to the wearer by 72% (Ameratunga et al., 2006). However, these figures are based on studies in high-income countries and the impact of legislation will depend on how thoroughly they are enforced, as well as the extent of any unintended consequences.<sup>17</sup> Ameratunga et al. also highlight that complementary approaches are needed to ensure that safety features are of sufficient quality and that they are used correctly.

The necessity of effective enforcement and complementary approaches alongside road safety laws, such as education programmes, has been highlighted by various authors (Ameratunga et al., 2006; Mohan, 2002; Peden and WHO, 2004). It is estimated that full enforcement of road safety laws in the EU could cut deaths and serious injuries by 50%. While a package of reforms enacted in Brazil including legislation, stiff penalties, media coverage and better enforcement cut traffic fatalities by a quarter (European Transport Safety Council, 1999; Poli de Figueiredo et al., 2001). Enforcement of speed limits using speed cameras has also led to significant reductions in injuries and fatalities – particularly among pedestrians – in collision hot-spots in both the UK and South Korea. Studies in high-income countries have shown benefits from initiatives to reduce drink driving and from laws limiting working hours for commercial and public transport drivers (Ameratunga et al., 2006). Lack of enforcement of regulations around drivers licensing is noted in a number of low-income countries, which means that drivers are not well trained in how to safely operate their vehicles (Bertrand et al., 2007).

Analyses of cost-effectiveness of these forms of measures have also been positive, although the impact of different measures varies by road-user and context. Bicycle helmet use was found to be the single most cost-effective measure in the African region, while speeding controls were most effective in the South East Asia region. It should be noted, though, that combinations of interventions showed the greatest overall level of cost effectiveness (Chisholm et al., 2012). In contrast, there are significant gaps in knowledge

16. Concentrations in the sample population vary, with 42.3% having a blood alcohol content (BAC) level over 0.24 g/100 ml (Mabunda et al., 2008).

17. This is particularly the case for laws enforcing compulsory wearing of bicycle helmets. There is an ongoing debate as to the extent to which these laws deter citizens from taking up cycling and so increase risks to cyclists due to a decline in 'safety in numbers'. See, for example, the debate in the British Medical Journal (2006).

around the effectiveness of high-visibility measures for pedestrians and cyclists in reducing collisions (Kwan and Mapstone, 2006).

The strength, form and administration of legislation also needs careful consideration. In Mexico, fear of lengthy, complicated trials and corruption in enforcement, as well as laws in places such as Mexico City that have a default assumption of driver culpability, led to a situation where 90% of cases in which cars hit pedestrians were classified as hit and run. This led to increased dangers for pedestrians who are injured and abandoned (Hijar et al., 2003; Ameratunga et al., 2006). Similar issues have also been highlighted in India, where bystanders are often reluctant to intervene and assist injured parties due to fear of being drawn into prolonged legal proceedings. There are also widespread anecdotal examples of mob violence after collisions in some countries, again making those involved in collisions less willing to stop and render assistance. All of these factors has resulted in attempts to create a ‘Good Samaritan’ law (Bornstein, 2016).

Ensuring that road safety and traffic laws are properly enforced – and so able to have an impact – often requires interventions at the systems level to address issues such as the presence of traffic police; corruption; inadequate resources for enforcement; and overcoming administrative and coordination challenges (WHO, 2015a). Efforts to improve targeting may include improved data systems and information coordination between agencies, and the development of frameworks and mechanisms to align strategies – such as dedicated ministries for road traffic safety and national strategies for reducing traffic collisions (WHO, 2015a, 2011). Equally important is the adoption of multifaceted strategies noted previously. For example, combining laws mandating motorcycle helmets with effective enforcement, regulation of helmet quality and public education to ensure that helmets are used effectively (Ameratunga et al., 2006; Mabunda et al., 2008).

Issues outside of the immediate road sector will also have an influence on the risk of road traffic collisions and the effectiveness of policies. For example, improved enforcement of laws around selling alcohol to minors and already intoxicated individuals – both pedestrians and drivers – may have a significant impact given the role alcohol plays in many collisions (Mabunda et al., 2008).

### 3.4. Improved vehicle and safety standards

These forms of interventions are intended to ensure that vehicles incorporate safety features (e.g. seat belts, crumple zones, advanced braking systems) as standard, and that both vehicles and safety equipment (e.g. motorcycle helmets) comply with high standards (WHO, 2015a).

While most aim to ensure maximum protection for the user of the vehicle or safety device in the event of a crash, some may also help to reduce the number of crashes and so benefit other road users and those from vulnerable groups.

The introduction of laws for automatic daytime headlights in high-income countries has resulted in significant reductions in traffic collisions, including for pedestrians and cyclists. There is also evidence from high- and low-income countries that automatic, high-mounted brake and stop lights have reduced the number of crashes and injuries, with notable impacts on two-wheeled vehicles in Singapore and Malaysia (Ameratunga et al., 2006).

The need for multiple, overlapping interventions is particularly emphasised for regulations related to the installation of seat belts. While there is substantial evidence from both high- and low-income countries that seat belt usage significantly reduces the chances of serious or fatal injuries, the extent to which they are functional and utilised when installed varies widely (Ameratunga et al., 2006). Addressing this in a manner consistent with the ‘Safe Systems’ approach will require a combination of regulation, law enforcement and citizen education.

The composition of vehicle fleets in low- and middle-income countries is likely to reduce the impact of these forms of intervention. A larger proportion of these fleets is made up by older vehicles that pre-date safety standards and will be unaffected by new regulations. Lorries and multiple passenger vehicles (both public and private) also make up a more significant proportion of vehicles, and these have been less of a focus for safety improvements designed to protect pedestrians or cyclists involved in crashes (Ameratunga et al., 2006).<sup>18</sup> Improved safety standards will still have a positive impact in the long term, but must be combined with other approaches during the lag-period. A broadened emphasis to include the safety needs of non-occupants of the vehicle will also be required.

### 3.5. Improved availability and quality of public transport

Public transport is also a major factor, as it may encourage the use of safer forms of transport and reduce the actual numbers of vehicles and pedestrians on the road. The potential importance of this shift is clear if, for example, we consider crashes related to intoxication. Estimates suggest that a 1% reduction in motor-vehicle distance travelled is associated with a 1.4-1.8% reduction in the incidence of crashes (Ameratunga et al., 2006; Mabunda et al., 2008; WHO, 2015a). Road transport in urban areas is particularly inefficient, operating at capacity only 5% of the time while covering more than 20% of a city’s surface. Despite the rise in the number of privately owned cars, it is also striking that they are in use only around 4% of

18. Also, see Summerskill et al. (2014) on blind spot analysis for these types of vehicles, and Wallbank et al. (2015) for analysis of vehicle fleets and safety standards in Latin America, particularly Argentina, Brazil, Chile and Mexico.

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the time. Cities are therefore exploring a range of options for expanding the use of other forms of transport, which are generally less likely to be involved in collisions. For buses, this includes dedicated bus lanes and pre-boarding ticketing, but other measures include car and bike sharing schemes and the creation of car free zones. Trends in urbanisation may further contribute to the popularity of these approaches, as increased congestion and the costs of maintaining a car create further incentives to shift to other forms of transport (The Global Commission on the Economy and Climate, 2014).

In order to encourage a shift towards public transport, it is crucial that it is well regulated, of adequate quality and crime-free; not only in terms of petty theft, but also serious crime such as sexual assault, which are major concerns and act as deterrents to women's use of public transport in many contexts.<sup>19</sup> Authors have highlighted that privately operated forms of public transport are often a major source of road casualties, particularly minibuses (Daladala) and other low-cost public transportation disproportionately used by poorer socio-economic groups (Azetsop, 2010; Komba, 2007; Peden and WHO, 2004). Poor driving behaviours of these vehicles have been noted and subject to interventions aimed at addressing these behaviours (Habyarimana and Jack, 2009). These challenges have also been documented in some African countries, although collision and injury figures vary widely by country and there is a possibility that official figures overstate the proportion of victims who are passengers in public/commercial buses, due to these crashes being more likely to be reported than others (Adeloye et al., 2016). Lagos provides an interesting example of progress in this area. The city has invested in improved licensing of taxis and private transport vehicles, alongside the creation of Lagos Metropolitan Area Transport Authority, which has overhauled Lagos' bus system while making significant investment in joining-up public transport through a network of ferries, buses, and light rail lines (Kuris, 2014). The result is significant reductions in waiting times and journey times for public transport; increased affordability

of these services; passenger numbers shifting from small minibus operators to newer, safer public transport; and improved public perceptions of security and public safety (World Bank, 2016).<sup>20</sup>

### 3.6. Improved post-crash emergency response and care

An alternative approach to system level policies focus on minimising the impact of road traffic collisions. These approaches look at both the immediate health implications of injury, but also the economic implications in terms of recovery times from injury and potential for compensation.

The availability and quality of emergency care post-collision can be a major factor in determining the survival of those affected by the collision and the extent to which their injuries are debilitating later on (WHO, 2015a). Two issues that receive less attention are rehabilitative treatment for those injured and the extent of care services. Rehabilitative treatment is important as it determines how rapidly an injured individual is able to return to work. The more quickly and fully an individual is able to recover, the lesser the reduction of their contribution to the household budget and so the risk of increasing poverty levels. The extent of care services is important for similar reasons, as it affects the extent to which households must carry the burden of caring for a severely injured relative, which comes with associated immediate costs and costs of the carer's foregone labour and income. Vehicle insurance and compensation schemes can have a similar impact too; where they are widespread, households may be able to claim compensating payments that can reduce their overall loss of income resulting from the collision and injury. However, demand for vehicle insurance may be low where other forms of insurance are uncommon. Improvements in the presence, coverage and quality of these forms of services and goods will therefore have a considerable impact in terms of reducing the suffering that can result from road traffic collisions, particularly for vulnerable socio-economic groups (WHO, 2011).

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19. Research from the Thomson Reuters Foundation (2014), for example, identifies Bogotá, Lima, Mexico City, Delhi and Jakarta as the five most dangerous public transport systems for women.

20. It should be noted that road safety indicators (focusing on pedestrian traffic casualties) incorporated into the World Bank project performance assessment were eventually removed because the data available was found to be unreliable. The establishment of a baseline and reporting system at the onset of the project were not given priority and so there is a data gap here (World Bank, 2016).

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# 4. The political economy of reforms

Literature directly examining the political economy of road safety is sparse. However, relevant literature can be found on the periphery of research on a range of tangentially related issues, such as urban planning, corruption (particularly among police forces), perceptions of risk and data systems. Drawing together these separate strands gives us a more complete picture of when, how and why it may be possible to create reforms to reduce the number of injuries and deaths on the road.

The need for this form of analysis is clear. A number of global initiatives have been put in place to improve road safety, including the ‘Safe Systems’ approach and associated attempts at the national level to create improved coordination mechanisms. Steps are being made in the promotion of integrated strategies to improve road safety along with a significant growth in the number of countries with dedicated ministries for road safety and national plans. However, not all of these are fully funded and there are also gaps in terms of meaningful targets for reducing death and serious injury on the roads, which suggests that genuine political commitment is lacking (WHO, 2015a). There are also broader questions regarding how well implemented these programmes are and the factors behind their effectiveness.

Resolving the challenge of road safety requires marrying system-level, technical approaches – such as the ‘Safe Systems’ approach – with an improved understanding of the political nature of the road and transport sector (Wales and Wild, 2012). This involves grappling with what the particular characteristics of road safety as an issue mean in terms of the ability of groups to mobilise, the nature of accountability relationships and how these will vary across urban-rural, gender and socio-economic divides (Mcloughlin and Batley, 2012).

The need for strong coordination and cooperation in order to improve road safety has led to it being closely linked with the overall quality of governance in a given context (Andrews, 2014), paving the way for a broader framing of how we engage with road safety issues. As previously mentioned, the focus of initiatives is beginning to shift from individual behaviours and responsibility to the actions of system designers. However, this does not necessarily acknowledge the extent to which collective action and coordination problems between these different groups and levels may create barriers to reforms.

## 4.1. Venues for decision-making and contestation

Understanding how reforms to improve road safety happen and how change can be achieved requires an understanding of the different levels, organisations and institutions where decisions are made and contested. These will obviously vary widely from country-to-country, depending on administrative and governance arrangements, but it is possible to outline broadly the different layers that may be involved in any given context.

### 4.1.1. International targets, agreements and regulation

At the international level, we can see two forms of decision-making. The first revolves around international targets for road safety and advocacy regarding particular forms of interventions and laws, such as specific SDG targets on road safety and the UN Decade of Action for Road Safety. While these have no direct and binding impact on governments, they can act as a powerful point of coordination for groups mobilising on these issues, as well as setting clear agendas with moral force. The second is, arguably, more substantial and involves international regulatory agreements and standards relating to vehicle safety, manufacturing quality of motorcycle helmets, etc. A considerable proportion of these forms of goods are either produced or intended for sale – in jurisdictions with strong regulatory environments. Therefore, in countries that largely import these goods, weaker regulatory or enforcement capacity may not necessarily impact on the quality of these mechanisms. In contrast, domestic regulations and enforcement capacity may be more important where there is a stronger domestic manufacturing base for these goods or more limited openness to trade in them.

### 4.1.2. National government – laws and regulations

Within the nation state, the precise division of labour will depend on the extent of devolution and decentralisation in operation. Broadly, we would expect national governments to play a key role in setting laws that regulate (i) individual behaviours (e.g. compulsory motorcycle helmets, drink-driving legislation); and, (ii) standards for vehicles and safety mechanisms. This level of government is also likely

to be responsible for establishing the policy framework within which road agencies and sub-national governments operate. This will include, for example, principles regarding speed limits and road design, but also more system level issues such as urban zoning laws, laws on culpability in collisions and national investments in aspects, such as public health and care systems. Alongside these legislative roles, national governments are also generally responsible for the bulk of revenue raising and allocations, as well as monitoring the performance of national agencies. This can allow significant leverage over the priorities of other bodies, as well as an ability to shape incentives around coordination and cooperation.

#### **4.1.3. Sub-national government – implementation and enforcement**

Sub-national government – and particularly metropolitan areas – are generally responsible for the actual implementation of road design, the enforcement of traffic laws and the provision of public transportation. They are, therefore, a key focal point for decision-making on issues that will shape the road safety environment within their jurisdiction. This includes their capacity to make decisions on land use zoning and the siting of infrastructure. Metropolitan governments with strong powers and concentrated leadership are likely to be particularly well placed to address the systemic factors contributing to poor road safety, by using a range of powers, as well as their ability to coordinate the different national agencies that may operate in the city. The extent to which national authorities will be able to shape these decisions will vary. The principal mechanisms will be through the national regulatory and legal framework, and the degree of freedom that sub-national government has in allocating funding. This is likely to be limited where local revenue raising powers account for only a small proportion of funding and where central government provides funding through categorical grants for specific purposes, rather than block grants.

#### **4.1.4. Importance of state effectiveness, coordination and political credibility**

The effectiveness of the state and different levels of government to tackle the issue of road safety will depend on their ability to meet a variety of challenges. One fundamental issue is that of state capacity. Whether the state can enforce its laws and regulations and monitor their implementation by national agencies and the police will have a significant impact on the effectiveness of policy-making. It will be hard for political actors to address issues of road safety effectively where these efforts are undermined by a lack of funding, low personnel capacity, poor coordination or the influence of corruption and patronage within the civil service. For example, both Vietnam and Cambodia have successfully implemented laws requiring motorcyclists to wear helmets. However,

the impact of these laws has been variable. In Vietnam, instances of helmet-wearing increased from 40% to 95% within days of the government passing the legislation; while in Cambodia, helmet-wearing among motorcycle riders increasing from 15% to 30% overall, and from 0% to 28% among children (Purvis, 2016). The reasons for this differential impact – both in terms of the baseline and overall improvement – would be interesting to explore. They are likely to be related to credible enforcement and government capacity.

Coordination challenges are particularly important, as road safety is touched on peripherally by the actions of many stakeholders operating with different jurisdictions. Planning in siloes and coordination failures across national government ministries, road agencies and local government might mean missed opportunities to shape environments and service provision to reduce road traffic collisions. Sub-national and metropolitan governments may be well placed to coordinate within their jurisdictions, but may lack the capacity, knowledge and financial resources to do so in many cases.

A closely related issue is that of political credibility. In some contexts, politicians rely on patron-client relationships, and there are short time horizons and rent seeking is common. In such contexts, the electorate may be sceptical as to whether political actors have the incentives to deliver sustained, system-wide reforms, such as those needed for road safety, and whether they are able to do so given the limitations of government capacity. In these circumstances, voters are unlikely to view road safety as an issue that politicians can address, and so they will pursue private solutions (e.g. wearing motorcycle helmets, driving cautiously, etc.) or localised improvements (e.g. traffic calming on a particular street) to the extent they can, and focus their political demands on areas where action seems more credible. In the areas of road safety, therefore, politicians may focus on highly visible, quick win interventions that can be personally attributed to them (e.g. pedestrian bridges). These endeavours may not have a significant impact on road traffic fatalities, but politicians are unlikely to be blamed directly for continued fatalities and so have fewer incentives to pursue systemic change.

These different levels of government and authority present a range of challenges and potential entry points for reforms aimed at improving road safety. A number of recent examples of reform at the city level, which have achieved varied levels of success, are highlighted in Section 4.1.5.

#### **4.1.5. Reforming transport at the city level – Lagos, Surakarta and Alexandria**

Three strong examples of city level transport reforms emerge from the literature: in Lagos (Nigeria), Surakarta (Indonesia) and Alexandria (Egypt). Yet it is striking that these efforts were primarily focused on improving urban transport more generally, rather than specifically aimed



at reducing road traffic collisions or fatalities. Preceding sections have noted successful examples of cities that have reduced road traffic collision fatalities (i.e. Sao Paolo and Mexico City); however, these studies do not examine the politics of how reforms were achieved.

The three examples in this section serve to demonstrate the strategies and approaches that can be effective at a city level and how they interact with enabling conditions at the national level. This analysis can be used to inform future research, specifically on the politics of city level reforms aimed at reducing road traffic collisions and fatalities.

The case studies in Surakarta (2005-2011) and Lagos (1999-2012) are similar in that they involve charismatic elected mayors, who took power following a period of democratic transition and decentralisation. In both cases, they were able to make use of newly acquired powers for local government, but faced different problems and so used different strategies.

**Sukarta, Indonesia (2005-2011):** During this period in Surakarta, mayor Joko Widodo (now President of Indonesia) was faced with the challenge of a rapid increase in street vendors in the centre of the city. They caused considerable congestion and loss of open space. The issue was resolved by the formation of a dedicated technical team that undertook careful and continuous engagement with the vendors and the NGOs who represented them. The team was able to broker an agreement where vendors would move to appropriate and specially constructed facilities that were well served by public transport. The city government also used careful surveying of the vendor community to design incentives to encourage them to migrate (e.g. free carts, affordable loans, temporary tax exemptions, etc.). These measures were sold to the broader electorate through appealing to existing sentiment for vendors needing to be moved. Pressures came particularly from established shopkeepers, with the promise that the improved business environment would generate sufficient revenues to cover costs. This initial success also helped speed up negotiations to relocate street vendors in other areas of the city and so reduced congestion and collision risks more widely. This success was then rewarded electorally – Widodo was re-elected in 2010 with almost 91% of the vote (Majeed, 2012a).

**Lagos, Nigeria (1999-2012):** In Lagos, there were two successive elected governors – Bola Tinubu (1999-2007) and Babatunde Fashola (2007-2015) – involved in reforms covering 1999-2012, following the end of military rule. These two politicians allowed strong continuity of policy, with the second, Babatunde Fashola, having been the chief of staff for Bola Tinubu during his terms as Mayor and retaining many of the same ministers and officials once he took office in 2007. Lagos had deteriorated considerably over the preceding 30 years. An oil financed boom in the 1970s was followed by two decades of unaccountable and

short-term military governors. The transport system was chaotic, with massive traffic issues and roads impassable to pedestrians. To overcome these challenges, a combined strategy was adopted that utilised long-term investments, accompanied by a series of quick wins and an approach of picking highly visible low-hanging fruit. This approach combined regulation of private transport vehicles and considerable investment in public infrastructure and transport. The creation of the Lagos Metropolitan Area Transport Authority – a semi-autonomous government agency – allowed the development of a joined-up public transport through a network of ferries, buses, and light rail lines. Alongside this, there were improvements to the road network, dividing the city into zones to ease administration and using a combination of new walkways, street signs and street lights to improve safety and reduce crime. Informal markets were shut down and there was a major focus on improving the behaviour of drivers. This last intervention was controversial, with complaints that the special police force created for this task overzealously enforced rules. They too became subject to reforms following a series of cases over fine issuance. Despite this, these tactics were defended as having produced results. The two mayors had different political styles, with Bola Tinubu being an important local power broker who used connections to ensure support for his policies and those of his successor. Babatunde Fashola was seen as less political and so was better able to weather the change in the federal government to ensure the relationship did not become antagonistic (Kuris, 2014). This combination of approaches, political skill and taking advantage of circumstances are important lessons to bear in mind when considering potential entry points and opportunities for reform.

**Alexandria, Egypt (1997-2006):** The case of Alexandria provides a notable contrast to the two case studies above. Reforms were undertaken by Governor Mohamed Abdel Salam El-Mahgoub during the authoritarian rule of President Mubarak – who was an official appointed by the government, rather than directly elected. The highly centralised nature of the Egyptian system made it hard for local administrators to set priorities and implement projects, with local officials reporting to national ministries, rather than the governor and having limited control over budgets. The city's infrastructure had become increasingly eroded and service delivery problems were common, with heavy traffic clogging the Corniche – a 22 kilometre stretch of coastal road in the city – peaking at almost 4,000 vehicles an hour. Governor Mahgoub was able to secure funding from central government and appealed directly to the local population to support reforms, succeeding in widening the Corniche to five lanes in each direction and greatly improving the traffic flow. Local support was built and sustained using a combination of highly visible and high profile projects to build momentum, rising revenues from improvements in the

local economy, and using the media and public meetings to cultivate the Governor's image as someone closely engaged with the population and genuinely concerned for the city. An important aspect in this case study is the manner in which relationships with the national government created an enabling environment. Governor Mahgoub had a good existing relationship with President Mubarak through his military experience, which created leverage with national officials. Additionally, this leverage also allowed him to win back support for the regime among the populace, following an increasingly visible presence of the Muslim Brotherhood (MB) in Alexandria, with the MB operating schools and health clinics (Majeed, 2012b). However, despite these reforms, road traffic collisions actually continued to rise in Alexandria between 2000-2009 (Wahab, 2011). Evidence increasingly suggests that road widening is not an effective approach to reducing congestion or risks of collision, and may actually lead to greater vehicle travel, more traffic and so a greater risk of collision (Welle et al., 2015). Thus, while Alexandria presents an interesting example of how transport reforms can be successfully enacted in more authoritarian and centralised settings, the actual policies pursued were not effective in the long-term improvement of road safety.

These different cases demonstrate how a variety of strategies can be used across levels of government under different regimes to promote reforms and improve transport and road safety at the city level. Section 4.2 will examine how the particular characteristics of road safety create opportunities and challenges for reform.

## 4.2. The nature of roads safety as an issue

The nature of road safety as an issue can help to explain the challenges for collective action to reduce road traffic collisions and the pattern of policies that emerge. The fact that technical characteristics have political implications has been explored extensively in a number of sectors (McLoughlin and Batley, 2012); and applying a similar framework to road safety provides us with useful insights. This exercise is complicated, however, by the fact that road safety measures cover a wide range of interventions with varying technical characteristics. However, these differences do also go some way towards explaining the differing mixtures of interventions and policies that are observed in different contexts.

### 4.2.1. Nature of the 'good'

Road safety is broadly 'non-rival' – improved road safety for one person or group does not necessarily prevent road safety for others. However, there are a number of

circumstances where different actors may treat it as rival. Interventions designed to improve safety may be perceived as having negative externalities for some groups – for example, automobile associations and users may oppose speed limits that are lower or more rigorously enforced, as they view them as creating unnecessary inconvenience for drivers.<sup>21</sup> Similarly, a focus on road safety for some groups may mean that measures to improve it for others are neglected – for example, many regulations focus on the safety of car users, while there is comparatively little focus on the needs of vulnerable road users, such as pedestrians. Therefore, despite the generally non-rival nature of road safety, there may be conflict between groups over safety measures. This comes with the resulting actions, or lack of actions, being determined by groups' relative ability to mobilise and exert influence on public authorities.

This is related to the fact that, while improved road safety is broadly 'non-excludable' (i.e. individuals cannot be directly excluded from improved road safety), individual interventions will not necessarily lead to improvements for everyone. While benefits will be focused on specific groups of road users (e.g. campaigns for increased seat belt usage will improve safety for those in vehicles, but not outside of them) or road users in a particular area (e.g. campaigns to redesign particular junctions to reduce collisions). Therefore, we may see a collective action issue for interventions that help a wide range of road users and so are non-excludable. Instead, we would expect activity to be concentrated on aspects that have a clearly identifiable constituency who will benefit (e.g. car safety or redesign of certain junctions). However, there will also be disputes over reforms where they are perceived as disadvantaging a specific group (e.g. speed limits and car drivers).

### 4.2.2. Market failure characteristics

The extent to which road safety exhibits a 'monopoly tendency' also varies by aspect. Approaches that are more systemic (e.g. municipal road design and public transport availability) have a high degree of monopoly tendency. However, aspects that are more closely related to individual safety (e.g. driving behaviours, purchase and the use of safety devices such as helmets or seat belts) have a very low degree of monopoly tendency. This variety means there are a number of strategies that can – and will need to be – pursued in order to improve road safety. Aspects with low monopoly tendency can be pursued by citizens themselves and so can be encouraged through information and education campaigns that do not necessarily need to be organised by the state. In contrast, the aspects with high monopoly tendency require more complex strategies to shape state policy and then strategies that will ensure

21. It should be noted that there are circumstances where lower speed limits, and improved enforcement of existing limits, can lead to better traffic flow and higher, or only slightly reduced, average speeds. For a recent example from Grenoble, see: <https://www.grenoble.fr/actualite/75/103-ville-apaisee-grenoble-a-30-km-h-depuis-le-1er-janvier-2016.htm>

that a lack of coordination or capacity does not undermine reforms.

There are also a range of ‘information asymmetries’. For example, between producers and consumers in terms of the safety of public transport or vehicles purchased for private use (Dionne et al., 2012). National and international regulations and guidelines on car manufacturing standards can close some of these gaps by ensuring that consumers have access to safer vehicles by default. For example, the UN established seven minimum recommended standards for newly manufactured vehicles in early 2016 (Purvis, 2016). However, these require states to have the will and capacity to enforce these standards, which creates a secondary information asymmetry for consumers if they do not know how well regulations are being applied. Civil society can play a useful additional role in checking and disseminating information. For example, the FIA Foundation is supporting the Global New Car Assessment Programme to crash-test cars in Latin America, India and South-East Asia and publish the results (Purvis, 2016).

Information asymmetries may also exist between politicians, road designers and road users; and between individual road users. They lack information on the likely presence, behaviours and risk of other road users (Dionne et al., 2012). The latter are the basis for training drivers to encourage adherence to a joint set of rules and are reinforced through a range of incentive programmes to improve road user behaviours (e.g. fines and points-based license systems). Information asymmetries between politicians, road designers and road users may lead to coordination challenges between actors in attempts to improve safety on the roads and are harder to overcome without concerted leadership, as outlined in the city case studies in Section 4.1.5.

An important characteristic of road safety is that most approaches and aspects exhibit strong externalities. Decisions made while driving affect not only the driver, but also others in the vehicle and elsewhere on the road. These issues have been particularly highlighted in terms of informal public transport, where reckless driving (combined with low vehicle standards) contributes to high rates of collisions and injuries (Habyarimana and Jack, 2009). A number of interventions have been tried to encourage passengers to speak up and demand safer driving through evocative messaging in long distance minibuses. This has resulted in reductions in collision rates and insurance claims in Kenya, with plans to expand these interventions in Tanzania, Uganda and Rwanda (Habyarimana and Jack, 2009; Purvis, 2016).

Similarly, the creation of the built environment around roads will have a strong impact on people’s actions and the repercussions, but few of the gains or losses these entail can be easily captured by decision-makers or designers.

Even decisions that would be expected to have relatively few externalities, such as whether or not to wear a helmet, will have repercussions in terms of impacts on public health services and the costs borne by households in caring for those with more severe injuries or disabilities. In many contexts, there is also a disconnect between the services that bear the costs of road traffic collisions (e.g. health and social welfare departments) and the agencies whose actions most directly impact road traffic collisions and make the decisions on investments in road safety measures (e.g. road authorities and police). These externalities may therefore lead road authorities and police to place a lower priority on issues of road safety, as they are not directly impacted by them as other departments (Fletcher, 2014). Given this range of externalities, we would expect road safety to be under-supplied in terms of both the actions taken by individuals and government departments, due to an inability to capture the gains of improvements.

As noted previously, overarching political leadership and interconnected government that encourages coordination may be able to overcome the challenges caused by externalities. This may partly account for the fact that wealthier countries with stronger institutions<sup>22</sup> and lower levels of corruption tend to have lower rates of road fatalities (Anbarci et al., 2006; Grimm and Treibich, 2010). However, ideas have also been proposed to ensure that externalities are felt by authorities with the ability to influence decisions – for example, international donors could refuse to finance road projects that did not meet minimum safety standards or incorporate road safety planning (Purvis, 2016). These demands would, however, need to be accompanied by credible monitoring and enforcement mechanisms. An alternative approach proposed by Inter-American Development Bank (IADB), the FIA Foundation and iRAP is the use of Social Impact Bonds to create financial incentives. These provide focus on the reduction of road traffic collisions and injuries by agencies that do not normally capture the benefits of the reduction. Initial attempts have been made in Mexico, where road concessionaires have been made responsible for the costs of collisions. However, these are at early stages and there is a lack of rigorous evidence so far (Fletcher, 2014).

Road safety also has some of the characteristics of a ‘merit good’. Individuals from groups that are at high risk of involvement in a traffic collision tend to underestimate their risk level. They may engage in riskier behaviours or fail to invest in safety measures as they prioritise short-term utility gains over the risks (Andersson, 2008; DeJoy, 1989; Sandroni and Squintani, 2004). This will be particularly the case in terms of risk groups such as men and young people. It also has an effect on propensity to engage in speeding and drink/drug driving. However, it

22. Referred to here, after North (1991), as the basic ‘rules of the game’ in a political system. This includes formal systems, such as constitutions, laws, and regulations, as well as informal norms of behaviour, such as habits, customs, and ideologies.

should also be noted that some low risk groups tend to overestimate their likelihood of being involved in a crash. Therefore, they may have additional incentives for taking actions on these issues and implementing measures to curb the dangerous behaviours of others (Andersson, 2008). Shifting risk perceptions and behaviours thus shapes a range of interventions – including public campaigns to increase people’s understanding of the risks involved and legal restrictions on driver behaviour.

Approaches on this have varied. A focus on road user education and ‘shock therapy’ have been notable in campaigns in Australia and New Zealand. Advertising campaigns aimed at reducing speeding and drunk-driving, and encouraging the use of safety belts have been linked to a reduction in road deaths (Guria and Leung, 2004). In Thailand, the recent ‘7% campaign’ aims to prevent the seven child fatalities that occur every day on Thailand’s roads. The campaign uses a combination of popular bands and social media to promote motorcycle helmet use among young people – only 7% of whom use them. The campaign tries to create a positive message around helmet use and involves cooperation across a range of organisations, including the FIA Foundation, Save the Children, the AIP Foundation, enforcement agencies, public health leaders and educators. It is important, however, to ensure that messages speak to those whose behaviour they aim to change and overcome the challenges of mobilisation and resistance to measures from certain groups. A novel approach was taken in Bogotá, where mimes were used to ridicule pedestrians and drivers who flaunted traffic rules (Bishai et al., 2008).

#### **4.2.3. Task-related characteristics<sup>23</sup>**

Traffic collisions are highly visible when they occur. But poor data collection and reporting levels may mean that the true scale of the issue is not well understood and individuals are only aware of issues on their routes. Visibility of the issue may, therefore, be low in many developing contexts (Adeloye et al., 2016; Aeron-Thomas et al., 2004; Ameratunga et al., 2006; Mabunda et al., 2008; WHO, 2015a). Visibility may also vary across groups, particularly as data is poor and generally not disaggregated, causing political actors to overlook the scale and severity of pedestrian traffic injuries (Dandona, 2006; Mabunda et al., 2008).

The measurability of road safety also has significant political implications. Good data systems may be able to capture the numbers of those injured or killed in collisions, but multiple factors will contribute to any given collision. Individual human error will often be blamed and system level issues ignored, as they are less visible. Research in

India found that members of parliament rarely made enquiries on road safety issues to the Ministry of Roads, Transport and Highways or the Ministry of Health and Family Welfare; and parliamentarians were generally informed that main cause of road crashes was human error. Roads data also focused on the number of crashes and fatalities, but not the age, sex or type of road user. Politicians therefore lack a detailed understanding of the underlying causes of road traffic collisions or those affected by them. This leads them to concentrate on a narrow range of policy options that were largely framed in terms of drivers (Dandona, 2006).

An exception to issues of poor visibility and measurability will be particular stretches of road or intersections where collisions are particularly frequent and which are often used by the same group of individuals, i.e. there is high transaction intensity. This might make willingness to mobilise on safety for these areas more likely. However, there is a danger that collective action problems will dominate unless there is a common institution that can act as a focal point, such as the roads around schools or specific neighbourhood associations. Some authors note that these can be developed, but that there can be issues of sustainability unless state funding is provided alongside community involvement (Howat et al., 2001). The results of localised mobilisation are also likely to be highly localised and ignore system level issues. More broadly, there is low transactions intensity in that road systems are designed and redesigned relatively rarely. While communities often find it difficult to engage meaningfully in consultations and planning processes, even in developed countries – reducing accountability before the fact (Howat et al., 2001).

The high degree of discretion and professionalisation in road safety provision also creates challenges in ensuring enforcement and attributing impacts. Traffic police, for example, have considerable discretion in applying penalties for dangerous road offences (e.g. speeding, drink/drug driving, dangerous driving, etc.) and in many low-income countries, may overlook offenses in exchange for bribes (Andvig and Fjeldstad, 2008; Nantulya and Reich, 2002). Examples of progress and police reform can be seen, for example, in Mexico City. Here, the creation of community policing programmes, building trust with the public and professionalising the police through better pay and conditions has seen improvements in policing overall (Jackson, 2014). Under-resourcing and low priority for traffic issues can also present a challenge here – higher intensity police patrols were associated with a 17% reduction in collision rates in Uganda. (Bishai et al., 2008). Vehicle and driver licensing agencies may also be subject to

23. This refers to McLoughlin with Batley (2012), who argue that the manner in which particular services or issues (e.g. road safety, road system design, policing) are provided has implications for how accountability relationships operate in practice. For example, delivery of piped water is highly visible and easy to measure. This means there are a range of possibilities for accountability by users or the state. In contrast, learning outcomes are often less visible and hard to measure, while teachers have a great deal of discretion and are highly professionalised, which in turn creates a range of accountability challenges in education.



similar weaknesses in terms of discretion and corruption (Bertrand et al., 2007; Nantulya and Reich, 2002). These can undermine the effectiveness of legislation designed to provide disincentives for dangerous behaviours, as well as to ensure high standards of both vehicle maintenance and driver skills.

There is also likely to be a significant gap in knowledge between road designers and politicians in terms of the likely impact of road layouts. It may also be hard to provide accountability where data on traffic collisions is aggregated at higher levels or by administrative areas that may not align with sections of the road network (Rifaat et al., 2010). Road engineers are likely to consider the impact of a road layout in terms of safety and so their level of discretion is likely only to be an issue where they overlook safety issues, or where they privilege the convenience or safety of particular groups (e.g. car occupants). In these circumstances, the lack of effective oversight and accountability may become an issue.

#### **4.2.4. Demand characteristics**

In terms of frequency, individuals may use roads frequently but despite high levels of road traffic collisions, they are still relatively infrequent for any given individual or household. Africa's high rate fatality rate of 26.6 traffic collision deaths per 100,000 still crudely amounts to only a 0.027% risk for any given individual in any given year. Therefore, the reduction of road traffic collisions in the abstract may not feel like an immediate priority, particularly if collisions are viewed through the lens of personal responsibility or culpability rather than as a result of public policy choices (WHO, 2015a). Similarly, road traffic collisions are generally not predictable for the individuals concerned and high risk groups tend to underestimate their risk of being involved in a collision (Andersson, 2008; DeJoy, 1989; Sandroni and Squintani, 2004). All of these factors are likely to combine to make a reduction in road traffic collisions a relatively low priority for citizens. Territoriality will be an important factor in mobilisation as it intersects with questions of frequency, transaction intensity and measurability of road safety. However, this tends to favour some types of road safety investments in particular locations, rather than an approach which addresses issues across the system (Howat et al., 2001).

Overall, the political salience of road safety is low, particularly when considering the high number of deaths due to road traffic collisions and how they compare to other, more high profile health issues (Dandona, 2006; Mabunda et al., 2008). It is also striking that much of the focus of interventions comes from the perspective of preventing injuries to vehicle occupants. This is partly due to many interventions originating in high-income countries. However, it is also related to the challenges of mobilisation outlined above, poor data and the challenge of attributing causes, particularly where individuals involved in collisions may be blamed for human error. It has been argued that since the number of and severity of pedestrian traffic injuries is often unknown to politicians, there is a need for sustained advocacy campaigns. Such campaigns should improve knowledge and build political will around a focus on vulnerable road users, who form the greatest proportion of road traffic injury victims worldwide, rather than the safety of car occupants (Ameratunga et al., 2006; Mabunda et al., 2008). There is a growing international focus on these issues that may help to shift awareness and incentives in the long term, while a range of other national level strategies are also being pursued.

A key element of many strategies is to mobilise a range of strategic stakeholders at different levels – including communities, schools, the Department for Transport, as well as local and provincial governments. These also link to high-level political support from both national and international organisations. Integrating vulnerable groups or communities into policy campaigns is key to ensuring that strategies are well grounded and to ensuring there is public accountability for road safety agencies (Nantulya and Reich, 2003).

Alternative strategies take a more lateral approach. For example, the SaveLife Foundation in India petitioned the Supreme Court following a failure to make headway with legislators. Using constitutional provisions on government responsibilities to ensure no one is deprived of life, it ordered the creation of a 'Good Samaritan' law that protects those who help victims of road traffic collisions, take them to hospital, and help them from being charged with the hospital fees or unnecessarily detained by authorities. This has created publicity and momentum that SaveLife has then been able to use to encourage actions in other areas (Bornstein, 2016).



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# 5. Proposed approach for city studies

This literature review has highlighted the scale of the problem of road safety, the range of factors that contribute to it, a series of strategies intended to combat it and the political challenges that must be overcome in order for policies to be successful. However, the review has also highlighted the absence of in-depth and detailed research that fully considers the political aspects of road safety to provide practical strategies as to how policies can be utilised and challenges overcome.

In order to address this gap, three case studies have been proposed that will examine the issue of road safety and existing road safety issues within major global cities. The case study cities are:

- Mumbai, India
- Bogotá, Colombia
- Nairobi, Kenya

The study of the phenomenon through the lens of cities is particularly attractive. This is because it combines the need to understand road traffic collisions as the product of system level factors, with the fact that many elements of policy design and implementation around roads and transport is conducted at the local level. Research at the city level will also highlight practical strategies that can be pursued to reduce road traffic collisions and the political coalitions behind them. They will also give insights into how local authorities engage with national level regulations for this sector.

The three case studies will each take one of two approaches. Some will be problem-driven, identifying a particular road safety challenge affecting the city, the factors underlying it and suggesting strategies for resolving them. Others will be positive case studies, analysing examples of successful interventions in order to understand what factors have contributed to their success and what would enable them to be emulated elsewhere.

A methodological approach that is applicable for both types of case studies is outlined below in four broad stages and more detailed guidance can be found in the Annex. The approach is derived from the literature review section of this paper. It combines a data audit and analysis approach to define the problem of road safety in the context, followed a problem-driven political economy analysis drawing on existing ODI methodology (Harris,

2013). The underlying assumption of this approach is that actors make decisions based on the incentives that they face in the context of their particular institutions and contexts. These are likely to vary across actors (government officials, politicians, NGO activist, citizen, car user, etc.) and across different levels of governance (i.e. international, national, sub-national, city, neighbourhood, etc.) A key element of this approach is therefore defining the fora and venues in which decisions are being made, as well as the actors involved in these decisions and the incentives that are (or can) drive their actions.

The first stage for the case studies is to examine the overall pattern of road traffic collisions, injuries and fatalities and determine whether there are specific groups (defined by road user type, socio-economic status, age and gender) or areas of the city that are particularly badly affected, or have seen rising risk levels. This will allow the case studies to decide which problems to focus on and will help to guide investigations of underlying issues that need addressing. For positive case studies, the focus of this analysis will be on which groups or areas have seen marked declines or a levelling off in trends in the number of collisions, injuries and fatalities. This then allows investigation of whether there is a causal link to interventions and through which channels they are operating. Data sources for this step will include figures collected by road authorities and police reports, and, for positive case studies, impact analysis reports. As noted previously, the depth and disaggregation of data may be lacking; where this is the case, it may be necessary to supplement the analysis by conducting small scale surveys or qualitative interviews.

Following the initial identification of affected groups and areas, the second stage further refines the problem definition by examining immediate and underlying causes. This will involve a combination of data analysis, reviewing of existing literature and interviews with relevant authorities and organisations.

Road traffic levels, traffic density and the prevalence/type of vehicle ownership/use may all have an impact on the risk of road traffic collisions, particularly if they have changed rapidly. Analysis of patterns of urban development, with specific focus on areas of rapid and largely unplanned expansion, will also highlight if land use and urban design are likely to be a risk factor. Equally,

it may be useful to examine the proportion of collisions that result in severe or fatal injuries, as this will indicate whether post-crash care is the key issue rather than the prevalence of road traffic collisions.

Reviews of existing literature and analysis, alongside interviews with key authorities, should examine a wide range of potential causal factors. Questions will be tailored according to the groups identified in the initial analysis of traffic collision patterns. For example, are there cultural norms that make drink-driving acceptable, encourage fast driving amongst adolescent groups or discourage the use of safety features such as bike helmets or safety belts? Have traffic laws and regulations of the type examined in earlier sections been legislated for? Are these laws strongly and fairly enforced by the police, and how well implemented are regulations around vehicle quality and driving licences? Is there joined-up planning around the placement of public transport, foot paths and public organisations such as schools? Has there been investment in infrastructure to reduce road traffic collisions? Is the impact of road traffic collisions considered when arranging urban planning, land use zoning or the construction of new roads and transport infrastructure? For positive case studies, this process is inverted by examining the channels through which the intervention was supposed to operate and the extent to which they proved to be effective, as well as other challenges that the intervention did not address, or were able to overcome. This phase of the analysis should result in the identification of a series of causal pathways behind the trends in road traffic collisions. These will then be analysed further to determine the underlying causes of these problems and – for positive case studies – how it was possible to overcome them.

The third stage begins to move explicitly into the terrain of political economy analysis and the examination of the role of different political actors. The key outcome of this process is an understanding of which actors have influence or jurisdiction over the problem identified, whether they have been able to take effective action and what factors have facilitated or blocked progress. Key elements are likely to include (i) the challenges of coordinating across multiple agencies and levels of governments – particularly where road safety seems tangential; (ii) the challenge of enforcing traffic laws and regulation; and (iii) creating political saliency and priority for the issue of road safety. The analysis of the technical aspects of road safety as an issue will also provide a useful guide here and highlight where there are certain challenges in coordination, enforcement, attribution and mobilisation. The process of analysis can be broken down into three main steps:

**Step 1:** Mapping the jurisdictions of different actors – what responsibilities are held by national governments, national road agencies and local/municipal government and its departments? Who sets which policies and who is then

responsible for carrying them out? What are the reasons underlying poor implementation/enforcement?

**Step 2:** Examining the issues of coordination across these different agents. Do different organisations coordinate their approaches (e.g. education officials working with public transport officials on joined up plans)? Do actors that have jurisdiction over the problem consider road safety issues to be a priority (e.g. urban planning officials)? Is there common local leadership or authority that could convene the different actors and enforce cooperation across them (e.g. directly elected city mayors)?

**Step 3:** Analysing the extent and potential for political mobilisation – is road safety considered to be an important issue or one that politicians at the national or local level are held responsible for? What would (or does) motivate local leadership to make decisions to improve road safety and law enforcement in these areas? Are the groups identified by the problem analysis able to effectively mobilise (e.g. through political parties, neighbourhood associations, parents' groups etc.) and, if not, what challenges prevent them from doing so? Are there important political actors or constituencies that will be disadvantaged by reforms or that have other priorities? What allows them to mobilise more effectively?

For positive case studies, this stage would involve process tracking around the intervention – looking at the organisations implementing the intervention, which organisations they worked with, identifying actors encouraging a focus on this problem and enabling the interventions, as well as analysis of how they negotiated the different interests involved and overcame implementation challenges.

The fourth and final stage of analysis will take different forms for the positive and problem-solving case studies. For the former, this will involve considering which elements of the experience and strategy may be transferable to other contexts and the lessons this holds for future programmes in the same context. For the latter, it will identify plausible pathways to achieve change. This will draw on the analysis of the previous steps to identify (i) the problems that are most tractable – given the constraints and challenges identified; (ii) the different actors who, individually or collectively, have the power to have an impact on these problems; (iii) the domestic or external actors who may be able to exert influence to change the problematic priorities and behaviours; and (iv) strategies for persuading these actors to mobilise and act on these issues, in line with their political and social incentives. These should aim to identify multiple potential pathways to achieve change and explicitly lay out the assumptions underpinning them. This will allow agencies attempting to achieve change to begin to experiment with different approaches to resolving the

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problems and to learn through their experiences of doing so, rather than relying on a single intervention.

These case studies should allow us to begin to close some of the knowledge gaps in the existing literature. This will be important in developing more effective strategies for reducing and eliminating injuries and deaths from road traffic collisions worldwide.

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# Annex: Proposed methodology for city-based road safety and sustainable transport case studies

The literature review has highlighted the scale of the problem of road safety, the range of factors that contribute to it, a series of strategies intended to combat it and the political challenges that must be overcome in order for these to be successful. However, it has also highlighted the absence of in-depth and detailed literature that considers the political aspects of road safety and provides practical strategies for how these can be utilised or overcome. In order to address this gap, three case studies have been proposed that will examine the issue of road safety and existing road safety issues within particular major global cities. These are:

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- Nairobi, Kenya

The study of the phenomenon through the lens of cities is particularly attractive. It combines the need to understand road traffic collisions as the product of system level factors, with the fact that many of the elements of policy design and implementation around roads and transport is conducted at the local level. Research at this level will also highlight practical strategies that can be pursued to reduce road traffic collisions and the political coalitions behind them. It will also offer insights into how local authorities engage with national level regulations for this sector.

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**Figure 2: Methodology**

|         | Problem-driven case studies  | Positive case studies   |
|---------|--|---|
| Stage 1 | Identification of groups/areas with high rates of road traffic collision injuries                                | Identification of groups/areas with improvements in rates of road traffic collision injuries linked to the programme/intervention                 |
| Stage 2 | Problem identification – mapping key causal factors behind identified patterns of road traffic collisions        | Identification of causal pathways and factors that the programme/intervention operated through  |
| Stage 3 | Identification and analysis of influential actors, potential incentives and enabling/blocking factors for reform | Process tracking of programme/intervention implementation and analysis of enabling/disabling factors - including mapping of actors and incentives |
| Stage 4 | Summary of potential strategies and entry points   | Summary of lessons learnt and their applicability to other contexts   |

The methodology for both types of case studies is outlined below in four stages (see Figure 2). The approach arises from the literature review section of this report, combining a data audit and analysis approach to define the problem of road safety in the context, followed a problem-driven political economy analysis drawing on existing ODI methodology (Harris, 2013).

The underlying assumption of this approach is that actors make decisions based on the incentives that they face in the context of their particular institutions and contexts. These are likely to vary across actors (government officials, politicians, NGO activist, citizen, car user, etc.) and across different levels of governance (i.e. international, national, sub-national, city, neighbourhood,

etc.) A key element of this approach is therefore defining the fora and venues in which decisions are being made, the actors involved in these decisions and the incentives that are (or can) drive their actions.

### Stage One:

The first stage for the case studies is to assess existing analyses and sources of data to determine the overall pattern of road traffic collisions, injuries and fatalities. This will reveal whether there are specific groups (defined by road user type, socio-economic status, age and gender) or areas of the city that the case study analysis should focus on. The extent, detail and disaggregation of existing data is likely to vary, and so where necessary, interviews

**Table 1: Stage One**

| Problem-driven case studies   | Positive case studies  |
|---|--|
| <p><b>Process:</b> Assessment of the scale and trend of road traffic collisions, injuries and fatalities (based on existing analyses), to identify particularly affected groups. Cleavages could include:</p> <ul style="list-style-type: none"> <li>• Road user type</li> <li>• Socio-economic status</li> <li>• Age</li> <li>• Gender</li> <li>• Areas of the city</li> </ul> <p><b>Sources:</b> National road authorities, national health authorities, national statistical officers, city transport offices, city police reports, city health authorities; supplementary data from interviews with officials at these agencies.</p> <p><b>Output:</b> Identification of those groups or areas that have (i) high rates of collisions, injuries or fatalities and/or (ii) rapid increases in rates of collisions, injuries or fatalities.</p> | <p><b>Process:</b> Assessment of the scale and trend of road traffic collisions, injuries and fatalities (based on existing analyses), focusing on the targets of interventions and encompassing:</p> <ul style="list-style-type: none"> <li>• Road user type</li> <li>• Socio-economic status</li> <li>• Age</li> <li>• Gender</li> <li>• Areas of the city</li> <li>• Ratio of collisions resulting in deaths or serious injury</li> </ul> <p><b>Sources:</b> Programme/intervention evaluation documents, impact analysis reports; broader data from national road authorities, national health authorities, national statistical officers, city transport offices, city police reports, city health authorities.</p> <p><b>Output:</b> Identification of those groups or areas that have seen significant decreases (or positive trend changes) in rates of collisions, injuries or fatalities that may be causally linked to the programme/intervention of focus.</p> |

with officials at relevant agencies may help to identify and define affected groups/areas.

### Stage Two:

Following the initial identification of affected groups and areas, the second stage further refines the focus of the research by examining the immediate causes of the observed trends. The lines of inquiry taken will be informed by the groups identified in Stage One. For example, if the focus is on pedestrian casualties then there will be little need to investigate the presence or implementation of laws concerning motorcycle helmets

or car safety standards. However, issues such as changes in traffic levels or vehicle use may be relevant, as may the prevalence of drink-driving and the effectiveness of driver licensing. If the focus is on collisions in a particular area of the city, then issues of land use zoning and the extent of joined up planning on roads infrastructure may be particularly relevant. This will not involve an in-depth analysis of all the potential factors involved, but rather a broad mapping of the relevant city and road traffic collision literature to identify key factors and relevant initiatives.

**Table 2: Stage Two**

| Problem-driven case studies  | Positive case studies  |
|--|--|
| <p><b>Process 1:</b> Overview of existing data analyses on recent trends in key transport indicators, including:</p> <ul style="list-style-type: none"> <li>• Overall traffic levels</li> <li>• Traffic density</li> <li>• Prevalence of vehicle ownership, overall and by type</li> <li>• Prevalence of vehicle use, overall and by type</li> <li>• Urban development (focusing on unplanned and rapid development)</li> </ul> <p><b>Sources:</b> National road authorities, national health authorities, national statistical officers, city planning offices, transport offices, city police reports, city health authorities; supplementary data from interviews with officials at these agencies.</p>   | <p><b>Process 1:</b> Overview of existing data analyses on recent trends in key transport indicators – particularly related to the intervention/programme in question, including:</p> <ul style="list-style-type: none"> <li>• Overall traffic levels</li> <li>• Traffic density</li> <li>• Prevalence of vehicle ownership, overall and by type</li> <li>• Prevalence of vehicle use, overall and by type</li> <li>• Urban development (focusing on unplanned and rapid development)</li> </ul> <p><b>Sources:</b> Programme/intervention evaluation documents, impact analysis reports; broader data from national road authorities, national health authorities, national statistical officers, city transport offices, city police reports, city health authorities.</p>   |
| <p><b>Process 2:</b> Review of road traffic collision factors related to the group or area identified. These should ideally be linked to the city or country in question. Areas of focus could include:</p> <ul style="list-style-type: none"> <li>• Cultural norms <ul style="list-style-type: none"> <li>– Drink-driving</li> <li>– Speeding</li> <li>– Use of motorcycle helmets/safety belts</li> </ul> </li> <li>• Legal framework <ul style="list-style-type: none"> <li>– Speed restrictions</li> <li>– Compulsory motorcycle helmet/seat belt usage</li> <li>– Vehicle standards</li> <li>– Driver licencing</li> </ul> </li> <li>• Extent and fairness of law enforcement <ul style="list-style-type: none"> <li>– Traffic police</li> <li>– Vehicle/driver licencing authorities</li> </ul> </li> <li>• Extent of joined up planning <ul style="list-style-type: none"> <li>– Placement of public transport, foot paths and public organisations (e.g. schools)</li> </ul> </li> <li>• Extent of road traffic collision considerations in city planning <ul style="list-style-type: none"> <li>– Land use planning</li> <li>– Road construction</li> <li>– Siting of transport infrastructure</li> </ul> </li> <li>• Presence/extent of investment in public transport</li> <li>• Presence/extent of investment in road safety programmes and infrastructure <ul style="list-style-type: none"> <li>– Education campaigns</li> <li>– Lane widths</li> <li>– Separate cycle/pedestrian lanes</li> <li>– Overpasses/pedestrian crossings</li> <li>– Traffic calming measures</li> <li>– Etc.</li> </ul> </li> </ul> <p><b>Sources:</b> Existing academic and international literature; think tank/research centre/NGO reports; analyses published by national/city traffic authorities; national road safety strategies; public expenditure data from national/city finance ministry; theories of change/evaluation/programme documents for existing interventions; interviews with key informants – agency officials, NGO activists, academics, etc.</p> <p><b>Output:</b> Identification of 2-3 key causal factors underlying high and/or rising rates of collisions, injuries or fatalities amongst the focus group/area.</p> | <p><b>Process 2:</b> Identification of channels through which the programme/intervention was intended to operate and extent to which these were effective. These could include changes in:</p> <ul style="list-style-type: none"> <li>• Cultural norms <ul style="list-style-type: none"> <li>– Drink-driving</li> <li>– Speeding</li> <li>– Use of motorcycle helmets/safety belts</li> </ul> </li> <li>• Legal framework <ul style="list-style-type: none"> <li>– Speed restrictions</li> <li>– Compulsory motorcycle helmet/seat belt usage</li> <li>– Vehicle standards</li> <li>– Driver licencing</li> </ul> </li> <li>• Extent and fairness of law enforcement <ul style="list-style-type: none"> <li>– Traffic police</li> <li>– Vehicle/driver licencing authorities</li> </ul> </li> <li>• Extent of joined up planning <ul style="list-style-type: none"> <li>– Placement of public transport, foot paths and public organisations (e.g. schools)</li> </ul> </li> <li>• Extent of road traffic collision considerations in city planning <ul style="list-style-type: none"> <li>– Land use planning</li> <li>– Road construction</li> <li>– Siting of transport infrastructure</li> </ul> </li> <li>• Presence/extent of investment in public transport</li> <li>• Presence/extent of investment in road safety programmes and infrastructure <ul style="list-style-type: none"> <li>– Education campaigns</li> <li>– Lane widths</li> <li>– Separate cycle/pedestrian lanes</li> <li>– Overpasses/pedestrian crossings</li> <li>– Traffic calming measures</li> <li>– Etc.</li> </ul> </li> </ul> <p><b>Sources:</b> Programme/intervention theory of change, evaluation documents, impact analysis reports etc.; interviews with key informants – implementing agency officials, NGO activists, academics etc.</p> |

| Problem-driven case studies | Positive case studies   |
|-----------------------------|---|
|                             | <p><b>Process 3:</b> Identification of (i) the range of causal pathways that the programme/intervention operated through and which the key ones were; (ii) any unintended impacts and (iii) relevant challenges that the programme/intervention either did not address or was not able to overcome. These would draw on the above examples.</p> <p><b>Sources:</b> Programme/intervention theory of change, evaluation documents, impact analysis reports etc.; interviews with key informants – implementing agency officials, NGO activists, academics etc.</p> |
|                             | <p><b>Output:</b> Identification of (i) 1-2 key causal pathways underlying falling or positive trend shifts in collisions, injuries or fatalities amongst the focus group/area; (ii) identification of unintended impacts and consequences; (iii) identification of 1-2 relevant key causal pathways that were not utilised by the programme or where the intervention failed to achieve an impact.</p>   |

### Stage Three:

The third stage begins to move explicitly into the terrain of political economy analysis and examining the role of different actors. The aim of this process is to identify the underlying systemic drivers of the immediate causal factors identified in Stage Two and to map which actors have influence or jurisdiction over the problem identified, whether they have been able to take effective action and what factors have facilitated or blocked progress.

Key elements are likely to include (i) the challenges of coordinating across multiple agencies and levels of

governments – particularly where road safety is not their primary focus or priority I; (ii) the challenge of enforcing traffic laws and regulation; and (iii) creating political saliency and priority for the issue of road safety – including where issues of road safety have been linked to wider policy priorities (e.g. improvements in transport efficiency/availability). The analysis of the technical aspects of road safety as an issue will also provide a useful guide here – highlighting where there are particular challenges in terms of coordination, enforcement, attribution and mobilisation.

**Table 3: Stage Three**

| Problem-driven case studies   | Positive case studies   |
|---|---|
| <p><b>Process 1:</b> Mapping the main actors that have power and influence over the problems identified in Stage 2 and their incentives. Key questions will include:</p> <ul style="list-style-type: none"> <li>• What responsibilities are held by national governments, national road agencies and local/municipal government and its departments?</li> <li>• Who sets which policies and who is then responsible for carrying them out?</li> <li>• Which actors exert power/influence over: <ul style="list-style-type: none"> <li>– The problems/proximate causes identified?</li> <li>– The formulation, legislation and implementation of proposed solutions?</li> </ul> </li> <li>• What are the main incentives driving the decisions of different actors in relation to road safety issues, policies and interventions?</li> </ul> <p><b>Sources:</b> National constitutions, national policy documents, national road safety strategies; interviews with key informants – national and city agency officials, NGO activists, academics etc.</p> | <p><b>Process 1:</b> Tracking the political process behind the programme/intervention being set up, including:</p> <ul style="list-style-type: none"> <li>• Mapping the power and responsibilities held by national governments, national road agencies and local/municipal government and its departments</li> <li>• Analysis of the forum/fora in which the programme/intervention was contested or created (legislative, regulation, decree, spending allocations; national/sub-national venue; public opinion, individual behavioural change etc.)</li> <li>• Analysis of which actors were responsible for setting relevant policies and who was then responsible for implementation</li> <li>• Organisations/actors that campaigned for the programme/intervention</li> <li>• Organisations involved in the implementation of the programme/intervention, or that otherwise exerted power and influence over it</li> <li>• Process by which organisations were persuaded to implement/co-operate on the programme/intervention</li> <li>• Organisations/actors that opposed/ resisted the creation and implementation of the programme/intervention</li> <li>• Incentives underlying decisions of different actors</li> <li>• Adaptions and changes in strategy that enabled implementation to be successful</li> </ul> <p><b>Sources:</b> National constitutions, national policy documents, national road safety strategies; existing political economy literature; think tank/research centre/ NGO reports; analyses published by national/city traffic authorities; theories of change/evaluation/programme documents for existing interventions; interviews with key informants – national and city politicians, national and city agency officials, NGO/civic activists, business organisations, unions, academics etc.</p> |



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**Problem-driven case studies**

**Process 2:** Identification of the underlying reasons why the actors in Process 1 face challenges with resolving the problems identified in Stage 2. Key question will include:

- Do agencies have sufficient capacity, or are they under-resourced or given low priority?
- Do the different actors coordinate their approaches (e.g. education officials engaging in joint planning with public transport officials)?
- Do actors that have jurisdiction over the problem consider road safety issues to be a priority (e.g. urban planning officials)?
- Is there common local leadership or authority that could convene the different actors and enforce co-operation across them (e.g. directly elected city mayors)?
- Is there opposition to the measures that could help to address the challenges identified?

**Sources:** Existing academic and international literature; think tank/research centre/NGO reports; analyses published by national/city traffic authorities; national road safety strategies; public expenditure data from national/city finance ministry; theories of change/evaluation/programme documents for existing interventions; interviews with key informants – national and city politicians, national and city agency officials, NGO/civic activists, business organisations, unions, academics etc.

**Process 3:** Analysis of the current extent and potential for political mobilisation. Key questions to consider include:

- What is the forum/fora in which the programme/intervention could be contested or created (legislative, regulation, decree, spending allocations; national/sub-national venue; public opinion, individual behavioural change etc.)?
- Is road safety considered to be an important issue or one that politicians at the national or local level are held responsible for?
- What would (or does) motivate local leadership to make decisions to improve road safety and law enforcement in these areas?
- Are the groups identified by the problem analysis able to effectively mobilise? For example, through:
  - Political parties
  - Neighbourhood associations
  - Parents groups
  - Religious associations
- If these are not able to mobilise, what challenges prevent them from doing so?
- Are there important political actors or constituencies that will be disadvantaged by reforms or that have other priorities? What allows them to mobilise more effectively?

**Sources:** Existing political economy literature; think tank/research centre/NGO reports; analyses published by national/city traffic authorities; theories of change/evaluation/programme documents for existing interventions; interviews with key informants – national and city politicians, national and city agency officials, NGO/civic activists, business organisations, unions, academics etc.

**Output:** Identification of (i) the underlying drivers of the causal factors identified in Stage 2; (ii) the actors who can feasibly address these issues; (iii) the barriers/incentives for overcoming these challenges; and (iv) potential enabling/blocking factors.

**Positive case studies**

**Process 2:** Analysis of the political and technical factors that allowed implementation to be successfully carried out: These could include:

- Political attention and priority creating stronger incentives for enforcement/co-ordination
- Channelling of additional capacity/resources
- Use of trusted interlocutors with public
- Transfer of powers/political authority to the city level
- Dedicated and focused cadre of city officials aiming to resolve issue
- Emergence of new political constituencies or organised groups
- Alliance of business lobbyists focused on related issue (e.g. public transport/ congestion issues/slum clearance)

**Sources:** Existing political economy literature; think tank/research centre/NGO reports; analyses published by national/city traffic authorities; theories of change/evaluation/programme documents for existing interventions; interviews with key informants – national and city politicians, national and city agency officials, NGO/civic activists, business organisations, unions, academics etc.

**Output:** Identification of various causal pathways that were utilised to implement the solutions identified in Stage 2, including (i) key actors; (ii) key actions undertaken; (iii) motivating factors/agents; and (iv) enabling factors.

#### Stage Four:

The fourth and final stage will then lay out the practical lessons learned from the bulk of the analysis and recommendations on the implications this has for future programmes.

These case studies should then allow us to begin to close some of the knowledge gaps in the existing literature and to begin to develop more effective strategies for reducing and eliminating injuries and deaths from road traffic collisions worldwide.

**Table 4: Stage Four**

| Problem-driven case studies   | Positive case studies   |
|---|---|
| <p><b>Process:</b> The identification of a plausible pathway to improve the issue of road traffic collisions in this contexts. This will include an evaluation of:</p> <ul style="list-style-type: none"><li>• Which problems are most tractable – given the constraints and challenges identified in the analysis</li><li>• What are the forum/fora in which the programme/intervention could be contested or created (legislative, regulation, decree, spending allocations; national/sub-national venue; public opinion, individual behavioural change, etc.)?</li><li>• The different actors who, individually or collectively, have the power to have an impact on these problems</li><li>• The domestic or external actors who may be able to exert influence to change the problematic priorities and behaviours</li><li>• Potential external factors that might enable/block reform attempts</li><li>• Potential strategies and entry points for persuading these actors to mobilise and act on these issues, in line with their incentives (political, social, economic, or otherwise).</li><li>• The likelihood that interventions and their impacts will be sustained, and promising approaches to ensure this.</li></ul> <p><b>Sources:</b> Analysis conducted in Stages 1-3 NGO/civic activists, business organisations, unions, academics, etc.</p> <p><b>Output:</b> Strategy document that summarises main findings and outlines the most plausible pathways/entry points to resolve the identified road traffic collision challenge.</p> | <p><b>Process:</b> Analysis of, (i) which elements of the experience and strategy may be transferable to other contexts; (ii) the extent to which the existing programme and its impacts are sustainable; and (iii) what lessons can be drawn for future programmes in the same context. Focusing on:</p> <ul style="list-style-type: none"><li>• What made these issues and challenges tractable in this case? Will these continue to hold? Would this hold in other contexts?</li><li>• What were the forum/fora in which the programme/intervention was contested or created (legislative, regulation, decree, spending allocations; national/sub-national venue; public opinion, individual behavioural change, etc.)? Are these likely to sustain or provide similar opportunities in the future? Would these be the same, or similar, in other contexts?</li><li>• What types of actors were, individually or collectively, able to have an impact of these problems? How? What drove this? Will they continue this focus in the future? What other contexts might this hold in?</li><li>• What types of domestic or external actors were able to exert influence? How? What drove this? Will they be willing and able to continue this focus in the future? What other contexts might this hold in?</li><li>• What external factors aided or blocked reform attempts? Are these likely to be sustained for recurring? Are these likely to occur in other contexts? How did the actors react to take advantage of them?</li><li>• What strategies and entry points were used to persuade actors to mobilise and act on these issues? Are these likely to be effective in the future? What other contexts might this hold in? How might tactics be altered for actors for whom these were not successful?</li></ul> <p><b>Sources:</b> Analysis conducted in Stages 1-3; existing academic, international studies and political economy literature; supplementary data from follow up interviews with key informants – national and city politicians, national and city agency officials, NGO/civic activists, business organisations, unions, academics, etc.</p> <p><b>Output:</b> Set of principles or recommendations for actors and organisations seeking to sustain existing programming, or to influence or carry out future programming in this road traffic collision area and analogous contexts</p> |



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