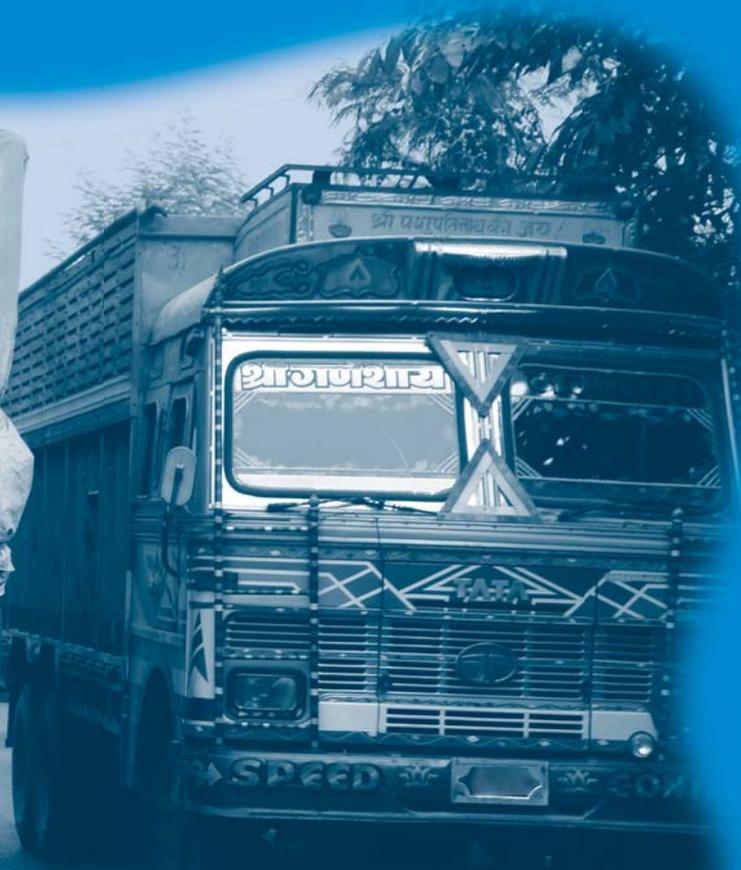


Road Safety in South Asia



Opportunities for Shared Regional Initiatives



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Foreword

The roads that crisscross South Asia are a vibrant spectacle to behold. Cars, motorcycles, trucks, and other vehicles fill the streets of cities and towns and traverse the highways. This pulsating symphony of traffic is crucial for trade and transportation and drives economic development in South Asia.

But it also brings a grim reality: although South Asia is home to only 10 percent of the world's motorized vehicles, it accounts for around 23 percent of global deaths from road crashes. Fatalities from road crashes are a leading cause of death among young adults between the ages of 15 and 29 in South Asia. According to the WHO Global Status Report on Road Safety 2018, annual road crash fatalities total nearly 25,000 in Bangladesh, more than 27,000 in Pakistan, and nearly 300,000 in India.

In addition to these tragic deaths, road fatalities take an enormous toll on national economies, with economic losses equivalent to an estimated 3-5 percent of GDP in low-and-middle-income countries every year. Years of rapid economic growth, followed by an exponential rise in vehicle ownership, have resulted in rising traffic deaths and lost economic opportunities. In the absence of drastic measures, this will only get worse in the coming years.

Fortunately, governments are recognizing the urgent need for safer roads, and the World Bank Group (WBG) is working with them to address this need. In 2006, the WBG established the donor-funded Global Road Safety Facility (GRSF) to assist developing countries in making roads safer. GRSF has since disbursed US\$45 million to improve road safety in 64 countries. Furthermore, WBG road safety support has increased fourfold since 2006 to reach an average US\$223 million per year.

However, much more is needed. Over the next decade, it will take an estimated US\$118 billion in additional investment to halve road crash fatalities in South Asia's eastern subregion – which accounts for 86 percent of the region's population, 92 percent of its vehicles, and 87 percent of its road crash fatalities. The economic benefits of this additional investment are estimated to be around US\$1.2 trillion and are annually equivalent to an estimated 3.75 percent of regional GDP.

The World Bank Group remains committed to helping realize these goals. Today, all highway and interurban road projects financed through the WBG incorporate road safety indicators to monitor their safety impact. The WBG's new Environmental and Social Framework includes a safeguard clause on road safety. The WBG has also developed a new Road Safety Screening and Appraisal Tool for all its road investment projects to evaluate project designs against potential road safety outcomes.

The road safety crisis is unacceptable but preventable. By focusing on investment priorities, opportunities for shared regional initiatives, and a way forward over the next decade, this report represents yet another arrow in our development quiver designed to save lives and boost prosperity by making roads safer - for drivers and pedestrians alike.

Hartwig Schafer
World Bank Vice President for South Asia

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Acronyms

| | |
|--------|---|
| ADB | Asian Development Bank |
| DRIVER | Data for Road Incident Visualization, Evaluation, and Reporting |
| ERSO | European Road Safety Observatory |
| EU | European Union |
| GRSF | Global Road Safety Facility |
| IRAD | Integrated Road Accident Database |
| MoRTH | Ministry of Road Transport and Highways (India) |
| RADMS | Road Accident Database Management System |
| SDG | Sustainable Development Goal |
| TEN-T | Trans-European Transport Network |
| UN | United Nations |
| TISPOL | European Traffic Police Network |
| UPHP | Uttar Pradesh Highway Police |
| WBG | World Bank Group |
| WHO | World Health Organization |

Executive Summary

There is an increasing recognition that policy initiatives at the regional level can complement and strengthen country road safety strategies and programs. This is certainly the case in the South Asia region, with implications for regional road safety investment priorities and potential for shared road safety initiatives.

As defined by the World Bank Group's (WBG) classification of regions, South Asia comprises two low-income countries (Afghanistan and Nepal), five lower middle-income countries (Bangladesh, Bhutan, India, Pakistan, and Sri Lanka), and one upper middle-income country (the Maldives). With an estimated 1.7 billion people, South Asia represents around 25 percent of the world's population. It is the least urbanized region in the world, has 10 percent of the world's vehicle fleet, and accounts for 25 percent of the world's crash fatalities.



Road safety risks in the South Asia region reflect its distinctive characteristics concerning the rate of motorization and composition of its vehicle fleet. Regional road safety investment has not kept pace with the dynamic forces of development. South Asia's economy is growing faster than any other regions of the world. The regional rate of vehicle ownership has doubled over the past decade and remains on an upward trajectory. In the absence of drastic measures, regional road safety performance is likely to get worse, unless country and regional measures are taken to redress investment and policy deficits.

Fatality risk rankings in the region highlight the hazards faced by motorized two and three-wheeler users, truck drivers and passengers, car and light vehicle passengers, and pedestrians, which rank first, second, and third in terms of fatalities per 100,000 people (population safety) and 10,000 vehicles (traffic safety), respectively. The region has the second highest ownership of motorized two and three-wheelers per capita in the world and the highest proportion in its vehicle fleet. A systemic revision of infrastructure designs and safer user behaviors will be required to ensure the safety of these vulnerable road users.

Across all population and traffic safety measures, the risks faced by truck and bus drivers and passengers in the South Asia region are the highest in the world and underline a regional road safety priority that has received scant attention in the global road safety agenda. The significant performance gap between South Asia and high-income countries highlights opportunities for introducing good practices that offer substantial road safety payoffs.

Measures of regional road safety risks in South Asia reflect those of India, given its dominance in terms of the size of its population and vehicle fleet, and, in particular, highlight the hazards faced by users of motorized two and three-wheelers. However, there are significant distinctions in road safety priorities between the region's countries, given their different levels of motorization and vehicle fleet compositions. For example, in Bangladesh, pedestrians and car and light vehicle passengers face higher risks than those of motorized two and three-wheeler users, as do car and light vehicle passengers in Bhutan.

Poor road safety performance throughout the South Asia region signals a prevailing level of underinvestment in systemic, targeted, and sustained road safety programs. A recent WBG study of road safety investment requirements in the eastern subregion of South Asia provides an indicative estimate of the scale of road safety investment required to achieve the SDG Target 3.6 of halving regional road crash fatalities by 2030. The eastern subregion comprises the countries of Bangladesh, Bhutan, India, and Nepal and dominates the South Asia region with an estimated 86 percent of its population, 92 percent of its vehicles, and 87 percent of its road crash fatalities. Hence the eastern subregion is largely representative of the South Asia region as a whole. Over the next decade an estimated additional investment of around US\$118 billion will be needed in the eastern subregion to achieve the SDG target of halving road crash fatalities. Annual investment benefits are estimated to be equivalent to 3.75 percent of regional GDP. This investment will also contribute to the achievement of other pressing sustainable mobility goals concerning improved transport productivity, universal accessibility, climate change mitigation and adaptation, and reduced local air and noise pollution.

The WBG study's findings in the trade corridors of the eastern subregion of South Asia highlighted the following:

- **Road safety risks in regional trade corridors reflect network-wide risks.**
- **Regional crash data management and analysis tools are generally of poor quality with a few exceptions in certain states in India.**
- **Regional trade corridor infrastructure is unsafe and functionally deficient.**
- **The wide variety of vehicles—in terms of both size and speed—undermines road safety.**
- **Unsafe road user behaviors are prevalent, including speeding, the nonuse of seat belts and safety helmets, unsafe overtaking, wrong-way driving, the nonuse of vehicle lights, risky crossing of roads by pedestrians, heavy vehicle overloading, and driver fatigue.**
- **Post-crash response service coverage across the region appears to be variable.**
- **The private sector is investing in vehicle fleet modernization, driver training, enhanced logistics systems, and, to some extent, road safety promotions.**
- **Rapid technological change is evident and road safety policy must anticipate and address the emerging complexity of these developments.**
- **Speed management is a vital safety priority that permeates all policy considerations addressing infrastructure, vehicle, and road user safety issues.**



These findings provide a strategic rationale for determining and addressing regional trade corridor safety priorities and the specification of shared regional initiatives designed to address them. The initiatives proposed for the South Asia region are aligned with the five pillars for action in the current United Nations Global Plan for the Decade of Action for Road Safety 2011–2020:

Pillar 1: Road safety management

- **Initiative 1:** Crash data management and analysis systems
- **Initiative 2:** Regional road safety observatory

These proposed initiatives will strongly underpin high-priority road safety management capacity building efforts in the countries of South Asia and enhance the targeting of road safety programs.

Pillar 2: Safer roads and mobility

- **Initiative 3:** Infrastructure safety design and assessment

This proposed initiative gets to the heart of infrastructure safety design and assessment issues that must be systematically addressed in South Asia, if the region's road networks are to be functionally capable of meeting the goal of ensuring protection for all road users.

Pillar 3: Safer vehicles

- **Initiative 4:** Regional new car assessment program
- **Initiative 5:** Truck size and weight regulations

These proposed initiatives lend weight to efforts being made to improve the protective qualities of the light vehicle fleet and the safety and productivity of regional freight logistics chains.

Pillar 4: Safer road users

- **Initiative 6:** Road policing and marketing and media campaigns

This proposed initiative targets the fundamental weaknesses evident in road policing in South Asia that must be addressed if safety gains are to be quickly made in the next decade, given that infrastructure and vehicle safety initiatives will take longer to fully realize their benefits.

Pillar 5: Post-crash response

- **Initiative 7:** Emergency medical and rehabilitation services
- **Initiative 8:** Injury surveillance systems

These proposed initiatives contribute to strengthening post-crash response measures in South Asia and enhancing understanding of the scale of the regional road crash burden.

Addressing road safety priorities in the trade corridors of South Asia provides opportunities for shared regional initiatives that can complement country road safety strategies and help accelerate their successful delivery. The eight initiatives proposed are aligned with national road safety efforts throughout the region. If properly resourced and directed, they would

make a significant contribution to reducing the regional road safety burden and achieving wider sustainable mobility goals that address transport sector productivity, accessibility, and environmental performance.

The 3rd Global Ministerial Conference on Road Safety, “Achieving Global Goals,” will be held in Stockholm, Sweden, on February 19–20, 2020. The conference will review progress made over the UN Decade of Action for Road Safety (2011–2020) and specify a pathway for greater gains over the coming decade. It is already clear that the SDG Target 3.6 to halve global road deaths by 2020 will not be met as a consequence of insufficient resources. Conference participants will consider extending the target date to 2030, as well as setting proposed regional fatality and injury targets. These issues are of vital importance to the South Asia region as the decisions taken in Stockholm will set out a platform and agenda for regional and country engagement with global partners over the next decade, including the multilateral development banks, United Nations’ agencies, the donor community and the private sector. All of these global partners have important roles to play in mobilizing funding and specialist resources for road safety at the country level. In the coming decade of action their leadership and facilitation of shared regional initiatives will provide added impetus to the global road safety agenda.

Multilateral development banks, United Nations’ agencies, the donor community and the private sector have all important roles to play in mobilizing funding and specialist resources for road safety at the country level. Their leadership and facilitation of shared regional initiatives will provide added impetus to the global road safety agenda.



1. Introduction

Trends in road crash fatalities over the past four to five decades show clear differences between high-income countries and low and middle-income countries, and between regions of the world, though historical data for this are limited and subject to varying regional classifications. Since the World Health Organization (WHO) and the World Bank Group (WBG) jointly published the *World Report on Road Traffic Injury Prevention* in 2004 the focus of global road safety initiatives has been at the country level (Peden et al. 2004). However, the importance of regional contexts and country relationships within regions is generally well acknowledged. This is most apparent in transport infrastructure investment programs and regulatory considerations arising within integrated regional trade blocs and logistics chains. There is also an increasing recognition that policy initiatives at the regional level, in vehicle and infrastructure safety for instance, can complement and strengthen country road safety strategies and programs.

This report considers these strategic issues in the context of the South Asia region and addresses related regional road safety challenges, investment priorities, opportunities for shared regional initiatives, and the way forward over the next decade to 2030.



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2. Road Safety Challenges in South Asia

2.1 Achieving the Sustainable Development Goals

As defined by the WBG's classification of regions, South Asia comprises two low-income countries (Afghanistan and Nepal), five lower middle-income countries (Bangladesh, Bhutan, India, Pakistan, and Sri Lanka), and one upper middle-income country (the Maldives). With an estimated 1.7 billion people, South Asia represents around 25 percent of the world's population. It is the least urbanized region in the world, has 10 percent of the world's vehicle fleet, and accounts for 25 percent of the world's crash fatalities (see Appendix A, Table A.1).

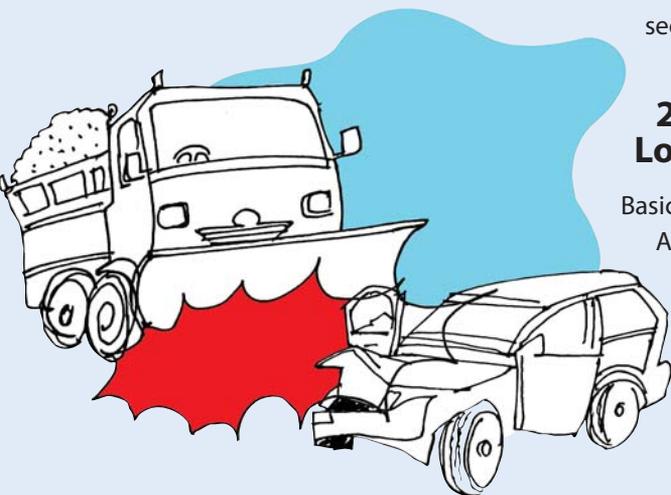
Sustainable Development Goal (SDG) Targets 3.6 and 11.2 call for a halving of global road deaths by 2020 and for universal access to safe transport in cities by 2030, respectively (UN 2015). Achieving these targets will be challenging for the South Asia region. Scaled-up road safety investment in South

Asia is an urgent priority and an important focus of the global dialogue on regional and country performance expectations. The 3rd Global Ministerial Conference on Road Safety, "Achieving Global Goals," will be held in Stockholm, Sweden, on February 19–20, 2020. The conference will review progress made over the UN Decade of Action for Road Safety (2011–2020) and specify a pathway for greater gains over the coming decade. It is already clear that the SDG Target 3.6 to halve global road deaths by 2020 will not be met as a consequence of insufficient resources. In Stockholm, conference participants will consider extending the target date to 2030, as well as setting proposed regional fatality and injury targets (Government Offices of Sweden and WHO 2019). These issues are of vital importance to the South Asia region as the decisions taken in Stockholm will set out a platform and agenda for regional and country engagement with global partners, including the multilateral development banks, United Nations' agencies, and the private sector, over the coming decade.



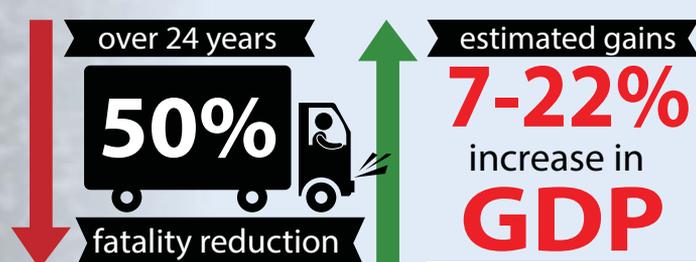
2.2 The Regional Burden of Road Safety Losses

Basic global road safety facts are well known and frequently cited. Annually, road crashes claim more than 1.3 million lives and cause at least an order of magnitude more serious injuries that require hospitalization and ongoing rehabilitation of crash victims. Crashes predominantly impose a high socioeconomic cost on the poor and productive-age population. In addition to the toll exacted on human health and well-being, crashes



result in lost productivity, property damage, legal and judicial costs, and out-of-pocket and public health care expenditures (Peden et al. 2004). Analyses conducted by the WBG, with funding from Bloomberg Philanthropies, in five countries indicate that countries can achieve substantial increases in economic growth and national income, while simultaneously achieving large population welfare gains, by sharply reducing the number of crash fatalities and injuries over time.

The disproportionate impact of road crash mortality and morbidity on the economically productive segments of the population is likely to depress GDP growth rates. For example, estimated gains from achieving a 50 percent fatality reduction target in the countries assessed ranged between a 7 to 22 percent increase in GDP over the analysis time frame of 24 years. Furthermore, the estimated population welfare gains from achieving a 50 percent reduction in fatalities in the countries assessed over this period were equivalent to between 6 to 32 percent of GDP (World Bank 2017). WBG research indicates that human capital accounts for around two thirds of a country's total wealth, far more than natural

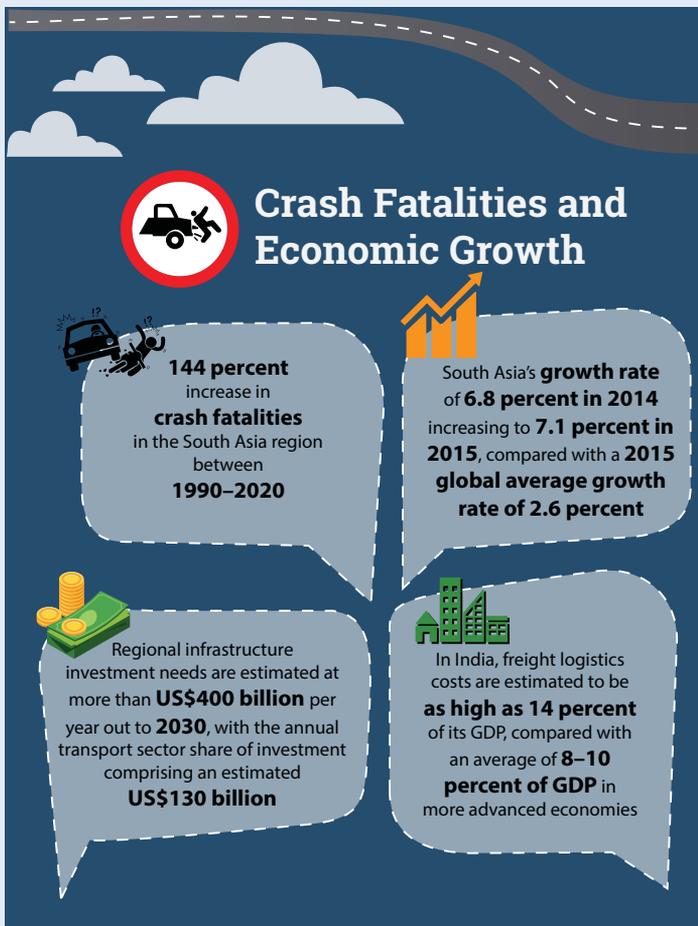


capital and produced capital (World Bank 2017). Investment in effective road crash fatality and injury prevention will contribute to the accumulation of human capital throughout the South Asia region, which in turn will contribute to sustainable and inclusive economic growth and increased regional wealth.

Economic losses associated with crash fatalities and injuries are amplified by the co-benefits lost if safety investment is curtailed. Scaled-up road safety investment in South Asia will contribute to the achievement of other sustainable mobility goals concerning improved transport productivity, universal accessibility, climate change mitigation and adaptation, and reduced local air and noise pollution (Sustainable Mobility for All 2017). Securing these network productivity, accessibility, decarbonization, and public health co-benefits of road safety investment will contribute to the achievement of regional trade facilitation and connectivity objectives. These sustainable mobility goals are inextricably linked with each other. Regional safety investment must negotiate a complex strategic space that delivers on all of them within an integrated policy framework (WBG 2019a).

More than 90 percent of global road crash fatalities occur in low and middle-income countries in regions where rapid motorization and expansion of highway infrastructure has accompanied and facilitated strong economic growth. This is especially the case in South Asia, which alone bears the burden of 25 percent of the total global road fatalities. However, regional road safety investment has not kept pace with the dynamic forces of development. As vehicle ownership grows, further deterioration in safety performance must be anticipated, unless measures are taken to redress prevailing investment and policy deficits.

Importantly, road safety investment in South Asia is not inherently constrained by national income levels in its member countries. Key funding sources are embedded and able to be unlocked within country transport, justice, health, and urban development sector budgets. The current inertia underscores the urgency of mobilizing government action given the time needed to build the necessary agency, industry, and community capacity to successfully overcome underinvestment in road safety and achieve sustainable performance gains over the coming decades.



2.3 Crash Fatalities and Regional Economic Growth

Economic developments in South Asia contribute to the regional road safety challenge. A global study analyzing the relationship between traffic fatalities and economic growth projected a 144 percent increase in crash fatalities in the South Asia region between 1990–2020. This was the highest estimated growth rate across all the WBG regions, resulting in the second highest number of projected regional crash fatalities by 2020 (Kopits and Cropper 2003). Current regional performance remains in line with these projections.

The implications of future economic growth on road safety are ominous. South Asia's economy has been growing faster than other regions of the world. It had a growth rate of 6.8 percent in 2014 increasing to 7.1 percent in 2015, compared with a 2015 global average growth rate of 2.6 percent (WBG 2017). Ongoing and scaled-up investment in regional transport infrastructure is planned. Climate-adjusted regional infrastructure investment needs are estimated at more than US\$400 billion per year out to 2030, with the annual transport sector share of investment comprising an estimated US\$130 billion (ADB 2017).

Regional development in South Asia will be further augmented by policies that enhance the productivity of national and regional supply chains. This will lead to a growth in road freight and bus passenger traffic, as well as an accelerated growth in private vehicle traffic. Increased road safety risks must, as a result, be anticipated.

In the case of India, which dominates the South Asia region when it comes to population and economic production, freight logistics costs are estimated to be as high as 14 percent of its GDP, compared with an average of 8–10 percent of GDP in more advanced economies. Closing this gap will further boost India's economic growth prospects (WBG 2016). It will also boost regional connectivity and trade, with growing exposure to road safety risks resulting from increased freight and passenger movements and the impacts of escalating rates of private vehicle ownership.

2.4 Assessing Regional Road Safety Risks

Reliable traffic fatality risk data for the regions of the world, including South Asia, are scarce, especially in terms of their consistency and completeness for comparative purposes. There are significant variations between official national estimates of crash fatalities and those of international studies. This report uses World Health Organization (WHO) data where relevant as they provide a reasonably consistent and comprehensive coverage of vehicle fleets, road user fatality risks, management arrangements, and legislation (WHO 2015; WHO 2018).

Note that fatality data reported by WHO have been systematically adjusted to account for estimated levels of country underreporting. Care has been taken to use this data to get

a sense of relative regional and country performance rankings, rather than focusing on absolute performance measures.

WHO data were recompiled on a country-by-country basis into WBG regions and assessed in terms of comparative road user fatality risks. They were also used to create a reference group of high-income countries to enable good practice regional and country performance comparisons. The high-income country reference group comprised a selection of the world's best performing countries (Sweden, the United Kingdom, the Netherlands, Norway, and Singapore), plus Canada, the United States of America, Australia, and New Zealand, to ensure relevant governance, topographical, population, and transport network differences were reasonably accounted for when exploring good practice performance (refer to Appendix A).¹

2.5 Vehicle Ownership and Fleet Composition in South Asia

Road safety risks in South Asia reflect the region's distinctive characteristics concerning the rate of motorization and composition of its vehicle fleet. These risks are dominated by those faced in India, given the sheer scale of that country's population and economy, but there are distinctive country differences that must also be accounted for in their road safety strategies and plans.

The South Asia region has the second lowest rate of vehicle ownership in the world, with only the Sub-Saharan Africa region being considerably lower (see Table 1).

Table 1. Vehicle Ownership

| WBG Regions and High-Income Countries | Vehicles per 1,000 People |
|---------------------------------------|---------------------------|
| South Asia | 106 |
| Average for WBG regions | 172 |
| High-income country reference group | 759 |

Source: Appendix A, Table A.1

Historically, over the course of the twentieth century, when countries reached motorization levels of between 50–100 vehicles per 1,000 people, road crashes became one of the leading causes of death and injuries. Improving road safety was then recognized as a national development priority and safety measures were introduced. Road fatalities per 100,000 population typically continued to rise, with motorization levels growing to around 300 vehicles per 1,000 people before the safety measures began to have discernible effects and the fatality rate per 100,000 people began to fall, while country motorization levels continued to grow (Carlsson and Hedman 1990). These performance indicators have important road safety implications for the South Asia region where the rate of vehicle ownership has doubled over the past decade and remains on an upward trajectory.

The South Asia region has the second highest rate of motorized two and three-wheelers per capita in the world, behind the East Asia Pacific region, and has the highest share of these in its vehicle fleet, at 71 percent, followed by the East Asia Pacific region at 56 percent (see Table 2). This network saturation of motorized two and three-wheelers is an unprecedented transportation phenomenon. A systemic revision of infrastructure designs and safer user behaviors are required if the safety of these vulnerable users is to be ensured.

Table 2. Motorized Two and Three-Wheelers

| WBG Regions and High-Income Countries | Motorized 2 and 3-Wheelers (per 1,000 people) | Percentage of Fleet |
|---------------------------------------|---|---------------------|
| South Asia | 76 | 71 |
| Average for WBG regions | 76 | 44 |
| High-income country reference group | 26 | 3 |

Source: Appendix A, Table A.2

Conversely, the South Asia region has the second lowest rate of car and four-wheeled light vehicles per capita in the world, with only the Sub-Saharan Africa region having rates a little lower. Cars and four-wheeled light vehicles comprise only around a quarter of the South Asia region's total vehicle fleet, compared with more than 90 percent in the high-income reference group countries (see Table 3). This highlights the region's distinctive road infrastructure design requirements.

Table 3. Cars and Four-Wheeled Light Vehicles

| WBG Regions and High-Income Countries | Cars and 4-Wheeled Light Vehicles (per 1,000 people) | Percentage of Fleet |
|---------------------------------------|--|---------------------|
| South Asia | 26 | 24 |
| Average for WBG regions | 79 | 46 |
| High-income country reference group | 700 | 92 |

Source: Appendix A, Table A.2

The South Asia region also has the second lowest number of trucks per capita in the world (see Table 4). Considerable growth in its truck fleet must be anticipated.

Table 4. Trucks

| WBG Regions and High-Income Countries | Trucks (per 1,000 people) | Percentage of Fleet |
|---------------------------------------|---------------------------|---------------------|
| South Asia | 2.9 | 2.8 |
| Average for WBG regions | 8 | 4.7 |
| High-income country reference group | 26 | 3.5 |

Source: Appendix A, Table A.2

Buses in the South Asia region comprise a higher proportion of the total vehicle fleet than in the high-income reference group countries, though the number of buses per capita is considerably lower (see Table 5).

Table 5. Buses

| WBG Regions and High-Income Countries | Buses (per 1,000 people) | Percentage of Fleet |
|---------------------------------------|--------------------------|---------------------|
| South Asia | 1.3 | 1.2 |
| Average for WBG regions | 1.6 | 0.9 |
| High-income country reference group | 2.2 | 0.3 |

Source: Appendix A, Table A.2

2.6 Road User Risks in South Asia

Regional road user risks have been assessed in terms of three measures:

- *Fatalities per 100,000 people* measure personal, or population, safety and for this reason are the favored indicator for country public health assessments. High rates indicate low levels of personal safety.
- *Fatalities per 10,000 vehicles* measure traffic safety and provide a rough surrogate measure for fatalities per volume of vehicle travel, given the general unavailability of reliable traffic data. High rates also indicate low levels of traffic safety.
- *Fatalities per 10,000 vehicles by type* provide a useful measure of traffic safety in terms of the population of vehicles of that type, rather than in terms of the total vehicle fleet.

In terms of these risk measures, the WBG regions that comprise the low and middle-income countries have distinct road safety risk profiles, which also differ from the high-income country reference group risk profile prepared for comparative purposes. These regional differences and priorities must be accounted for while seeking to achieve SDG Targets 3.6 and 11.2 by 2020 and 2030, respectively. Effective and efficient regional responses must be tailored accordingly.



For example, in population safety terms, users of motorized two and three-wheelers face the highest risks in the South Asia and East Asia and Pacific regions. Pedestrians face the highest risks in the Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, and Sub-Saharan Africa regions, whereas car and light vehicle drivers face the highest risks in the high-income country reference group. These rankings can change when assessed in terms of traffic safety measures and will influence the shaping of policy initiatives (see Appendix A, Table A.3).

With 25 percent of the world's road crash fatalities, South Asia has its own distinct safety priorities and needs. Fatality risk rankings in the South Asia region highlight the hazards faced by motorized two and three-wheeler users, truck drivers and passengers, pedestrians and car and light vehicle passengers, which rank first, second, and third in terms of fatalities per 100,000 people (population safety) and 10,000 vehicles (traffic safety), respectively (see Table 6).



Table 6. South Asia Road Fatality Risk Rankings

| Rank | Fatalities per 100,000 People (Population Safety) | Fatalities per 10,000 Vehicles (Traffic Safety) | Fatalities per 10,000 Vehicles by Vehicle Type (Traffic Safety) |
|------|--|--|--|
| 1 | Motorized 2/3-wheelers | Motorized 2/3-wheelers | Bus drivers/passengers |
| 2 | Truck drivers/passengers | Truck drivers/passengers | Truck drivers/passengers |
| 3 | Pedestrians Car/light vehicle passengers | Pedestrians Car/light vehicle passengers | Car/light vehicle passengers |
| 4 | Car/light vehicle drivers Bus drivers/passengers | Car/light vehicle drivers | Motorized 2/3-wheelers |
| 5 | Cyclists | Bus drivers/passengers | Car/light vehicle drivers |
| 6 | | Cyclists | |

Source: Appendix A, Table A.3

Across all population and traffic safety measures the risks faced by truck and bus drivers and passengers in the South Asia region are the highest in the world and reflect a regional priority that has received scant attention in the global road safety agenda. The huge performance gap between South Asia and high-income countries is significant and

highlights opportunities for introducing good practices that offer high safety pay-offs.

Note that fatalities per 10,000 vehicles data are presented in terms of the total regional vehicle fleet and do not distinguish between vehicle types. WHO data provided a breakdown of vehicle type numbers and gave the opportunity to disaggregate this measure by vehicle type (excluding cyclists), which allowed for deeper insights into related vehicle user risks. Road user traffic safety risk rankings change when this measure is used. In the South Asia region this is especially the case for car passengers and truck and bus drivers and passengers whose high risks are masked when apportioned across a total vehicle fleet dominated by two and three-wheelers. It also provides insights into motorized two and three-wheeler risks, as when measured this way they are not much higher than two and three-wheeler risks in high-income countries, which reflects the intrinsically dangerous nature of this vulnerable transport mode (see Appendix A, Table A.3).

It is also important to recognize that there are differing country road safety priorities within regions. Overall, measures of regional risk in South Asia largely reflect those of India, given its dominance in terms of the size of its population and vehicle fleet, and, in particular, highlight the hazards faced by users of motorized two and three-wheelers.

However, there are clear distinctions between the region's countries, given their different levels of motorization and vehicle fleet compositions. For example, in Bangladesh, pedestrians and car and light vehicle passengers face higher risks than motorized two and three-wheeler users, as do car



and light vehicle passengers in Bhutan. Separate country reports have been prepared for the South Asia region to address country road safety priorities in more detail.²

2.7 Underinvestment in Road Safety Programs

Poor road safety performance throughout the South Asia region signals a prevailing level of underinvestment in systemic, targeted, and sustained road safety programs. More effective and efficient road safety investment will be required to emulate the performance trajectory of high-income countries over their last four decades of continual improvement. The South Asia region is poorly placed to meet this challenge.

As previously outlined, South Asia accounts for 25 percent of the world's road crash fatalities. It is the world's least urbanized region and has the second lowest rate of vehicle ownership and the fastest rate of economic growth. Regional vehicle ownership exceeds 100 vehicles per 1,000 people and is escalating rapidly. This indicator foreshadows likely future outcomes. Crash fatalities per 100,000 population can be expected to keep rising until motorization levels reach around 300 vehicles per 1,000 people, unless substantial new investments in road safety are made.

3. Regional Investment Priorities

3.1 Indicative Estimate of Investment Requirements

A recent WBG study of road safety investment in the eastern subregion of South Asia provides an indicative estimate of the scale of road safety investment required to achieve the SDG Target 3.6 of halving regional road crash fatalities by 2030 (WBG 2019a). The eastern subregion comprises the countries of Bangladesh, Bhutan, India, and Nepal and dominates the South Asia region with an estimated 86 percent of its population, 92 percent of its vehicles, and 87 percent of its road crash fatalities. Hence the findings of this study can be viewed as being largely representative of the South Asia region as a whole. In particular, they underscore the need for substantial regional investment over the coming decade.

The scale of the additional safety investment required to achieve a 50 percent reduction in crash fatalities in the eastern subregion of South Asia over the coming decade was estimated using analyses undertaken for the UN Road Safety Trust Fund (Bliss 2016; UNECE 2018). These analyses derived from findings of a previous study conducted by the Global Road Safety Facility (GRSF) (Guria 2008; Guria 2009). The GRSF study assessed the additional investment required to meet the Decade of Action for Road Safety 2011–2020 goal of stabilizing and reducing road crash fatalities by 2020.

In order to prepare business-as-usual projections of country fatalities over a 10-year time frame, the GRSF study used previous World Bank study findings that estimated the relationship between traffic fatalities and economic growth over the latter half of the twentieth century for 156 countries across WBG regions and high-income OECD countries (Kopits and Cropper 2003). Projected traffic fatalities and injuries for each country were expressed in terms of social costs, using estimated values of statistical life and serious injuries (Dahdah and McMahon 2008). Dividing these social costs by good practice benefit-cost ratios for

safety engineering and enforcement programs produced estimates of the level of additional investment required to achieve a 50 percent fatality reduction. This additional investment was expressed as a percentage of each country's GDP and provided the foundation for an updated estimate of the eastern subregion's additional road safety investment needs on a country by country basis.

The analyses assumed that baseline road safety investment in the eastern subregion countries would follow the historical growth path taken by high-income country investment and that this investment included investments in road infrastructure, vehicle safety, enforcement, and post-crash services.



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The estimated additional investment required covered country infrastructure safety programs and enforcement and media campaigns that address unsafe road user behaviors, sufficient to achieve the fatalities reduction target. Aggregating the country findings, it was estimated that over the coming decade an additional investment of around US\$118 billion will be needed in the eastern subregion of South Asia to achieve the SDG target of halving road fatalities, with the bulk of the investment in India and Bangladesh (see Table 7).³

Table 7. Additional Road Safety Investment Requirements in the Eastern Subregion of South Asia

| | |
|---|-------------------|
| Estimated additional regional road safety investment required over 10 years to achieve the SDG target of a 50% reduction in road crash fatalities by 2030 | US\$118 billion |
| Estimated benefit of additional road safety investment over 10 years to achieve SDG target of 50 percent reduction in road crash fatalities by 2030 | US\$1.23 trillion |
| Estimated average annual benefit of additional road safety investment expressed as equivalent of average annual regional GDP | 3.75% |

Source: WBG 2019b

The estimated benefit of this additional road safety investment over 10 years is around US\$1.23 trillion. Annual benefits are estimated to be equivalent to 3.75 percent of regional GDP. It is important to reiterate that this estimate of additional investment assumes that baseline road safety funding in the eastern subregion countries already follows a comparable investment path to that taken by high-income countries with similar benefits. It is also assumed that the additional investments made to improve infrastructure safety and road user safety behaviors will perform just as well as the high-income country practices from which they are adapted.

3.2 Strategic Safety Issues

Besides scoping future regional road safety investment requirements, the WBG study provided strategic insights into related regional road safety issues. The primary objective of the study was to assess road safety performance and future trends in the eastern subregion and identify safety investment priorities for a shared regional approach to safe transit for long-distance regional freight and passenger transport. Safety investment priorities were viewed through a regional trade corridor cooperation lens, while recognizing that they would necessarily be anchored in and complemented by the country road safety strategies of Bangladesh, Bhutan, India, and Nepal.

Study findings in the trade corridors of the eastern subregion of South Asia highlighted a range of safety issues (WBG 2019a).

- **Trade corridor risks reflect network-wide risks**

The study's findings revealed that road safety conditions and strategic priorities in a network of eight regional trade corridors in South Asia that connect the four countries presented a microcosm of conditions and issues prevalent throughout the countries

concerned, in terms of network service demand, road users impacted, and the nature and scale of road safety losses at stake.

All categories of road users and vehicle types—animals, pedestrians, bicycles, rickshaws, motorcycles, motorized three-wheelers, cars, minibuses, buses, mini trucks, trucks, and agricultural vehicles—are represented in the regional trade corridors, which are mainly two-lane, two-way national highways that bisect roadside towns, linear villages, and roadside enterprises. Road safety losses resulting from regional trade corridor crashes are significant in national terms. For example, in India, 34.5 percent of fatalities in 2016 resulted from crashes on the National Highways, which comprise just 1.79 percent of the total road network in the country (Gol 2017).

This risky mix of road users and high concentration of crash conflicts is evident in other sections of country road networks throughout the region, such as state highways and major urban arterial roads. Well-targeted interventions in the regional trade corridors will not only provide the cornerstone for implementing successful country road safety strategies, they will also provide a model for effective replication across the network.

- **Poor crash data management and analysis systems**

Countries in the South Asia region are in varying stages of developing crash data and performance management systems. With the exception of India, current regional crash data management and analysis tools are generally of poor quality.

Several states and cities in India are developing crash database and analysis systems to tackle road crash data deficiencies, which include incompleteness, imprecise locations, delays in provision, restricted access, cumbersome reporting formats, lack of digitized data, and difficult user interfaces. Leading initiatives include the Road Accident Database Management System (RADMS) in Tamil Nadu (developed and rolled out under the WBG-financed Tamil Nadu Road Sector Project in 2009) and an updated RADMS initiative in Himachal Pradesh (developed under the WBG-financed Himachal Pradesh Road Sector Project and rolled out in 2015). Under the Bloomberg Initiative for Global Road Safety, the WBG is establishing a Data for Road Incident Visualization, Evaluation, and Reporting (DRIVER) system in the city of Mumbai. DRIVER is a web-based and open-source system originally developed for geospatially recording and analyzing road crashes in the Philippines. Under the WBG-funded Uttar Pradesh Core Road Network Development Project, there is also a proposal to support the development and statewide implementation of a web-enabled Uttar Pradesh Crash Database and Analysis System that will meet the specific requirements of all road safety partners and stakeholders in Uttar Pradesh, including the police, transport, health, and public works departments.

At the federal government level in India, the Ministry of Road Transport and Highways (MoRTH) has streamlined the format for reporting crashes nationwide. This process is based on an extensive study of the weaknesses in the current format that led to underreporting, subjectivity, and non-reporting of aspects such as road engineering defects, crash vehicle attributes, and other relevant technical details. The resulting Accident Recording Form, based on global good practice, has 55 fields in five sections designed to capture all relevant information, including crash location, vehicle types (motorized and nonmotorized), road conditions, vehicle overloading, driver traffic violations, and victim details (drivers, passengers, and others). The form is simple, objective, and facilitates data entry by local police (WBG 2019c). The MoRTH is also developing an Integrated Road Accident Database (IRAD) through the WBG-funded

National Highways Interconnectivity Improvement Project. The IRAD will eventually cover the entire country and all categories of roads. It will provide integrated data and analytical capabilities that are required by different stakeholders, including health, police, transport, and highways agencies.

The DRIVER system is also being piloted in the city of Dhaka, Bangladesh (WBG 2019d). Nepal, meanwhile, is piloting its Road Accident Information Management System, the first web-based road crash database system in the country, using DRIVER software (WBG 2019e).

- **Unsafe road designs**

The current regional trade corridor infrastructure is functionally unsafe given its limited traffic capacity, the complex mix of differing vehicle masses and speeds, preponderance of vulnerable road users, and the chronic levels of underinvestment in the face of sustained traffic growth. However, good practice in high-income countries shows great promise in terms of providing infrastructure safety design practices and tools that can be adapted to address these challenges.

The trade corridor network in the eastern subregion of South Asia comprises more than 6,000 kilometers of national highways, which are mostly narrow, two-lane, two-way roads with slim, often unpaved shoulders, in flat and mountainous terrains. Median and roadside safety barriers are largely absent and intersections are uncontrolled. Road-widening opportunities are generally limited. Safe, well-serviced truck parks are lacking and heavy vehicle weighing facilities can be dysfunctional. Significant roadside population activities are prevalent given the large number of towns that are bisected by the highways, ranging from around one every 30 kilometers in flat terrain through to one every 200 kilometers in mountainous terrain, with an average of one town every 60 kilometers. Ribbon development between these towns results in high levels of inter-town local traffic, as well as state, national, and regional freight and bus traffic. Posted speed limits are low, as are network mean speeds, reflecting road and traffic conditions, but extreme speeding is also evident.

Dangerous concentrations of crash fatalities provide cause for concern. Crash data collected from police stations that serve 15 highway sections across Nepal, India, and Bangladesh reveal annual fatality rates that range from 0.3 to 3 fatalities per kilometer, at an annual average of 0.87 fatalities per kilometer. This is an alarming death rate by any standard (WBG 2019a).

The only apparent signs of safety interventions are the sporadic use of speed humps and limited application of safety barriers in high-risk situations. There are no dedicated passing lanes and overtaking regularly happens on all sections of roads, with the slimmest of safety margins. Road infrastructure is especially unsafe for vulnerable road users. While large numbers of pedestrians are widely encountered, safe, delineated roadside areas for pedestrians and well-marked crossings are noticeably absent. Roads built on narrow embankments, predominantly in the south, or through steep mountains in the north, provide pedestrians with few alternatives to walking along them or their narrow roadsides. It is difficult to envisage vehicles stopping for pedestrians, even if crossings did exist, unless they were provided with traffic safety features such as calmed approaches and raised pedestrian platforms. Designated safe areas for local buses to pick up and drop off passengers are also largely lacking.

- **Vehicle safety**

A wide variety of vehicles, including two and three-wheelers, fast-moving buses and minibuses, agricultural vehicles, and goods vehicles ranging from small utilities to trucks, use the regional trade corridors. The size and speed of these vehicles on any given stretch of highway varies a lot. Vehicles are mainly old and worn, especially the bus fleet. Heavy vehicle configurations and driver practices in regional trade corridors undermine safety, productivity, decarbonization, and infrastructure asset performance, with related compliance regimes being weak and ineffective. Truck and bus safety are also compromised by their fundamental incompatibility with trade corridor infrastructure, in terms of its geometric characteristics, traffic capacity, and link and place and functions. Trucks are often unsafely loaded and dangerously parked along narrow roadsides. They are configured for overloading and visibly achieve this objective, as do smaller freight vehicles. Available data highlight safety risks and indicate significant truck and bus involvement in the high concentration of crash fatalities in the regional trade corridors, with excessive speeds and vehicle-to-vehicle conflicts evident.

Heavy trucks that ply on the regional trade corridors are mostly single-unit vehicles with two to four axles. Articulated vehicles in the form of tractor semitrailers are present, but less common. The trucks are generally robust in design with rugged steel spring suspensions specifically selected to handle substantial overloading. These suspensions are highly reactive and generate large dynamic loads, which have a detrimental impact on pavements and bridge structures (OECD 1998). Trucks are often creatively decorated and well cared for, indicating pride of ownership, which suggests a culture of at least basic vehicle maintenance. Hence, vehicle owners are likely to be receptive to education and initiatives directed at improving vehicle conditions and



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safety. However, drivers in the South Asia region have a history of resisting compliance activities such as weight enforcement, which creates a barrier to policy change in this important arena.

Buses are omnipresent and being large, long, and wide, they compete with trucks and other modes of transport for the scarce road space. They are in rough shape, with side-scraped scars emblazoning their close encounters with other vehicles. Both trucks and buses are incompatible with the narrow and crowded regional trade corridors. This strengthens the business case for infrastructure upgrades and safety enhancements. Opportunities for the harmonization of regional truck configurations and operating arrangements are also evident, with policy options that would be a beacon of good practice and improve safety and freight productivity outcomes.

Achieving truck weight compliance is challenging in South Asia. Country variations in axle load and size and weight regulations are substantial. Countries have a high degree of codependency with respect to freight corridors. Truck overloading compromises both vehicle safety and infrastructure life. The most important policy instruments for optimizing trans-border transport are size and weight requirements, such as gross vehicle weight, axle load limits, and overall vehicle length. These parameters fundamentally define vehicle characteristics and, therefore, have a first-order effect on vehicle safety.

While improving heavy vehicle safety is a high priority in South Asia, it must be recognized that motorized two and three-wheelers dominate the regional vehicle fleet. At 71 percent, their share of the vehicle fleet is by far the highest in the world and considerably greater than that of the East Asia and Pacific region, which also displays high ownership of this vulnerable vehicle type at 56 percent of the vehicle fleet (see Appendix A, Table A.2).

Besides vehicle measures that can directly contribute to two and three-wheeler safety, such as anti-lock braking systems, innovative infrastructure safety designs that reflect South Asia's unique vehicle environment are required. It is inappropriate to transfer to South Asia infrastructure designs from high-income countries that at best cater, often not very safely, for low traffic volumes of motorcyclists. Other good practice measures that promote driver and passenger use of safety helmets and protective clothing should also be prioritized.

- **Unsafe road user behaviors**

Safety in South Asia's regional trade corridors is poor by good practice country benchmarks. Unsafe road user behaviors include speeding, the nonuse of seat belts and safety helmets, unsafe overtaking, wrong-way driving, the nonuse of vehicle lights, risky crossing of roads by pedestrians, heavy vehicle overloading, and driver fatigue. Alarming levels of annual death rates per kilometer of highway are evident. Truck and bus involvement in fatal and injury-causing crashes are disproportionately high. Enforcement of unsafe behaviors is visually absent. Instead, the road policing role is focused on clearing up crashes, prosecuting related traffic violations, and producing crash reports. The only apparent signs of safety behavior interventions are slogans exhorting safe driving painted on the backs of trucks or poorly displayed as roadside signage. Field surveys highlighted the high number of near misses between trucks, buses, cars, and other road users. A chronic lack of a "spatial safety cushion" is evident. This results in a state of extreme and persistent danger, with little margin left for error. Trucks and buses passing in the opposite direction are often required to encroach onto

deficient road shoulders being used by pedestrians as the space between the passing vehicles is very tight. Driving practices appear chaotic, combative, and competitive, with an overarching goal to get in front of the next vehicle. Lane change and passing indicators are not generally used. Overtaking is frequent, risky, and aggressive, often occurring in the face of oncoming traffic and requiring evasive maneuvers by vehicles and vulnerable users to avoid crashes. These risky behaviors are mitigated by well-honed driving skills, responsiveness, and vehicle position awareness. The vigilance and forbearance of road users in trying circumstances, along with traffic congestion and resulting low network speeds, are also mitigating factors.

Truck drivers freely acknowledge excessive driving hours, to cover greater distances and make ends meet. Regulatory compliance regimes are said to be undermined by powerful competing stakeholder interests. Commercial pressures influence unsafe behaviors observed in the regional trade corridors. When opportunity permits, trucks and buses—often heavily loaded—speed. Bureaucratic delays forced upon truck drivers, and to a lesser extent bus drivers, reinforce the need to drive faster and for longer when possible. Drivers are often delayed by congestion in towns and look to make up time by speeding when the traffic frees up. Extended periods on the road and trip-completion fees provide further incentives to drivers to drive faster and longer in order to get paid and get back home. Curfews on trucks entering or leaving cities at key times can exacerbate fatigue issues by artificially extending the driving day. Drivers must largely fend for themselves as the road rules remain unclear, or unenforced, with potential safety issues being resolved by facilitation payments.

Vehicle and pedestrian conspicuity issues are of concern. There is little or no street lighting and pedestrians are vulnerable. Many vehicles do not have, or do not use lights, making it hard to see other road users and be seen by them. Trucks and other vehicles park haphazardly on roadsides, often without suitable parking lights, and present risks for passing vehicles.

Many diverse road user safety behavior campaigns, using various media, are implemented throughout South Asia. While their effectiveness and efficiency remains unclear, there is little sign of them improving safety behavior in the regional trade corridors. Guidance provided by global good practice suggests more substantial and well-targeted efforts are necessary. South Asia is a large, diverse, multilingual, multiethnic region, with notable cultural differences and many different languages being spoken. Truck drivers in the regional trade corridors come from different parts of the region. Safety messaging, such as road signs and advertising billboards, must be responsive to this reality if it is to be effective. However, regional literacy levels are relatively low. Truck drivers and their assistants are likely among the least literate occupational groups in the South Asia region. This reduces the effectiveness of road safety rules and campaigns conveyed through signage and print media such as brochures, newspapers, magazines, and websites.

In line with global trends, the media landscape in South Asia is changing rapidly. This change is marked by a decline in terrestrial television services and newspaper readership and corresponding growth in satellite and online news and social media services. Smartphones are ubiquitous and offer great potential for message delivery in the regional trade corridors, provided potential driver distraction issues can be managed.

- **Post-crash response services**

Study findings in the eastern subregion of South Asia did not address post-crash response services in the regional trade corridors as the study method employed could not review their effectiveness. However, service coverage appears to be variable. All countries in the region report at least partial access to national emergency care phone numbers. Only India and Nepal report having trauma register facilities and only India and Bhutan require formal certification of prehospital providers. None of the countries in the region report undertaking national assessments of their emergency care systems (WHO 2018).

- **Private sector role**

In the South Asia region, the private sector is making a major contribution to the rapid growth of country, regional, and global supply chains, with ongoing investments in vehicle fleet modernization, driver training, enhanced logistics systems, and, to some extent, road safety promotions (Together for Safer Roads 2015). This has the potential to contribute significantly to improved road safety performance, as well as increased productivity and decarbonization. Mobilizing effective private sector partnerships to achieve this is a high priority and there are opportunities for the private sector to play a leadership role in regional road safety. This is a pressing issue given that truck driver and passenger risks in the South Asia region are the highest in the world and are likely to escalate with the growth in regional trade (see Appendix A, Table A.3).

- **Technology and innovation**

High-income countries and cities are experiencing an industry-led convergence of information and communications technologies with transport technologies running ahead of regulatory regimes. This has profound implications for future regional mobility and safety. While in technology-transfer terms, the South Asia region can be viewed as being downstream from high-income countries and cities central to this revolution, rapid market diffusion processes must be anticipated. Integrated surveillance technologies can deter unsafe network behaviors. New vehicle technologies for trucks, cars, and motorcycles can improve safety by reducing road crashes and injury severity. In-vehicle telematic devices can incentivize safer driving through lower insurance premiums. Some of these developments are already proving their value. Others promise safety gains in the near term, but also come with potential safety risks. There is already evidence of rapid technological change in the South Asia region and road safety policy must anticipate and address these issues of emerging complexity.

For example, Rivigo, a large fleet owner in India, has developed driver and vehicle utilization technology that substantially improves safety, freight efficiency, and asset utilization. Ninety percent of its vehicles are less than two years old and all have autonomous braking systems installed to ensure brake applications when driver error occurs. Speed governors are also installed in the entire fleet to limit speed in accordance with government regulation. Telematic monitoring of air brake pressure, engine oil pressure, coolant level, and temperature is carried out to reduce the probability of truck down time. Vehicles are inspected before every trip, and a central monitoring and tracking team ensures that the nearest repair shop or original equipment manufacturer dealer is alerted for immediate attention in case of any breakdown. Besides a standard bolt system, advanced locking mechanisms with hidden locks are installed in each truck to ensure safety and security of consignments.

The technology package provides end-to-end visibility with real-time, map-based vehicle tracking, automated vehicle arrival alerts before loading and unloading, delay alerts due to unforeseen events, advanced GPS logs from start to end of the trip, data reports, and a management information system dashboard, which are all available to customers through desktop and mobile-based applications. Auto allocation of driving duties to pilots through relay automation ensures that drive time is restricted to four to six hours. Adequate rest time between trips is ensured through the scheduling system. All drivers carry a smartphone with an application that provides feedback at the end of every trip based on outliers in performance like speeding and speed volatility. This encourages responsible driving and reinforces safe behavior. Drivers can also check their past performance history and their improvement with various metrics. Driver performance-based incentives are linked to driving efficiency and not turnaround times. Smooth and controlled driving is incentivized up to 60 percent of the base wage. Monthly coaching sessions are conducted with drivers, highlighting their performance on various safety metrics such as average speed, speeding, and speed volatility (WBG 2019a).

Opportunities exist at the regional level to assess these developments and promote and foster their wider diffusion throughout the transport industry. The leapfrogging of past unsafe practices in the heavy freight sector offers great potential for road safety gains, but the adoption of these new practices in turn must be strategically managed to ensure their full potential is achieved.



- **Speed management**

Speed management is a vital safety priority in South Asia that permeates all policy considerations addressing infrastructure, vehicle, and road user safety issues. It is integral to the “safe system approach” promoted by the OECD’s influential *Towards Zero: Ambitious Road Safety Targets and the Safe System Approach* report of 2008 (OECD 2008). The genesis of this approach can be found in the Dutch Sustainable Safety and Swedish Vision Zero strategies, developed a decade before the OECD report, which aimed to eliminate road crash deaths and serious injuries (Tingvall 1995; SWOV 1996). Behavioral and biomechanical science inform this vision. Road users are recognized as error prone and physically vulnerable, with their safety being assured by eliminating their exposure to forces that exceed their injury tolerance thresholds.

In accordance with this vision, road crashes in South Asia’s regional trade corridors must be anticipated, planned for, and accommodated to ensure their level of violence does not threaten life or long-term health. Speed management is central to this because it is a factor in all road deaths and injuries. Speed contributes to the level of body damaging kinetic energy exchanged in a crash. It also contributes to the likelihood of a crash occurring in the first place, either in terms of not being able to stop a vehicle quickly enough when a dangerous situation arises, or by losing vehicle control. Crashes are usefully understood as a sequence of collisions. For light and heavy vehicle’s occupants, the first collision is between vehicles, or with an external hazardous object; the second collision is between the vehicle’s occupants and the vehicle’s interior; and the third collision is between the vehicle’s occupants’ internal organs and their containing body (e.g., the brain colliding with the skull). Motorcyclists and cyclists experience the first and third collision sequences; as do pedestrians struck by vehicles.

In the case of crash victims who die or who are seriously injured, the exchange of crash energy exceeded their injury tolerance thresholds. Crash impact speeds and the level of crash protection provided by road infrastructure and vehicle safety features, and safety clothing and helmets in the case of motorcyclists and cyclists, contribute to or ameliorate this outcome, as does human physical condition with older people and young children being more fragile and at greater risk. Vehicle mass contributes significantly, with heavy buses and trucks damaging the occupants of vehicles and other road users they crash with more severely than light vehicles do. Consequently, limiting speed can substantially reduce these crash fatality and injury losses. A safe speed limit will effectively be determined by the protective qualities of a road’s link and place functions, the protective qualities of the vehicles using the road, and the protective qualities of the safety clothing and helmets used by motorcyclists and cyclists.

Available evidence on road crash impact speeds and fatality risks provides the following indicative speed limit thresholds for different types of road:

- For roads with possible conflicts between light vehicles and unprotected users, the safe speed limit should be 30 kilometers per hour.
- For roads with possible side-on conflicts at intersections between light vehicles, the safe speed limit should be 50 kilometers per hour.
- For roads with possible frontal conflicts between light vehicles, the safe speed limit should be 70 kilometers per hour.

- For roads with no possible frontal or side-on conflicts between road users, the safe speed limit should be 100 kilometers per hour, or perhaps higher depending on road quality (Tingvall and Haworth 1999).

These safe speed thresholds reflect Sustainable Safety road and network hierarchy design principles (see Box 2). They require the physical separation of moving vehicles with large speed and mass differences, to avoid crashes, and designing for lower travel speeds where potential crashes cannot be avoided, to ensure impact speeds do not exceed human injury tolerances. Evidence from ongoing research may result in these prescribed speed thresholds being revised, but currently these thresholds set reasonable upper limits for light vehicle speeds (Rosen et al. 2011). These limits must be revised downwards where there is potential for heavy vehicle crashes with light vehicles, motorcyclists, cyclists, and pedestrians, as the crash impacts will be greater. For example, the safe speed for buses and trucks in pedestrianized areas would be considerably lower than 30 kilometers per hour.

Survey findings in a sample of regional trade corridors in South Asia highlighted their distinct traffic stream composition and vehicle speeds in relation to infrastructure characteristics and potential impacts on safety and freight efficiency performance. These findings provide a useful contextual grounding for better understanding and acting on identified regional and country road safety risks and related factors affecting heavy vehicle freight productivity. Low average daily speeds for trucks and buses are evident in the corridors surveyed, being around 30 kilometers per hour or less, but the corridors are far from safe. Risks arise from the large speed differentials between vehicle types and the disparities between the masses of heavy and light vehicles and pedestrians. Being struck by a heavy vehicle at speeds even lower than 30 kilometers per hour is still dangerous for users of light vehicles, motorcyclists, cyclists, and pedestrians. While average speeds are low, there was a wide spread between the maximum and minimum speeds recorded over the survey period, which indicates dangerous speeding behavior. Even though the prevalence of higher speeds is low, risks are elevated on roads with narrow cross-sections and recurrent roadside hazards.

Available corridor crash data confirm this diagnosis with dangerous concentrations of annual crash deaths per kilometer being revealed. High proportions of truck-involved and bus-involved crashes are evident, confirming the regional risk assessment findings (see Section 2.6 and Appendix A, Table A.3). Excessive truck and bus speeds in the survey corridors shed light on their risky performance, with recorded maximum speeds of up to 90 kilometers per hour or more going far beyond the safety threshold of the infrastructure provided. High maximum speeds are also evident for other vehicle types, especially two-wheelers and cars, which further explains the high concentrations of corridor road crash fatalities and injuries (WBG 2019a).

The Sustainable Safety strategy specifies a generalized urban and rural road hierarchy with three broad categories of road: high-speed flow roads and low-speed access roads, with medium-speed distributor roads connecting them. In reality, it is recognized that the road hierarchy is more complex than this, given that roads often serve both flow and access functions (SWOV 2010). Nevertheless, in high-income countries this categorization aligns quite well with high-speed, urban, and interurban flow roads, and high-density, residential access roads. Safe system applications have been advanced in these contexts. It is in the grey zones of medium-speed, mixed-use arterial roads that ensuring the safety of all road users is proving to be difficult and requires more attention to be paid to safety issues, not just through-traffic requirements, in the

urban place realm (Austroads Ltd. 2017). These issues are evident and more complex in the regional trade corridors of South Asia where conflicting link and place functions undermine road user safety.

An emphasis on link and place functions has arisen from a reassessment of road hierarchies in urban planning contexts to address the concern that undue priority has been given to ensuring the efficiency of traffic flows, which undermines the safety, amenity, and environmental quality of places being served by roads. This new urban design agenda calls for a rebalancing of “right-of-place” and “right-of-way” concerns with priority attention being paid to the former (Marshall 2004). Prevalent economic and social activities in the road environment, as well as traffic flows, are systematically accounted for taking a human-centered, rather than vehicle-centered, approach aligned with safe system thinking and practice (Jones et al. 2007). Priority is being given to people and their place-making activities.

Place-making activities evident in global urban settings are omnipresent in South Asia’s regional trade corridors where de facto place functions that serve high concentrations of roadside towns, villages, and ribbon developments conflict with long-distance corridor link functions, especially truck and bus traffic. The formal designation of these corridors as national highways determines their operational mode and overrides local traffic and community safety and amenity priorities, resulting in consequential poor safety outcomes.

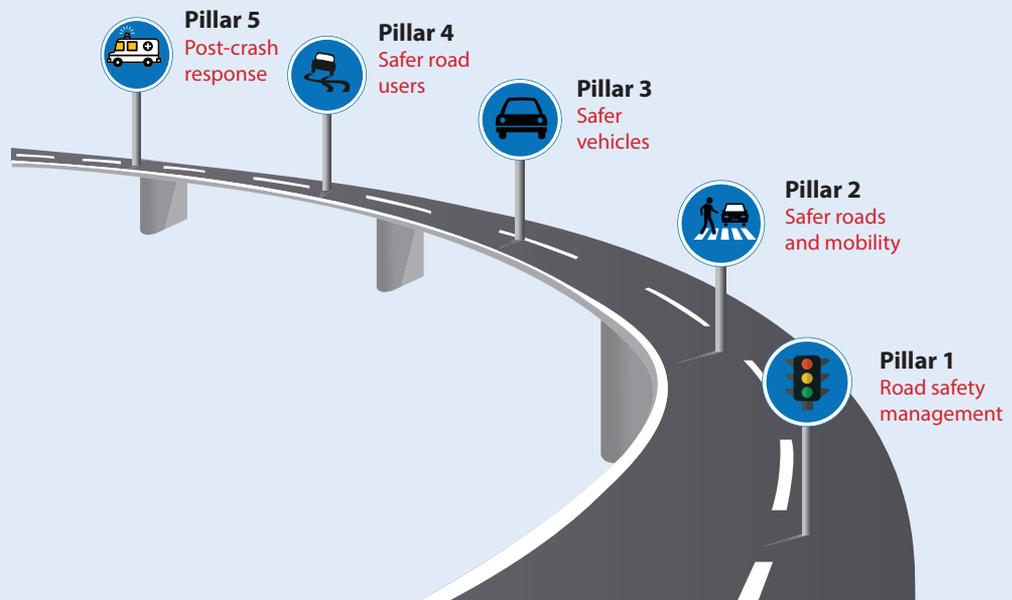
Scientific evidence on the relationship between vehicle speeds and crash risks is robust. This was further confirmed by a recent review of speed limit changes and deployment of automated speed enforcement in 10 case study countries. In the countries studied, increases in mean speeds resulted in a higher number of crashes, fatalities, and injuries, and vice versa (International Transport Forum 2018). This evidence applies equally well to South Asia’s regional trade corridors, but it is not necessarily the case that increased speeds will always result in safety losses. On the contrary, adherence to safe road network design principles can both improve safety outcomes and contribute to the achievement of other sustainable mobility goals related to vehicle productivity and environmental performance (see Appendix B). Good practice speed management is central to delivering effectively and efficiently on this wider ambition.

3.3 Complementing National Strategies with Shared Regional Initiatives

The study’s findings in the eastern subregion of South Asia provide a strategic rationale for determining and addressing regional trade corridor safety priorities and the specification of shared regional initiatives designed to address them. Countries in the wider region can complement their national strategies with these shared regional initiatives and strengthen their institutional management capacity through mutually beneficial knowledge transfer.

Road safety improvement opportunities in the region’s trade corridors mirror countries’ strategic priorities and provide a practical pathway to scale up and accelerate country interventions to achieve quick safety gains. Road safety investment can also be harmonized with the achievement of freight productivity, decarbonization, and infrastructure asset protection objectives. The following framework for shared regional initiatives in the South Asia region is aligned with the five pillars for action specified in the current United Nations Global Plan for the Decade of Action for Road Safety 2011–2020:

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



The UN Global Plan's guiding principles and vision embrace the safe system approach, which aims to eliminate crash fatalities and serious injuries with an integrated response across these five pillars (WHO 2011). Speed management underpins pillars 2, 3, and 4. In recognition of this, the Australasian safe system frameworks included a separate safer speeds pillar to prioritize speed limits and address related issues more holistically.⁴ It is now well recognized that key solutions for managing speed are building or modifying road infrastructure to calm traffic, requiring car makers to install new technologies to help drivers keep to speed limits, and establishing and enforcing speed limit laws (WHO 2017). These speed management considerations will be addressed in the following assessment of regional opportunities for shared initiatives, under the respective UN Global Plan action pillars.

4. Opportunities for Shared Regional Initiatives

4.1 Road Safety Management

Initiative 1: Crash Data Management and Analysis Systems

A shared regional initiative to harmonize crash data management and analysis systems across the South Asia region countries would accelerate and enhance current country measures to improve their current systems and facilitate the benchmarking of country performance within the region and benchmarking of regional performance with other regions (see also proposed Initiative 7).

Initiative 2: Regional Road Safety Observatory

The joint participation of all countries in the South Asia region in the proposed establishment of a regional road safety observatory for Asia and the Pacific would complement Initiative 1 and facilitate more rapid and effective knowledge transfer.



Pillar 1 of the UN Global Plan encourages the creation of multisectoral partnerships and the designation of a lead agency with the capacity to develop and direct the delivery of national road safety strategies, plans, and targets. It places an emphasis on ensuring that there is sufficient funding for sustainable implementation and the development of crash data and performance measurement systems to guide the national effort. It also calls for adherence to UN legal instruments and encourages their further development at the regional level.

These proposed initiatives will strongly underpin high-priority road safety management capacity building efforts in the countries of South Asia and enhance the targeting of road safety programs. Effective and efficient road safety management depends upon having a clear understanding of network safety performance over time. Country crash data and analysis systems must be strengthened to enhance functional capacity to deal with data entry, types of data collected, database navigation, analysis of crashes (sites of interest and policy level), mapping, integration with other data, quality control issues, monitoring sites of interest, and dissemination of data.

Addressing this priority can provide valuable road safety management benefits in the short to medium term. Nationwide crash database and analysis systems must meet the monitoring and evaluation needs of lead road safety agencies and be accessible to all their partners and stakeholders to underpin performance tracking and the development of programs and policies designed to achieve longer-term safety targets.

Global good practice can guide system development. In line with recent technological innovations, such systems can be web-based with palm-top crash recording devices providing GPS locations for crash events, connected with police stations, and, where feasible, linked to health sector data systems to provide a more comprehensive picture of crash injuries. They can also provide analytical tools to target enforcement activities to road safety risks and user-friendly interfaces to ensure easy system access for all potential users.

A proposed Asia-Pacific Road Safety Observatory will provide expert assistance to countries in Asia and the Pacific by facilitating shared crash data collection and analysis practices and promoting the design of effective fatality and injury reduction measures. The WHO, the Global Road Safety Facility, the FIA Foundation, and the Government of Japan are providing financial support for this initiative. A high-level regional workshop was held in Singapore in March 2019 to launch this initiative. The World Bank Group, the Federation Internationale de l'Automobile, the Asian Development Bank, the International Transport Forum, and government officials from 15 countries in the region (including representation from Bangladesh, Nepal and Pakistan) participated in this workshop (WBG et al. 2019a). A second workshop was held in Bangkok in December 2019 to seek continued country support and endorsements for the proposal, with Bhutan and Nepal being represented in this meeting (WBG et al. 2019b). This initiative has the potential to assist the development of crash data recording and management systems in all the South Asia region countries, through regional and global knowledge sharing and transfer of good practice procedures and technologies.

The European Road Safety Observatory (ERSO) provides a good practice model for the proposed Asia and Pacific initiative (see Box 1). In exploring the potential to adapt and transfer this model to the Asia and Pacific regions, it must be recognized that its development drew upon extensive specialist expertise from its member countries and built upon a history of successful road safety management. Other critical success factors included regional budgets commensurate to the scale of the task and strong political and agency leadership committed to its establishment and ongoing support. In less well-resourced regions, the establishment process will, out of necessity, have to be adapted to regional capacity strengths and aligned to available resources.

Box 1: European Road Safety Observatory

The Trans-European Transport Network (TEN-T) sets the benchmark for safe long-distance freight and passenger operations across national borders, within a regional road safety management framework. Shared regional performance monitoring of the TEN-T network is undertaken by the European Road Safety Observatory (ERSO). While ERSO was primarily created to be used by European Union (EU) and member state policy makers, it was also designed to support a wide range of stakeholders, including automotive manufacturers, road operators, police, insurers, NGOs, and other safety advocates. The establishment of ERSO commenced in 2002. Its purpose was to bring together and harmonize all road safety data from EU member states and build a platform for road safety knowledge sharing and policy-making initiatives. An agreement made by the European Council of Ministers in 2003 called on member states to cooperate in the provision of safety data and a major project (SafetyNet) commenced in 2004 to assemble the observatory framework and develop a set of harmonized approaches to safety data. It also developed a state-of-the-art knowledge base concerning key areas of road and vehicle safety policy-making. The establishment project was completed by late 2008. ERSO has since developed into a major data repository and knowledge hub supporting evidence-based road safety management across the European region and beyond to a global audience. Its website provides access to harmonized member state crash fatality and injury data by road user, vehicle, and road types, and related analytical tools. It also provides comprehensive exposure data, safety performance indicators, and an extensive knowledge base with peer-reviewed web texts on a wide range of road safety issues.

Source: WBG 2019a

4.2 Safer Roads and Mobility

Initiative 3: Infrastructure Safety Design and Assessment

A shared regional initiative to harmonize infrastructure safety design principles and safety assessment tools across the trade corridors of South Asia would enhance country measures to improve the safety performance of their strategic road networks for all users, especially the most vulnerable.



Pillar 2 of the UN Global Plan promotes raising the inherent safety and protective quality of road networks for the benefit of all users, especially the most vulnerable: pedestrians, cyclists, and motorcyclists. It places an emphasis on greater operator and designer accountability for safety performance, enhanced land use, transport system integration, improved infrastructure safety rating and assessment tools, and related capacity building and knowledge transfer.

This proposed initiative gets to the heart of infrastructure safety design and assessment issues that must be systematically addressed in South Asia, if the region's road networks are to be capable of meeting the goal of ensuring protection for all road users.

The most concise exposition of systematic infrastructure safety design principles is provided by the Dutch Sustainable Safety strategy (see Box 2). Fundamentally, the regional trade corridors in South Asia do not comply with these design principles, resulting in predictably high crash fatality and injury rates. Traffic and speed survey findings in the regional trade corridors underscore this design failure.

Box 2: Sustainable Safety Design Principles

Road safety developments in the Netherlands have been influential given their systemic inclusiveness, which aims to intrinsically ensure the safety of all road users, especially those most at risk. The five principles guiding the Dutch Sustainable Safety strategy provide an integrated framework for improving infrastructure safety in South Asia:

1. **Functionality of roads:** Mono-functionality of roads as either through roads, distributor roads, or access roads in a hierarchically structured road network.
2. **Homogeneity of mass and/or speed and direction:** Equality of speed, direction, and mass at moderate and high speeds.
3. **Predictability of road course and road user behavior by recognizable road design:** Road environment and road user behavior that support road user expectations through consistency and continuity of road design.
4. **Forgivingness of the environment and of road users:** Injury limitation through a forgiving road environment and anticipation of road user behavior.
5. **State awareness by the road user:** Ability to assess one's capacity to handle the driving task.

The original Sustainable Safety strategy embraced the first three of these design principles—functionality, homogeneity, and predictability of roads—with an infrastructure and vehicle safety focus. Further development introduced two useful new principles, social forgivingness and state awareness, highlighting important road user behavioral issues integral to the achievement of the vision. Social forgivingness concerns road users' anticipation of potentially unsafe behaviors by other road users and willingness to compensate for them. State awareness concerns the ability of road users to realistically assess their capability of safely performing traffic tasks in the road environment that they are engaged in. Just recently, these five principles have been further adapted and refocused into three design principles (functionality, biomechanics, and “psychologics”) and two organizational principles (responsibility and learning and innovating). This adaptation and refocusing responds to new societal trends in population, urbanization, and technology, which have potential road safety implications for nations and influence the delivery of effective injury prevention measures for the future. These new insights are broadly well aligned with the previous principles and contribute to their ongoing development and application. Continual improvement remains a strong Sustainable Safety strategy focus.

Source: WBG 2019a

Overall, mean speeds in the regional trade corridors are very low, which reduces freight vehicle productivity. There are still significant speed variations between different vehicle masses operating in the narrow carriageways, which produces unsafe outcomes. The risks are high in uncongested periods where the speed differentials are greater. In congested periods where the protective space for vulnerable road users is increasingly tightened, the safety margins are also diminished. More specifically, the Sustainable Safety functionality and homogeneity principles are violated and the lack of adequate separation between differing vehicle masses and speeds mean that even at low speeds crash outcomes for the many vulnerable road users can be fatal, or result in serious injuries.

The separation of vulnerable road users from heavy vehicle traffic would improve their safety outcomes. It would also lessen their congestion impacts, with consequent productivity gains for heavy vehicles. In this regard, it is important to recognize that the long-term Sustainable Safety vision envisages the development of exclusive, dedicated road networks for heavy motor vehicles to safely separate them from light vehicles (Wegman and Aarts 2006). In the United States, consideration has been given to the creation of dedicated freight lanes on the interstate road network (Aritua et al. 2018). The development of strategic road networks in the South Asia region is concurrent with its early stages of motorization. Hence there is great opportunity to embrace this design vision and leapfrog high-income country practices to more safely and productively address the inevitable and inexorable growth in heavy vehicle traffic.

Infrastructure safety audit, safety inspection, safety rating, and safety impact assessment tools are well documented, accessible, and widely applied in good practice high-income countries, across all stages of the road infrastructure life cycle, from planning and design through to major upgrading and rehabilitation (PIARC 2015). While they are essential in managing infrastructure safety, their effectiveness and efficiency are dependent on supporting investment and regulation; good quality traffic, infrastructure, and crash data; and adequate institutional capacity to develop, implement, and sustain their use (International Transport Forum 2015).

Countries in the South Asia region would benefit from a systematic review of their current practices, to assess the potential for improved, harmonized tools and procedures to

be introduced, suitably adapted, and calibrated to the service requirements of their road environments. However, it must be recognized that infrastructure safety performance problems in South Asia are ubiquitous, visibly evident to road safety professionals, and reflect more fundamental safety design issues that must be addressed before suitably adapted and calibrated safety assessment tools can meaningfully be used. It cannot be assumed that current good practice infrastructure safety assessment tools can be readily applied to road environments in South Asia when their traffic conditions and safety design requirements are far more complex than those in high-income country contexts. Experience with addressing the safety of mixed use, urban arterial roads in high-income countries is highly relevant in this regard. While these road environments are less complex than regional trade corridors in South Asia, it is still proving difficult to guarantee the safety of all road users when priority is given, explicitly or implicitly, to motorized vehicles. Issues arising from this in urban environments are becoming more hotly contested.

The vehicle-centric tools of highway engineers encounter intractable design problems when seeking to rebalance “right-of-place” and “right-of-way” issues that arise in the road environments they are assessing (Austroads Ltd. 2017). New tools that take a more human-centered approach to classifying road link and place functions show far greater promise (Marshall 2004). Their application in regional trade corridors, combined with the use of road safety impact assessment tools, potentially provide an opportunity to innovatively adapt and apply high-income country practices to more effectively and efficiently address the unique requirements of road environments in South Asia.

4.3 Safer Vehicles

Initiative 4: Regional New Car Assessment Program

A shared regional initiative to create a regional new car assessment program in South Asia would enhance country measures to improve light vehicle safety standards and related crash protection for drivers, passengers, and pedestrians.

Initiative 5: Truck Size and Weight Regulations

A shared regional initiative to harmonize country size and weight regulations and related compliance regimes for heavy trucks using regional trade corridors in South Asia (ideally established as protocols under the nascent Motor Vehicle Agreement between the eastern subregion countries) would enhance country measures to improve road freight safety, productivity, and decarbonization performance.



Pillar 3 of the UN Global Plan encourages the universal deployment of improved passive and active vehicle safety technologies. It places an emphasis on the adoption of harmonized UN global standards, implementation of consumer-focused new car assessment programs in all regions of the world, and the use of fiscal and other incentives to accelerate consumer and major public and private fleet operator uptake of motor vehicles that offer high levels of road user protection.

These proposed initiatives lend weight to efforts being made to improve the protective qualities of the light vehicle fleet and the safety and sustainability of regional freight logistics chains.

Regional new car assessment programs in Europe and Australasia have been effective in creating consumer demand for vehicle safety improvements that enhance crash protection for vehicle occupants in crashes and pedestrians struck by vehicles (Ward 2015). The aim of new car assessment programs is to test new vehicle crash performance and publicize the findings to potential consumers. This provides valuable market information as safety performance can vary greatly between car models, even those in the same price range, or the same models in different geographic markets. Buyers can make more informed decisions, which in turn encourages manufacturers to improve and promote product safety. Experience with such consumer programs has shown that they work; buyers respond to test results, particularly where a model performs poorly, and manufacturers improve their products in response. The Global New Car Assessment Programme has demonstrated progress being made in India with two locally produced light vehicles recently achieving 5-star occupant protection ratings (WBG 2019c).

Optimizing vehicle size and weight regulations can reduce total truck travel distance, which in turn produces fuel savings and reductions in greenhouse gas emissions and local air pollution, as well as reducing exposure to crash risks and contributing to improved safety outcomes (see Box 3) (Woodrooffe 2016). Achieving this in the South Asia region will require truck reforms to be aligned and integrated with improved regional infrastructure planning, design, operation and use.

Box 3: Truck Size and Weight Regulations

Competitive forces within the transport industry are generally strong and profit margins are low. This can encourage overloading and speeding, compromise maintenance, and undermine safety. Freight tasks vary, including the weight and shape of cargo transported, and trucks must be adaptable to maximize their financial returns. First-order elements of truck design, such as the length, wheelbase, width, height, axle loads, axle spacing, and gross vehicle mass, are influenced and limited by size and weight regulations, which in turn determine freight productivity, safety, and environmental performance.

Size and weight regulations can be issued at various levels of government, particularly at national and regional levels. In good practice countries and regions, harmonization of size and weight regulations is promoted to improve freight efficiency, but related decisions must also account for safety and environmental factors. In these countries, the range of truck types is broad and the customer exercises choice over major components used in the assembly of the vehicle such as engine, transmission, drive axles, and suspensions. The customer also specifies the gross vehicle weight, suspension, and axle load rating; the vehicle wheelbases; and drive axle spread. In most cases components such as engine, transmission, drive axles, and suspension are supplied by a third party to the manufacturer as plug-in components, which are fully compatible within the truck manufacturing industry. In the South Asia region, trucks are generally much smaller and are often delivered as incomplete vehicles to be finished by local final-stage manufacturers.

Size and weight regulations define the upper limit of both low and high-density freight vehicle efficiency and directly influence how trucks impact on infrastructure, consume fuel, produce emissions, and influence crash frequency. Axle loads and gross vehicle weight influence vehicle center of mass height, which in turn influences vehicle stability. High center of mass is strongly correlated to rollover risk and poor vehicle dynamic characteristics. These characteristics are expressed as performance-based standards and are used as essential building blocks for progressive truck size and weight policy.

Source: WBG 2019a

A qualitative balance sheet of indicative regional trade corridor costs and benefits for three infrastructure development options in South Asia underscores the complexities that must be addressed (see Appendix B). This balance sheet highlights the realities of the traffic stream composition and speed profiles analyzed in the surveyed regional trade corridors, where significant differences in the speed distribution of the various traffic streams at lower flows increase crash fatality and injury risks, and the sheer number of vehicles of different types at higher flows further increase crash risks given the narrow corridor cross sections, inadequate pedestrian facilities, and recurrent roadside hazards. Speeds of freight vehicles are generally low, and even lower in peak periods, which impacts negatively on the efficiency of freight movements.

The first development option is a “lose-lose” scenario, where safety, network productivity, accessibility, and environmental performance continue to deteriorate. The second development option is a “win-lose” scenario, which suggests that it is not easy to create a way out of the problems highlighted by the first option, unless heavy vehicle movements are safely separated from light vehicle movements and important corridor place functions for pedestrians and corridor access are tightly controlled. The third development option is a “win-win” scenario that comes at a higher capital cost, but can deliver the benefits that are being sought. It may be argued that if properly handled, the second development option can achieve this across the sustainable mobility spectrum, but experience suggests it will be difficult. Analyses of Indian crash data indicate that the construction of four-lane divided highways (without access control) has not reduced fatality rates and that there is a clear case for the redesign of intercity roads with the separation of slow and fast modes (Mohan et al. 2009).

Available evidence underscores the need to take innovative measures that recognize the interrelationships between improved safety and network productivity. The achievement of significant safety, productivity, and decarbonization gains in the regional trade corridors of South Asia hinges on the implementation of effective truck size and weight reforms, the provision of safe infrastructure, and the improvement of road user behaviors.

4.4 Safer Road Users

Initiative 6: Road Policing and Marketing and Media Campaigns

A shared regional initiative to develop standard operating procedures for targeted road policing operations in regional trade corridors in South Asia and guidelines for coordinated marketing and media campaigns would enhance country measures to bring unsafe road user behaviors under control.



Pillar 4 of the UN Global Plan calls for the development of comprehensive enforcement programs, combined with social marketing campaigns, to improve road user behavior. It places an emphasis on setting and seeking compliance with evidence-based standards and rules aimed at reducing speeding and drink-driving, and increased use of seat belts and helmets. It also promotes enhanced occupational health and safety laws for the safe operation of commercial freight and passenger services and the establishment of graduated driver licensing systems for novice drivers.

This proposed initiative targets the fundamental weaknesses evident in road policing in South Asia that must be addressed if substantial safety gains are to be quickly made in the

coming decade, given that infrastructure and vehicle safety initiatives will take longer to realize their benefits.

Modern road policing adopts a high-visibility approach that is proactive and preventative in nature. It aims to deter unsafe road user behaviors through the intense enforcement of offenses that can result in crash fatalities and serious injuries (e.g., speeding, not wearing seat belts and helmets, drink-driving, and violation of professional driving hours and required rest periods). This requires moving away from reactive policing to a preventative model. Reactive policing is incident-driven, focused on managing crash scenes, investigating crashes and related crimes, and dealing with subsequent court actions. Preventative road policing, on the other hand, is proactive and intelligence-driven, focused on visibly policing high-risk behavior on a sustained basis to improve safety across targeted roads and the wider network (see Box 4).

Box 4: Creation of a National Highway Patrol Service in Uttar Pradesh, India

Under the WBG-financed Uttar Pradesh Core Road Network Development Project, it is planned to establish the Uttar Pradesh Highway Police (UPHP) to pilot the introduction of proactive, targeted road policing focused on preventing crashes and achieving reductions in road crash deaths and injuries. The UPHP will be established as a new service with its own command structure and initial staffing of up to 1,000 officers during the pilot phase. It will be enforcement-focused, authorized to issue fines for traffic offenses, and have its own operational protocols, specialist equipment and training, and reporting requirements. UPHP patrols will target selected National Highways in Uttar Pradesh on a 24-hours-a-day, seven-days-a-week annual basis to ensure high visibility and provide a strong general deterrence road policing presence. Highway operations that target unsafe road user behaviors will be supported by intensive marketing and media campaigns. The project will finance the UPHP vehicle fleet (cars and motorbikes), including maintenance and operating costs for the first four years, and patrolling and enforcement equipment (radars, laser guns, passive breath-analyzers, portable radios, first aid kits, and vehicle video and GPS tracking systems), plus marketing and media services. UPHP communications, event recording, dispatch and information analysis will be facilitated by the 100 UP Command and Control Center (the Integrated Emergency Management System of the UP Police, which provides year-round public access to safety services at all times of the day and night). Once the pilot demonstrates good results and the operational model proves to be working well, the Traffic Directorate intends to scale the service up and extend UPHP enforcement operations to additional high-risk corridors across Uttar Pradesh. This model will also have the potential to be replicated throughout India and the rest of the South Asia region.

Source: WBG 2019a

While reactive road policing lacks visibility and behavioral impact, proactive road policing is highly visible, resulting in the general deterrence of unsafe road user behaviors through the increased perception of being detected and swiftly and severely penalized. This is particularly so with speed management, where both on-road enforcement and automated speed camera enforcement have proved to be highly effective.

Shifting to proactive road policing models in South Asia will require the creation of high-capacity highway patrol services with upgraded vehicles and related enforcement technologies. Consideration should be given to the use of automated camera enforcement programs and improving the efficiency of court processes and administrative penalty systems to efficiently manage the likely higher volume of offence notices.

Looking ahead, once effective country road policing capacity is created, a good practice regional road policing model is provided by TISPOL, the European Traffic Police Network. TISPOL was established by the police forces of Europe to improve road safety across their regional network through the use of shared road safety intelligence and shared road policing practices and enforcement operations (TISPOL 2015). TISPOL members plan and deliver cross-border road safety campaigns that play a key role in ensuring the safety of the Trans-European Transport Network.

In order to improve their effectiveness, proactive road policing programs should be supported by marketing and media campaigns that target at-risk user groups and address the devastating consequences of crash deaths and injuries and impacts on victims and their families, friends, and associates. These campaigns must compete with mainstream commercial advertising, matching it in quality, intensity, creativity, and duration, to ensure high target audience recall of key messages and audience acknowledgement of their relevance.

4.5 Post-Crash Response

Initiative 7: Emergency Medical and Rehabilitation Services

A shared regional initiative to review the provision of post-crash care services in South Asia and prepare related operational guidelines would enhance country measures to improve the effectiveness and efficiency of post-crash response measures.

Initiative 8: Injury Surveillance Systems

A shared regional initiative to prepare guidelines for harmonized injury surveillance systems in prehospital and hospital settings across the South Asia region would complement country measures under proposed Initiative 1 to harmonize crash data management and analysis systems.



Pillar 5 of the UN Global Plan calls for increased responsiveness to post-crash emergencies and improved delivery of emergency treatment and rehabilitation services to crash victims. It emphasizes enhanced hospital trauma care and timely rehabilitation, improved road user insurance schemes to finance rehabilitation services, thorough crash investigation and victim compensation processes, and encouragement and incentives for the employment of disabled crash victims.

These proposed initiatives contribute to strengthening post-crash response measures in South Asia and enhancing understanding of the scale of the regional road crash burden.

Emergency medical and rehabilitation services make a vital contribution to improving road safety outcomes and require the direction and coordination of well-sequenced interventions to maximize their effectiveness and efficiency (see Box 5).

Available evidence suggests that generally post-crash response services throughout South Asia are of variable quality and the Emergency Care System Assessment Tool developed by the WHO could be used to review and identify priorities to strengthen post-crash services for all regional crash victims.⁵

The importance of having high-quality road crash fatality and injury data has been emphasized in Section 4.1. The preparation of regional guidelines for prehospital and hospital injury data collection will contribute to the integration of transport, justice, and health sector injury management systems and related targeting of prevention measures.

Box 5: Emergency Medical and Rehabilitation Services

Effective post-crash care is characterized by efficient emergency notification, fast transport of qualified medical personnel, correct diagnosis at the scene, stabilization of the patient, prompt transport to the point of treatment, quality emergency room and trauma care, and extensive rehabilitation services.

Post-crash care improvement must address the chain of interventions which can commence with bystanders at the scene of the crash, through to emergency rescue, care, and trauma services, on to longer-term rehabilitation. In low and middle-income countries, attention to prehospital care is important, especially in terms of training for first responders, improving access to the emergency medical system, and coordinating emergency rescue services. Basic improvements in the hospital setting, some of which is not expensive, such as addressing human resources and trauma-related equipment, is also important.

Rehabilitation services are also an essential component of comprehensive post-hospital care. Related to this, third-party motor vehicle insurance schemes provide an important mechanism to fund essential services and reduce poverty impacts.

Source: Bliss and Breen 2009



5. The Way Forward in South Asia

The South Asia region faces considerable road safety challenges. It accounts for 25 percent of the world's road crash fatalities, a fast growing economy, and rapid motorization that is creating greater exposure to road safety risks. Achieving SDG Targets 3.6 and 11.2 will require the mobilization of scaled-up and sustained additional road safety investment throughout the region. Addressing road safety priorities in the regional trade corridors of South Asia provides opportunities for shared regional initiatives that can complement individual country road safety strategies and help accelerate their successful delivery.

Eight shared regional initiatives have been proposed concerning crash data management and analysis systems, a regional road safety observatory, infrastructure safety design and assessment, a regional new car assessment program, truck size and weight regulations, road policing and marketing and media campaigns, emergency medical and rehabilitation services, and injury surveillance systems. These initiatives are aligned with national road safety efforts throughout the region. If properly resourced and directed, they would make a major contribution to reducing the regional road safety burden and achieving wider sustainable mobility goals that address transport sector productivity, accessibility, and environmental performance.

In the context of the upcoming 3rd Global Ministerial Conference on Road Safety in Stockholm, it is timely to consider the role of regional policy and related organizations in moving the agenda forward. Regions have their unique characteristics and priorities, but each share the same sense of urgency and common institutional mandates to achieve ambitious performance targets in the road safety arena over the coming decade. Cities and nations are increasingly framing their economic, social, and cultural development policies in regional terms and with this comes the incentive to leverage success within a wider framework of opportunity.

The multilateral development banks, UN regional commissions, international agencies, and the global donor community all have important roles to play in mobilizing funding and specialist resources for road safety at the country level. In the coming decade of action their leadership and facilitation of regional initiatives would provide added impetus to the global road safety agenda. The South Asia region presents attractive, but challenging, opportunities to explore this new focus.

Appendix A: Comparative Regional Performance Data

Table A.1. Regional Population, Vehicles, and Road Safety Performance

| WBG Regions and High-Income Countries | Number of Countries | Population | Percentage of Population Urban | Total Vehicles | Vehicles per 1,000 People | Fatalities | Fatalities per 100,000 People | Fatalities per 10,000 Vehicles |
|---------------------------------------|---------------------|----------------------|--------------------------------|--------------------|---------------------------|----------------|-------------------------------|--------------------------------|
| South Asia | 8 | 1,671,598,481 | 33 | 177,827,112 | 106.4 | 267,912 | 16.0 | 15.1 |
| South Asia (eastern subregion) | 4 | 1,437,285,962 | 26 | 162,826,228 | 113.3 | 233,694 | 16.3 | 14.4 |
| East Asia and Pacific | 22 | 2,011,305,299 | 47 | 468,420,089 | 232.9 | 380,502 | 18.9 | 8.1 |
| Europe and Central Asia | 20 | 359,874,388 | 53 | 94,944,133 | 263.8 | 53,157 | 14.8 | 5.6 |
| Latin America and the Caribbean | 23 | 547,258,826 | 61 | 170,610,147 | 311.8 | 99,271 | 18.1 | 5.8 |
| Middle East and North Africa | 11 | 366,239,722 | 66 | 59,419,885 | 162.2 | 84,507 | 23.1 | 14.2 |
| Sub-Saharan Africa | 41 | 871,724,741 | 47 | 33,406,143 | 38.3 | 208,538 | 23.9 | 62.4 |
| WBG Regional Totals | 125 | 5,828,001,457 | 51 | 1,004,627,509 | 172.4 | 1,093,887 | 18.8 | 10.9 |
| High-Income Country Totals | 49 | 1,115,846,301 | 75 | 761,377,586 | 682.3 | 88,154 | 7.9 | 1.2 |
| Totals (all countries) | 174 | 6,943,847,758 | 63 | 1,766,005,095 | 254.3 | 1,182,041 | 17.0 | 6.7 |
| High-Income Country Reference Group | 9 | 482,981,741 | 86 | 363,437,224 | 752.5 | 40,764 | 8.4 | 1.1 |

Source: WBG 2019a; WHO 2015; and XX World Development Indicators, Environment 3.12, The World Bank

Note: The high-income country reference group data in this table (and following Tables A.2 and A.3) are an average across some of the best performing countries in the world (Sweden, the United Kingdom, the Netherlands, Norway, and Singapore), and Canada, the United States of America, Australia, and New Zealand, to ensure a reasonable spread of high-income country performance outcomes and relevant governance, topographical, population, and transport network differences were accounted for when benchmarking good practice performance. If the regional comparisons were made with just the world's best performing countries, the performance gaps revealed would be much greater.

Table A.2. Regional Vehicle Fleets

| WBG Regions and High-Income Country Reference Group | Cars and 4-Wheeled Light Vehicles | | Motorized 2 and 3-Wheelers | | Trucks | | Buses | | Not Specified | |
|---|-----------------------------------|------------------|----------------------------|------------------|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| | percentage of fleet | per 1,000 people | percentage of fleet | per 1,000 people | percentage of fleet | per 1,000 people | percentage of fleet | per 1,000 people | percentage of fleet | per 1,000 people |
| South Asia | 24 | 26.0 | 71 | 75.9 | 2.8 | 2.9 | 1.2 | 1.3 | 0.3 | 0.3 |
| South Asia (eastern subregion) | 24 | 27.2 | 72 | 81.9 | 2.6 | 3.0 | 1.1 | 1.2 | 0.1 | 0.1 |
| East Asia and Pacific | 38 | 87.5 | 56 | 130.1 | 2.9 | 6.8 | 0.5 | 1.2 | 3.1 | 7.2 |
| Europe and Central Asia | 81 | 214.1 | 6 | 17.0 | 9.4 | 24.9 | 1.55 | 4.0 | 1.4 | 3.8 |
| Latin America and the Caribbean | 64 | 198.8 | 24 | 73.7 | 8.8 | 27.4 | 1.1 | 3.4 | 1.7 | 5.2 |

| WBG Regions and High-Income Country Reference Group | Cars and 4- Wheeled Light Vehicles | | Motorized 2 and 3-Wheelers | | Trucks | | Buses | | Not Specified | |
|---|------------------------------------|------------------|----------------------------|------------------|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| | percentage of fleet | per 1,000 people | percentage of fleet | per 1,000 people | percentage of fleet | per 1,000 people | percentage of fleet | per 1,000 people | percentage of fleet | per 1,000 people |
| Middle East and North Africa | 56 | 90.9 | 4 | 5.9 | 5.5 | 8.9 | 0.5 | 0.9 | 2.1 | 3.4 |
| Sub-Saharan Africa | 60 | 22.9 | 21 | 8.1 | 3.6 | 1.4 | 2.9 | 1.1 | 1.7 | 17.2 |
| Average for WBG Regions | 46 | 78.7 | 44 | 76.2 | 4.7 | 8.1 | 0.9 | 1.6 | 2.1 | 3.6 |
| HIC Reference Group | 92 | 694.0 | 3.5 | 26.4 | 3.5 | 26.1 | 0.3 | 2.2 | 0.5 | 4.9 |

Source: WBG 2019a; WHO 2015

Table A.3. Regional Road Safety Risks by Road User Group

| Region/ Road User Group | South Asia | East Asia and Pacific | Europe and Central Asia | Latin America and Caribbean | Middle East and North Africa | Sub-Saharan Africa | High-Income Country Reference Group |
|---|------------|-----------------------|-------------------------|-----------------------------|------------------------------|--------------------|-------------------------------------|
| Pedestrians | | | | | | | |
| Fatalities per 100,000 people | 1.6 | 4.1 | 4.0 | 4.5 | 4.6 | 4.2 | 1.2 |
| Risk ranking within region | 3= | 2 | 1 | 1 | 1 | 1= | 4 |
| Fatalities per 10,000 vehicles | 1.5 | 1.8 | 1.5 | 1.4 | 2.8 | 10.9 | 0.2 |
| Risk ranking within region | 3= | 2 | 1 | 1 | 1 | 2 | 2= |
| Cyclists | | | | | | | |
| Fatalities per 100,000 people | 0.6 | 1.2 | 0.3 | 0.5 | 0.4 | 0.8 | 0.2 |
| Risk ranking within region | 5 | 4 | 5 | 5 | 6 | 4 | 5= |
| Fatalities per 10,000 vehicles | 0.5 | 0.5 | 0.1 | 0.2 | 0.2 | 2.0 | 0.03 |
| Risk ranking within region | 6 | 4 | 5= | 5 | 6 | 5 | 3 |
| Motorized 2/3-wheelers | | | | | | | |
| Fatalities per 100,000 people | 4.5 | 5.8 | 0.5 | 4.1 | 2.0 | 1.8 | 1.3 |
| Risk ranking within region | 1 | 1 | 4 | 2 | 4 | 2 | 3 |
| Fatalities per 10,000 vehicles | 4.2 | 2.5 | 0.2 | 1.3 | 1.3 | 4.7 | 0.2 |
| Risk ranking within region | 1 | 1 | 4 | 2 | 4 | 3 | 2= |
| Fatalities per 10,000 motorized 2/3 wheelers | 5.9 | 4.5 | 3.1 | 5.6 | 34.3 | 22.3 | 4.8 |
| Risk ranking within region | 4 | 3 | 1 | 2 | 1 | 3 | 1 |
| Car and light vehicle drivers | | | | | | | |
| Fatalities per 100,000 people | 1.0 | 1.0 | 3.2 | 1.5 | 2.9 | 1.3 | 3.9 |
| Risk ranking within region | 4= | 5 | 3 | 4 | 3 | 3 | 1 |
| Fatalities per 10,000 vehicles | 1.0 | 0.4 | 1.2 | 0.5 | 1.8 | 3.5 | 0.5 |
| Risk ranking within region | 4 | 5 | 3 | 4 | 3 | 4 | 1 |
| Fatalities per 10,000 cars and light vehicles | 4.0 | 1.2 | 1.5 | 0.8 | 3.2 | 5.9 | 0.6 |

| Region/ Road User Group | South Asia | East Asia and Pacific | Europe and Central Asia | Latin America and Caribbean | Middle East and North Africa | Sub- Saharan Africa | High- Income Country Reference Group |
|---|------------|--------------------------|----------------------------|--------------------------------------|------------------------------------|---------------------------|--|
| Risk ranking within region | 5 | 5 | 3 | 5 | 5 | 5 | 3= |
| Car and light vehicle passengers | | | | | | | |
| Fatalities per 100,000 people | 1.6 | 2.1 | 3.4 | 2.7 | 3.6 | 4.2 | 1.5 |
| Risk ranking within region | 3= | 3 | 2 | 3 | 2 | 1= | 2 |
| Fatalities per 10,000 vehicles | 1.5 | 0.9 | 1.3 | 0.9 | 2.2 | 11.1 | 0.2 |
| Risk ranking within region | 3= | 3 | 2 | 3 | 2 | 1 | 2= |
| Fatalities per 10,000 cars and light vehicles | 6.2 | 2.4 | 1.6 | 1.4 | 3.9 | 18.5 | 0.2 |
| Risk ranking within region | 3 | 4 | 2 | 3 | 4 | 4 | 4 |
| Truck drivers and passengers | | | | | | | |
| Fatalities per 100,000 people | 1.7 | 0.6 | 0.2 | 0.3 | 0.9 | 0.3 | 0.2 |
| Risk ranking within region | 2 | 7 | 6 | 6 | 5 | 6 | 5= |
| Fatalities per 10,000 vehicles | 1.6 | 0.3 | 0.1 | 0.1 | 0.6 | 0.9 | 0.02 |
| Risk ranking within region | 2 | 6= | 5= | 6= | 5 | 6 | 4 |
| Fatalities per 10,000 trucks | 57.9 | 9.1 | 0.9 | 1.2 | 10.1 | 24.1 | 0.6 |
| Risk ranking within region | 2 | 2 | 5 | 4 | 3 | 2 | 3= |
| Bus drivers and passengers | | | | | | | |
| Fatalities per 100,000 people | 1.0 | 0.7 | 0.1 | 0.2 | 0.2 | 0.4 | 0.1 |
| Risk ranking within region | 4= | 6 | 7 | 7 | 7 | 5 | 6 |
| Fatalities per 10,000 vehicles | 0.9 | 0.3 | 0.0 | 0.1 | 0.1 | 1.0 | 0.01 |
| Risk ranking within region | 5 | 6= | 6 | 6= | 7 | 7 | 5 |
| Fatalities per 10,000 buses | 78.1 | 58.8 | 1.4 | 7.0 | 22.9 | 32.7 | 3.3 |
| Risk ranking within region | 1 | 1 | 4 | 1 | 2 | 1 | 2 |

Source: WBG 2019a; WHO 2015

Note: For each region, the risk rankings presented in this table should be read down the columns.

Appendix B: Balance Sheet of Indicative Regional Trade Corridor Costs and Benefits

| Regional Trade Corridor Development Options | Sustainable Mobility for All Performance Objectives | | | | Sustainability Assessment to 2030 |
|--|---|---|---|--|--|
| | Safety | Efficiency | Universal Access | Green Mobility | |
| 1. Baseline – do minimum (Low capital cost) | Unsafe, with rules for safe design, operation, and use systemically violated and all road users facing high risks. | Congested, low-speed trade corridor environment with poor heavy vehicle productivity performance. | Limited accessibility for pedestrians and nonmotorized modes. | Poor heavy vehicle fuel economy and emissions performance. | Sustainable regional trade corridor mobility for all is unachievable, with a high level of certainty. |
| 2. Upgrade existing corridor alignments to provide additional traffic capacity (Medium capital cost) | Safety gains are achievable, assuming controlled trade corridor access for road users, with physical separation of heavy and light vehicles and active transport modes. However, past experience with upgraded regional trade corridors has run counter to this, with increased crash fatality rates resulting from traffic growth, weak entry and exit controls, and ineffective separation of mixed mass, mixed speed vehicles using corridors. | Efficiency gains are achievable, provided larger mass vehicles can safely operate at far higher speeds with heavier loads. However, this is clearly contingent on heavy vehicle reforms being aligned and integrated with improved regional trade corridor infrastructure planning, design, operation, and use. | Accessibility is likely to be undermined by the severance and displacement of corridor community link and place and functions resulting from upgraded infrastructure capacity in the narrow regional trade corridors. | Reduced heavy vehicle fuel consumption and emissions are achievable, assuming regional trade corridor infrastructure and governance improvements are conducive to the introduction and management of high-productivity heavy vehicles. | Sustainable regional trade corridor mobility for all is uncertain given that freight efficiency and green mobility gains hinge on the alignment and integration of heavy vehicle reforms with infrastructure planning, design, operation, and use. Increased accessibility costs resulting from likely corridor community severance and displacement also weigh heavily on the balance sheet, as does potential deterioration in road safety outcomes. |
| 3. Provide dedicated heavy vehicle corridors, plus repurpose existing corridor alignments for more local light vehicles and active transport modes (High capital cost) | Substantial safety gains are assured by the physical separation of heavy vehicles from light vehicles and active transport modes, with high-speed regional trade corridors dedicated to heavy vehicles, and low-speed community corridors traffic-calmed and enforced for mixed use by light vehicles, nonmotorized modes, and pedestrians. | Substantial efficiency gains are assured with the higher speed, less congested operation of larger mass vehicles in dedicated trade corridors, and with less congested operation of lower-speed community corridor transport modes. | Improved accessibility for corridor communities is assured with enhanced link and place functions, assuming effective and efficient interconnection with dedicated trade corridors is provided where required. | Reduced heavy vehicle fuel consumption and emissions are assured with the higher-speed, less-congested operation of larger mass vehicles in dedicated trade corridors. | Sustainable regional trade corridor mobility for all is achievable. However, the benefits of this option must be weighed against its higher capital costs. |

Source: WBG 2019a

Note: For all options, safety gains from reduced vehicle overloading will also result in significant reductions in road damage and asset rehabilitation costs

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Endnotes

- 1 Data are from WBG 2019a. Washington, DC. This study used the WHO's *Global Status Report on Road Safety 2015* data as they provided a more comprehensive and comparable picture of road user risks in selected countries in the South Asia region than the 2018 report.
- 2 Data are from WBG 2019c. Companion reports have also been prepared for Bangladesh, Bhutan, India, Nepal, and Sri Lanka.
- 3 If the South Asia region countries of the Maldives, Pakistan, and Sri Lanka are included, it is estimated that an additional US\$130 billion investment would be required to achieve the SDG Target 3.6 of halving road fatalities by 2030. This estimate would increase with the inclusion of Afghanistan, but insufficient data are available to estimate by how much.
- 4 For example, see South Australia's Road Safety Strategy to 2020, *Towards Zero Together*, and New Zealand's Road Safety Strategy 2010–2020, *Safer Journeys*.
- 5 For more information on WHO's Emergency Care System Assessment Tool, see "Emergency and Trauma Care" on the WHO website at <https://www.who.int/emergencycare/activities/en/>.



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