Save LIVES

A road safety technical package

World Health Organization

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Foreword

The 2030 Agenda for Sustainable Development includes an ambitious target to reduce road traffic deaths and injuries by 50% by 2020. It is my hope that this target will leverage renewed momentum for the Decade of Action for Road Safety 2011–2020. While much progress has been made by governments during the Decade of Action to adopt and enforce new road safety laws on risks such as speeding, to redesign roads with protective infrastructure such as sidewalks, and to ensure that vehicles are equipped with life-saving technologies, governments must rapidly accelerate their efforts to achieve Sustainable Development Goal target 3.6.

To do so will mean that governments fulfil the commitments they have repeatedly made through various policy instruments and overcome the challenges they have faced, particularly fatalism, the misconstrued notion that road traffic crashes are accidental and nothing can be done to prevent them. It will also mean surmounting a lack of prioritization for road safety generally and a focus on interventions that are not always the most effective.

This document, *Save LIVES: a road safety technical package*, details key evidence-based measures identified by many of the world's leading road safety experts and their agencies as those most likely to impact road traffic deaths and injuries in the short and long term. They relate to: speed management, infrastructure design, vehicle safety, laws and their enforcement, emergency post-crash care and leadership on road safety.

If still today some 1.25 million people die from road traffic crashes every year, and millions more are injured, it is because policy-makers – particularly those in low- and middle-income countries – continue to find these solutions out of reach. This document seeks to demonstrate otherwise, by identifying those measures which when implemented in combination, have saved hundreds of thousands of lives in recent decades in many high-income countries in Europe as well as in Australia, Canada, Israel, Japan and New Zealand, among others.

If put into practice in a strategic manner, this package of measures will go a long way towards proving that deaths and injuries on the roads need not be an inevitable by-product of our highly mobile societies, and that together we can indeed build a future in which a culture of road safety prevails.

Dr Etienne Krug

Director

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World Health Organization

Save LIVES

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Overview of the Save LIVES package

Aimed at halving road traffic deaths and injuries by 2020 and providing access to safe, affordable, accessible and sustainable transport systems for all by 2030, Sustainable Development Goal (SDG) targets 3.6 and 11.2 provide a powerful focus to galvanize governments and the international community into action on road safety policy. The challenge is to seize this opportunity and to significantly scale up implementation of road safety measures. In this context, the Save LIVES technical package has been developed to support road safety decision-makers and practitioners in their efforts to significantly reduce the number of road traffic deaths in their countries.

Save LIVES provides an evidence-based inventory of priority interventions to be implemented towards achieving the SDG targets. The core components of Save LIVES are **S**peed management, **L**eadership on road safety, **I**nfrastructure design and improvement, **V**ehicle safety standards, **E**nforcement of traffic laws and **S**urvival after a crash. These components are interrelated and need to be implemented in an integrated manner, following the Safe System Approach, to effectively address the problem of road traffic deaths and injuries. The implementation of the interventions presented in this technical package will help reduce road traffic fatalities, injuries and related socioeconomic costs; improve the facilities and quality of the environment for walking and cycling; strengthen the institutional and legislative framework for road safety policy; and address broader societal and governance issues that affect road safety policy.

To reduce road traffic deaths and injuries, simultaneous actions are needed at national and local levels in the focal areas of the Save LIVES technical package. Since the reality of road safety policy implementation differs across countries, this package should not be seen as a one-size-fits-all solution, but rather as a guide to support decision-making on priority interventions for scaling up the road safety policy response towards achieving SDG targets 3.6 and 11.2.

1

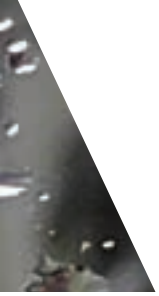
Introduction

The road safety policy context

Currently estimated to be the ninth leading cause of death across all age groups globally, road traffic crashes lead to the loss of over 1.2 million lives and cause nonfatal injuries to as many as 50 million people around the world each year. Nearly half (49%) of the people who die on the world's roads are pedestrians, cyclists and motorcyclists. Road traffic crashes are the main cause of death among people aged between 15 and 29 years.

In addition to the grief and suffering they cause, road traffic crashes constitute an important public health and development problem with significant health and socioeconomic costs *(1)*. Considerable economic losses are not only incurred by victims and their families, but also by nations as a whole: road crashes cost most countries 1–3% of their gross national product. Over 90% of road traffic deaths and injuries occur in low- and middle-income countries, yet those countries only account for 54% of the world's registered vehicles.

Road traffic crashes may be an everyday occurrence but they are both predictable and preventable, as illustrated by the large body of evidence on key risk factors and effective road safety measures that work in practice *(2–5)*.



The Safe System Approach (Figure 1.1) provides a viable framework to examine road traffic injury risk factors and interventions from a holistic perspective. The Safe System Approach is based on Sweden's Vision Zero strategy, which has the long-term vision of achieving no fatal or serious injuries within the transport system *(3, 6–8)*. The aim of this approach is to inform and guide the building of a safe road system to prevent crashes, and if crashes occur, to ensure that impact forces are not sufficient to result in serious injury or death, that those injured are rescued and that they receive adequate trauma care *(6–8)*.

Figure 1.1
Safe System Approach

Source: Reproduced with permission from reference *(6)*.

Four guiding principles are central to a safe system *(3, 6–8)*:

- people make mistakes that can lead to road traffic crashes;
- the human body has a known, limited physical ability to tolerate crash forces before harm occurs;
- individuals have a responsibility to act with care and within traffic laws, but a shared responsibility exists with those who design, build, manage and use roads and vehicles to prevent crashes resulting in serious injury or death and to provide post-crash care; and
- in order to multiply their effects, all parts of the system must be strengthened in combination, and road users are still protected if one part fails.

A safe system requires the complex and dynamic interaction between operating speeds, vehicles, road infrastructure and road user behaviour to be understood and managed in a holistic and integrated manner. In this way, the sum of the individual parts of the system combine for a greater overall effect and if one part fails the other parts will still prevent serious harm from occurring. There is no single pathway for the adoption, establishment and implementation of a safe system: moving to a safe system is a learning-by-doing process best described as a journey that presents opportunities, hazards and challenges along the way *(8)*. The experiences of pioneering countries such as the Netherlands and Sweden show that each country follows its own journey, shaped by the cultural, temporal and local context, but guided by the four underlying principles. With this approach, instead of seeing how to make incremental progress in road safety, one starts by setting the goal of no road traffic deaths and then works backwards, implementing measures to achieve that goal in a systematic and steady fashion.

The opportunity

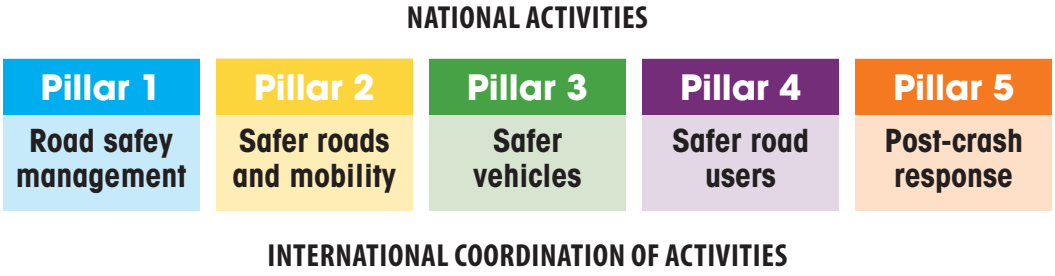
Countries have been implementing road safety measures for a number of years. This has not only given valuable insight into measures that work but also examples from which other countries can learn.

In addition, the international community is paying increasing attention to road safety policy. In 2010, for example, the United Nations General Assembly adopted Resolution 64/255 *(9)*, which established the Decade of Action for Road Safety for the 2011–2020 period, with the goal of stabilizing and reducing predicted levels of road traffic fatalities around the world. The United Nations Road Safety Collaboration also developed a Global Plan for the Decade of Action for Road Safety to provide an overall framework for action *(10)*. The Plan promotes proven, cost-effective solutions to improve road safety including those pertaining to: (i) road safety management; (ii) safer roads and mobility; (iii) safer vehicles; (iv) making road users safer; and (v) improved post-crash response and hospital care (Figure 1.2).

Despite the above developments, the number of road traffic deaths has remained fairly constant since 2007. The fact that a significant decline is yet to be observed in the number of global road traffic fatalities *(1)* underlines the need to find ways of strengthening the implementation of effective interventions.

In September 2015 the United Nations adopted the 2030 Agenda for Sustainable Development – the development framework that replaces and builds on the achievements of the Millennium Development Goals *(11)*. Road safety was absent from the Millennium Development Goals but road safety targets have been integrated into the new 2030 Agenda. The 17 Sustainable Development Goals (SDGs) and their 169 targets are intended to balance the economic, social and

Figure 1.2
Pillars of the Global Plan for the Decade of Action for Road Safety 2011–2020



Source: Reproduced with permission from reference *(10)*.

environmental dimensions of sustainable development, and stimulate action over the next 15 years in these critical areas. They include two targets that relate to road safety, one in Goal 3 (on health) and one in Goal 11 (on sustainable transport in cities and human settlements) (Box 1.1).

The SDG targets related to road safety create an opportunity for road safety policy as follows:

- SDG target 3.6 is far more demanding than the 2020 goal set for the UN Decade of Action for Road Safety (to "stabilize and reduce" road deaths by 2020).

- The targets have renewed attention to road safety policy. They have also recognized the importance of this issue to broader global health and development, and the need for countries and the international community to prioritize action towards achieving results even before the end of the SDG period. Moreover, the targets acknowledge that there is a strong scientific base for what works in practice, as demonstrated by the success of a number of countries in reducing the burden of road traffic deaths.

In this context, the Save LIVES technical package has been developed to support road

Box 1.1

Road safety-related SDGs and targets

SDG Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents

SDG Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

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

Source: Based upon reference *(11)*.

safety decision-makers and practitioners in their efforts to significantly decrease the number of road traffic deaths in their countries. A technical package is defined as a selected group of related interventions that, together, will achieve and sustain substantial and sometimes synergistic improvements in a specific risk factor or disease outcome *(12)*. A technical package distils a broad set of potential interventions into a manageable and limited high-value set, thereby providing policymakers with specific interventions known to be effective *(12)*.

Save LIVES provides an evidence-based inventory of priority interventions for road safety decision-makers and practitioners to implement towards achieving SDG targets 3.6 and 11.2 on road safety and human settlements. The momentum generated by those targets challenges countries to create safer roads and scale up the implementation of priority interventions around the world in order to halve deaths and injuries caused by road traffic crashes by 2020 and beyond, as well as to improve road safety through access to safe, affordable, accessible and sustainable transport systems for all by 2030.

If the problem of road safety is effectively addressed, the gains resulting from the reduction in costs, both in economic and human terms, can be channelled, for example, into development projects and other areas of concern. If no significant action is taken, however, road traffic fatalities are predicted to become the seventh leading contributor to the global burden of disease by 2030 *(13)*.

The core components of the Save LIVES technical package are **S**peed management, **L**eadership on road safety, **I**nfrastructure design and improvement, **V**ehicle safety standards, **E**nforcement of traffic laws and **S**urvival after a crash (Figure 1.3). Each component of Save LIVES is associated with priority interventions that will assist road safety decision-makers and practitioners in making tangible and sustained progress in reducing road traffic deaths and injuries in the next five years and beyond. The components of Save LIVES are based on the pillars in the Global Plan for the Decade of Action for Road Safety and other existing documents such as the *World report on road traffic injury prevention (3)*.

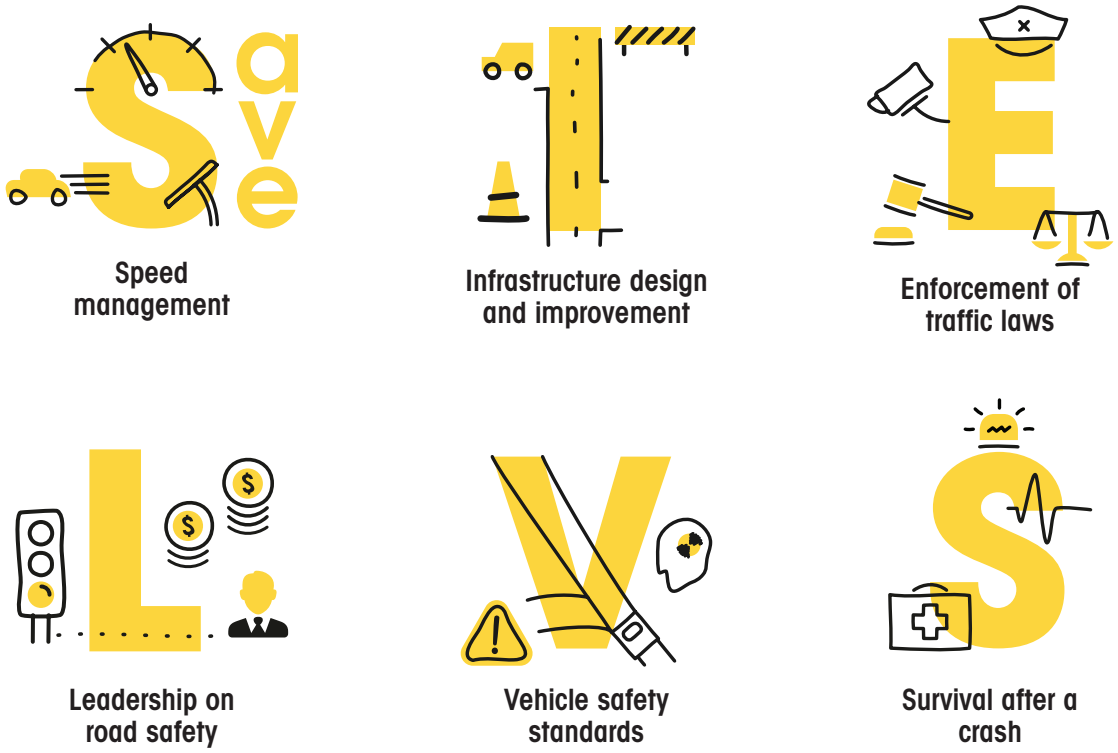
The Save LIVES technical package can contribute to:

- a 50% reduction in road traffic deaths and injuries across the world by 2020 and beyond; and
- the provision, by 2030, of access to safe, affordable, accessible and sustainable transport systems for all, and improvements in safety, notably by expanding public transport systems, with special attention to the needs of those in vulnerable situations.

Assessing the evidence

The road safety measures implemented and evaluated in different countries over the years have created a body of knowledge about evidence-based solutions that can be adapted and improved in other settings. This body of knowledge continues to be refined as existing measures are re-evaluated, new ones are tried out and further research is conducted into risk factors *(2–5, 14)*. The effectiveness of specific interventions has been assessed by their contribution to the reduction of fatalities and injuries, as well as changes in behaviour, attitudes and knowledge.

Figure 1.3
The Save LIVES technical package



Each intervention was assessed for effectiveness as follows:

- Proven: evidence from robust studies such as randomized controlled trials, systematic reviews and case–control studies shows that these interventions are effective in reducing road traffic fatalities and injuries, or in bringing about desired changes in behaviour.
- Promising: evidence from robust studies shows that some road safety benefits have resulted from these interventions, but further evaluation from diverse settings is required and caution is needed when implementing them.
- Insufficient: evaluation of an intervention has not reached a firm conclusion about its effectiveness because of a lack of evidence.

2

Save LIVES priority components and interventions

This section provides details of key measures that can be implemented in each core component of Save LIVES (Table 2.1). These measures are interconnected and will contribute to the creation of safer roads around the world. Specifically, information is provided on the nature of the problem, solutions that can be implemented and the benefits of implementing key measures in each component.

Table 2.1
Save LIVES: six components and 22 interventions

Acronym	Component	Interventions
S	**Speed management**	Establish and enforce speed limit laws nationwide, locally and in cities
		Build or modify roads which calm traffic, e.g. roundabouts, road narrowing, speed bumps, chicanes and rumble strips
		Require car makers to install new technologies, such as intelligent speed adaptation, to help drivers keep to speed limits
L	**Leadership on road safety**	Create an agency to spearhead road safety
		Develop and fund a road safety strategy
		Evaluate the impact of road safety strategies
		Monitor road safety by strengthening data systems
		Raise awareness and public support through education and campaigns
I	**Infrastructure design and improvement**	Provide safe infrastructure for all road users including sidewalks, safe crossings, refuges, overpasses and underpasses
		Put in place bicycle and motorcycle lanes
		Make the sides of roads safer by using clear zones, collapsible structures or barriers
		Design safer intersections
		Separate access roads from through-roads
		Prioritize people by putting in place vehicle-free zones
		Restrict traffic and speed in residential, commercial and school zones
		Provide better, safer routes for public transport
V	**Vehicle safety standards**	Establish and enforce motor vehicle safety standard regulations related to: • seat-belts; • seat-belt anchorages; • frontal impact; • side impact; • electronic stability control; • pedestrian protection; and • ISOFIX child restraint points
		Establish and enforce regulations on motorcycle anti-lock braking and daytime running lights
E	**Enforcement of traffic laws**	Establish and enforce laws at national, local and city levels on: • drinking and driving; • motorcycle helmets; • seat-belts; and • child restraints
S	**Survival after a crash**	Develop organized and integrated prehospital and facility-based emergency care systems
		Train those who respond to crashes in basic emergency care
		Promote community first responder training

Speed management

Speeding is a major risk factor for road traffic injuries, contributing to both crash risk and crash consequences *(3, 4, 15–18)*. As average traffic speed increases, so too does the likelihood of a crash *(15)*. For instance, an increase of 1 km/h in mean vehicle speed results in an increase of 3% in the incidence of crashes resulting in injury and an increase of 4–5% in the incidence of fatal crashes *(3)*. The higher the speed the greater the stopping distance required, and hence the increased risk of a road traffic crash. As shown in Figure 2.1, with a speed of 80 km/h on a dry road, it takes around 22 m (the distance travelled during a reaction time of approximately 1 second) to react to an event, and a total of 57 metres to come to a standstill. Male and young drivers are more likely to speed, while other factors likely to influence speed include alcohol, road layout, traffic density and weather conditions.

Effective speed management measures such as establishing and enforcing speed limit laws, roadway design and vehicle technology have been implemented in several settings. However, the implementation of such measures remains a challenge in many countries. For example, while 97 of the 180 participating countries in the *Global status report on road safety 2015* have speed limit laws set at 50 km/h or below in urban areas, only 27 countries (15%) rated the enforcement of their speed laws as "good" (8 or above on a scale of 0 to 10) *(1)*.

Solutions

Existing evidence shows that the key solutions for managing speed are establishing and enforcing speed limit laws, building or modifying roads which calm traffic and requiring car makers to install new technologies to help drivers keep to speed limits.

A 5% cut in average speed can result in a **30%** reduction in the number of fatal road traffic crashes.

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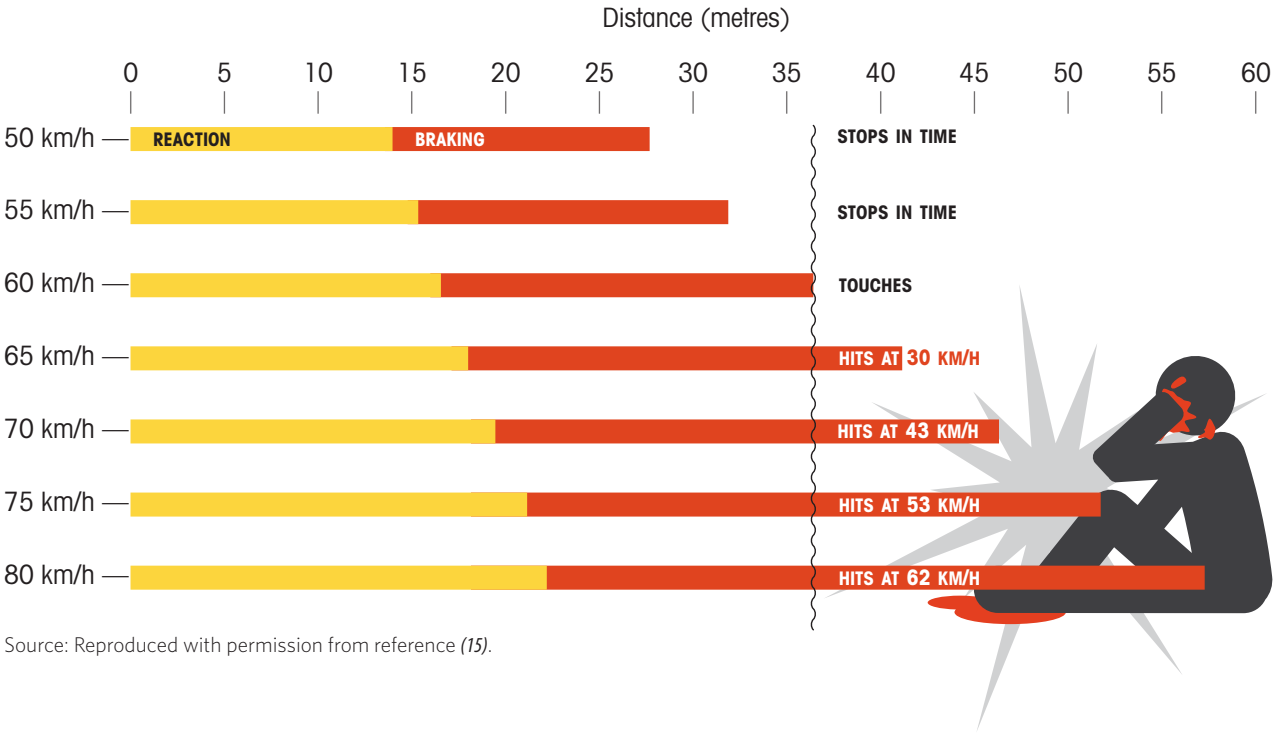
Figure 2.1
Stopping distance at different speeds (including reaction time of around 1 second)



Source: Reproduced with permission from reference *(15)*.

Establish and enforce speed limit laws nationwide, locally and in cities

This solution involves setting and enforcing appropriate speed limits on roads at national, urban and local levels. The current practice is to set the vehicle speed limit on urban roads at 50 km/h in general and 30 km/h in residential areas and sites where high volumes of pedestrian and/or cyclist traffic mix with vehicles (Box 2.1). It is necessary, however, to review speed limits regularly and to ensure they are safe. Moreover, it is not only important to set speed limits but also to inform drivers by posting the legal speed limit and to enforce that speed limit.

Setting vehicle speed limits needs to take into account *(8)*:

- the type and mix of road users;
- the safety quality of the infrastructure, especially its capability to forgive foreseeable human errors and thus create low-risk conditions for all road users;
- the crashworthiness and crash avoidance capabilities of vehicle fleets; and
- different road functions and the traffic mix.

The consequences of violating speed limits should be clearly stated in the law and/or regulations. These can include, for example, financial penalties, demerit points and licence suspension.

It is important to ensure that speed limit laws are enforced and appropriate punishments administered to drivers who break them. Enforcement takes different forms in different contexts and includes manual and automated approaches. Evidence has shown that automated enforcement is most effective at reducing speeds. Automated enforcement includes hand-held cameras, fixed cameras and mobile cameras, which are cameras in unmarked police cars. The law should not have provisions that limit the ability of police to use these effective enforcement measures.

Box 2.1

Speed reduction around schools in Kenya

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In the 2011–2014 period a school safety project was implemented in 20 primary schools in Naivasha and Thika sub-counties in Kenya. The programme, with the main aim of ensuring that children travel safely to and from school, targeted over 20 000 vulnerable school children, 49% of them girls. A baseline assessment covering the January 2008 to July 2011 period indicated that there were 266 injuries around schools, claiming the lives of 38 school-going children. However, not all schools had the same level of risk to road traffic injuries and deaths; those located around busy highways and roads posed a greater risk to vulnerable children. Robust criteria were put in place to select the schools with higher exposure to these risks. Accordingly, 20 primary schools (ten each in Naivasha and Thika) were selected to be included in the project, which implemented high-impact interventions to reduce the risk of road traffic collision for children on their way to and from school. The interventions included speed control around schools, enhancing the visibility of both children and crossing areas, environmental modifications, supervised crossing and awareness creation for children, teachers and parents. There were positive achievements as well as important lessons learnt over the four years of the project. The most prominent gain was the steady reduction in road traffic crashes and deaths around the schools selected; for example, the number of crashes dropped by 37% in Thika and by 49% in Naivasha from the baseline figures four years earlier. Similarly the number of deaths showed a decline of 83% in Naivasha and 60% in Thika.

Source: Based upon reference *(19)*.

Build or modify roads which calm traffic

The provision of self-explanatory road layouts that encourage and reinforce the desired speed at the location are important for supporting compliance. In urban areas the specific road design or engineering solutions to include in roadway design are roundabouts, road narrowing, traffic calming, speed bumps, chicanes and rumble strips, among others *(20–23)*. These measures are often backed up by speed limits of 30 km/h, though they can be designed to achieve various levels of appropriate speed. While each measure may be implemented as a separate intervention, they are usually implemented together in an area-wide or corridor-level traffic-calming scheme. Traffic-calming measures can vary from a few minor changes, through the modification of local streets, to area-wide changes and major rebuilds *(24)*. In rural and urban expressway environments, higher speeds should only be permitted when roadsides are safe, median separation exists, intersections are designed appropriately and road users of different speed, mass and direction are separated.

Require car makers to install new technologies

Intelligent speed adaptation (ISA) technologies bring speed limit information into the vehicle to assist the driver in making decisions about the appropriate speed limit *(25)*. The standard system uses an in-vehicle digital road map onto which speed limits have been coded, combined with a satellite positioning system *(3)*. The level at which the system intervenes to control the speed of the vehicle can be one of the following:

- Advisory: the driver is informed of the speed limit and when it is being exceeded.

- Voluntary: the system is linked to the vehicle controls but the driver can choose whether and when to override it.

- Mandatory: no override of the system is possible.

Benefits of speed management solutions

The following can be achieved through effective speed management:

- reduction in road traffic fatalities, injuries and related socioeconomic costs;

- improvement in other areas of transport and environmental policy such as air pollution, fuel consumption and noise pollution;

- improvement in facilities and quality of the environment for walking and cycling, contributing to the creation of liveable communities; and

- improvement in noncommunicable diseases as a result of increased exercise and reductions in pollution.

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Leadership on road safety

Leadership is the ability to influence or inspire people to achieve a certain goal *(26)*. One of the responsibilities of leaders is to provide a vision of how the future may look and to mobilize action to achieve it. A good example of this is Sweden, which adopted Vision Zero in 1997 and has mobilized action and implemented effective measures over the years *(7)*, a process that has led to a significant reduction in road traffic fatalities. A number of other countries have also adopted Vision Zero or Towards Zero fatality targets that reflect the fact that the only acceptable goal is no road traffic deaths or serious injuries *(8)*.

Mobilizing action around a vision is particularly challenging in the case of road safety, given the multisectoral aspect of the issue and the diversity of actors involved (including from health, transport, finance, education, the interior and/or police) *(27)*. In addition to the coordination challenges linked to the involvement of different stakeholders, the divergence of views concerning appropriate road safety strategies can delay or, in the worst case, hinder action. Other leadership issues include inconsistency in the implementation of road safety strategies, poor coordination and a lack of policy change champions *(28, 29)*. As such, the quality of leadership is one of the factors facilitating or hindering the implementation of road safety measures *(27, 29, 30)*.

Leadership on road safety is not only needed at the highest national political level but also at other levels of society and road safety policy, and is important in creating a sense of urgency for change, raising awareness and creating demand among stakeholders *(8)*.

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Responsible and accountable road safety **leadership** at country, state, provincial and city levels is vital to success.

Solutions

Existing experience shows that the key leadership roles lie in influencing and/or managing the functions and activities outlined below.

Create an agency to spearhead road safety

Coordination of road safety efforts across multiple sectors and stakeholders is critical for success *(1)*. In many countries this role is fulfilled by a lead agency that should ideally have the authority and resources needed to coordinate the implementation of a national strategy. In some countries coordination is done by a designated stand-alone agency while in others the lead agency is hosted within a government ministry (Box 2.2).

Although lead agencies or coordinating mechanisms are necessary, their mere existence will not lead to the improvement of the road safety situation in a country. They need to deliver on their responsibilities and to be funded at a level commensurate with the scale of the road safety problem and their ability to reduce that burden. Whether at national or local level, leadership in road safety needs to explore ways of building the basis for action for road safety, for example, by signing the major UN road safety-related agreements and conventions *(31, 32)*. Local leadership, in partnership with communities, can also be an effective way of achieving results. There is a vital role, too, for leadership in fleet safety and the management of people who drive for a living. Essentially, effective road safety leadership needs to utilize and trigger numerous opportunities at local, national and international levels if it is to move action on road safety policy.

Develop and fund a road safety strategy

A strategy provides a blueprint of where a country wishes to go. Like institutions, a strategy does not deliver solutions by itself; it needs to be implemented and backed up by the

Box 2.2

Examples of organizational structure for road safety lead agencies

The Norwegian Public Roads Administration (NPRA) is a stand-alone entity that coordinates road safety across different sectors and levels of government in Norway, and is involved in reviewing legislation and in data collection and dissemination. The National Traffic Safety Committee in Viet Nam is located in the Ministry of Transport and coordinates road safety policy across different government agencies under the overall leadership of the Deputy Prime Minister, who is also the chairman of the Committee.

Source: Based on reference *(1)*.

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allocation of financial and human resources to the implementation of the planned activities.

Evaluate the impact of road safety strategies

Evaluating and assessing the implementation of road safety programmes is important in determining whether the expected results are being achieved and where adjustments are needed. In addition, there may be a need to conduct specific assessments such as conducting new car assessments, undertaking road safety audits and/or inspections, conducting safety ratings of roads, reviewing road design standards, reviewing investment levels in road agencies and assessing national emergency care.

Monitor road safety by strengthening data systems

The importance of data on road traffic fatalities and injuries for monitoring country-level trends, tailoring prevention efforts, assessing progress and comparing the scale of road traffic deaths relative to deaths from other causes cannot be overstated *(1)*. However, data on road traffic fatalities are not robust in many countries. There is a need for countries to undertake greater harmonization and improvement in road traffic data with respect to:

- adopting a standard definition of a road traffic death for use in police databases;
- linking data sources (i.e. vital registration records, ambulance data, police data, hospital data, insurance data, etc.) to improve official road traffic fatality estimates;
- offering training to the police for accurate assessment of injury severity and cause of crash, covering all aspects of the road, road user and vehicle type;
- addressing the problem of underreporting of road traffic crashes;
- disseminating data to stakeholders;
- using available data in planning interventions; and
- adopting new technology to support data collection and analysis, where feasible.

Raise awareness and public support through education and campaigns

There are two specific activities that need to be conducted for this strategy:

- the first is educating and informing policy-makers, practitioners and the public about the importance of addressing the problem of road traffic injuries.
- the second is increasing awareness of road safety risk factors and prevention measures, and implementing social marketing campaigns aimed at changing behaviour and attitude.

Safe road user behaviour and a reduction in road traffic fatalities depend not only on knowledge and skills but also on community support, perception of vulnerability and risk, social norms and models, engineering measures and law enforcement. It is therefore important to remember that increasing awareness of road safety risk factors and prevention measures through education and social marketing campaigns is an adjunct to other measures, rather than a stand-alone solution (Box 2.3).

Box 2.3

Social marketing campaign in the Russian Federation

Four major campaigns were developed and aired in 2010–2014 as part of a road safety project in the Lipetskaya and Ivanovskaya regions of the Russian Federation. Focusing on seat-belt use, speeding and child restraint use, the campaigns were accompanied by enforcement. An evaluation showed a consistent reduction in the proportion of vehicles exceeding the speed limit: from 54.7% (2012) to 40.1% (2013) in Ivanovskaya Oblast and from 47.0% (2011) to 26.1% (2013) in Lipetskaya Oblast. The overall prevalence of seatbelt use increased from 52.4% (2010) to 73.5% (2013) among all occupants in the Lipetskaya region and from 47.5% (2011) to 88.8% (2013) in the Ivanovskaya region.

Source: Based on reference *(24, 33)*.

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Benefits of leadership solutions

The following can be achieved by improving road safety leadership:

- developing a governance foundation for undertaking specific interventions;
- addressing broader societal and governance issues, such as law and order, that affect road safety policy;
- triggering action and mobilizing stakeholders;
- improving coordination of road safety policy, ensuring work is efficiently conducted among different agencies;
- providing frameworks and accountability to ensure the implementation of specific interventions and the achievement of road safety policy outcomes;
- allocating financial and human resources to road safety policy; and
- increasing awareness of road safety risk factors and prevention measures, leading to greater support of enforcement and other road safety interventions.

Infrastructure design and improvement

Road infrastructure has traditionally focused on motorized transport and economic efficiency at the expense of safety, particularly for pedestrians, cyclists and motorcyclists *(34–36)*. The *Global status report on road safety* 2015 *(1)* found that 92 countries (of which 49% are high-income countries) have implemented policies to promote walking and cycling. However, studies show that these policies are not accompanied by other measures, such as effective speed management and the provision of safe infrastructure for pedestrians and cyclists, creating risks that lead to road traffic injuries *(37)*.

A recent assessment of over 250 000 km of road in 60 countries highlights the road design deficiencies that largely contribute to the global burden of road traffic injuries (Figure 2.2). More than 50% of the roads assessed lacked basic infrastructure for the safe movement of pedestrians, cyclists, motorcyclists and vehicle occupants. Improving the 10% highest-risk roads in each country over 20 years, through the implementation of footpaths, safety barriers, bicycle lanes and paved shoulders, has the potential to prevent around 3.6 million deaths and 40 million serious injuries *(22)*.

The traffic mix that exists in many countries means that pedestrians and cyclists share the road with high-speed vehicles, forcing them to negotiate dangerous situations and fast-moving traffic *(1)*. A lack of basic facilities, such as footpaths, cycle paths, motorcycle lanes and safe speed-controlled crossing points on many roads, increases the level of risk for all road users.

Improving the top
10%
highest-risk roads in each country over
20 years
can prevent millions of deaths and serious injuries.

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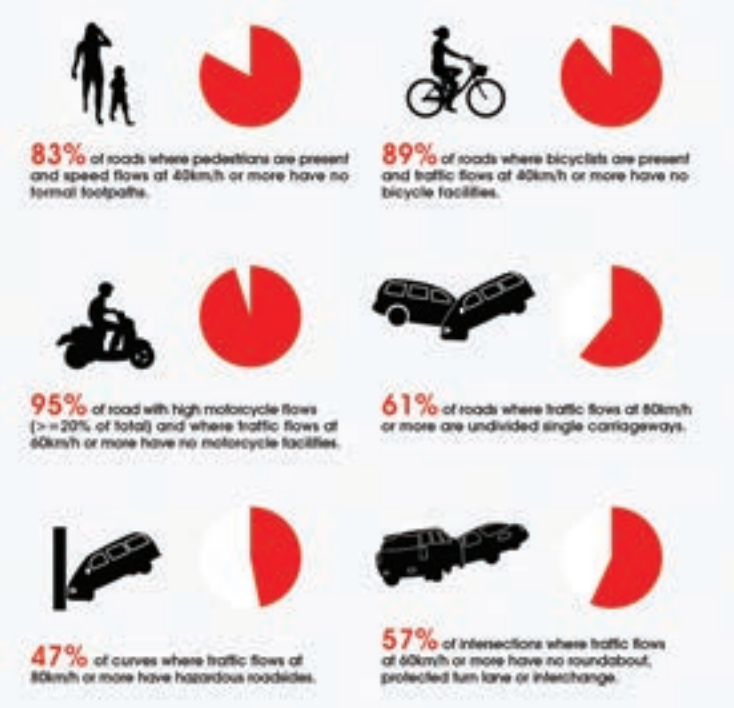
Figure 2.2
Exposure to risky road infrastructure conditions



Source: Based upon references *(8, 22)*.

Solutions

Existing literature and experience indicate that safety is the key principle to consider in planning, designing and operating the road network *(3, 4, 8, 19, 20)*. It is important to ensure that existing roads, new roads and public transport systems are all built to a high safety standard for all road users. An immediate priority is to update road design standards, avoiding past omissions and ensuring that brand new roads do not cause fatalities as soon as they are opened for use. Existing infrastructure should be improved by setting appropriate safety standards for all road users. The specific solutions for ensuring that the road network is safe for all road users are summarized below.

Provide safe infrastructure for all road users

Sidewalks separate pedestrians from motorized vehicles and bicycles. They provide space for different types of pedestrian to walk, move, run, play, meet and talk. To maximize their benefits to pedestrian safety, sidewalks should be part of every new and existing roadway where there is existing or potential future demand, including rural roads where relevant. In addition, where required, they should be provided on both sides of the road, be continuous and accessible to all pedestrians, be adequately maintained, be of adequate width, include kerb ramps and other facilities to meet the needs of wheelchair users and pedestrians with mobility and vision impairments, and be free from obstructions such as lamp posts and road signs.

Safe signalized or marked crossings separate pedestrians from vehicular traffic for a brief time period while they cross the street. Signalized or marked crossings help to indicate pedestrian right-of-way and the need for motorists to yield to pedestrians at appropriate points. Marked crossings are commonly installed at signalized intersections, as well as at other high-volume pedestrian crossing locations such as school zones and shopping precincts. They should, however, be installed in conjunction with other physical roadway enhancements that reinforce the crossing and/or reduce vehicle speeds (e.g. raised platform crossings and traffic calming).

Raised pedestrian kerb build-outs, refuge islands and medians along a road provide another strategy to reduce pedestrian exposure to motor vehicles and provide pedestrians with more secure places of refuge when crossing the street.

Pedestrian overpasses and underpasses are bridges and tunnels that allow for uninterrupted flow separate from vehicular traffic. This measure is used primarily in areas with high pedestrian volumes or where vehicle flows and speeds are high (e.g. expressways). To ensure the use of overpasses and underpasses, their accessibility and security needs to be addressed. In addition, safe provision needs to be made in rural areas for crossing livestock and agricultural vehicles.

Put in place bicycle and motorcycle lanes

Bicycle and motorcycle lanes enable cyclists and motorcyclists to be separated from motorized traffic and to move in a safer environment than the main carriageway. Facilities should be planned and developed at network level to provide continuity of quality and safety, and manage any interactions with other traffic (e.g. intersections, merge lanes) in a safe manner. Both on-road and off-road facilities can improve safety with safe design principles that ensure width, capacity, separation of users and surface type are appropriate for the speed and function of the facility.

Make the sides of roads safer

Collisions between vehicles and roadside objects are characterized by the high severity of their resulting injuries *(3)*. Infrastructure treatments generally act to assist drivers to stay on the road (e.g. improvements to the road surface, line marking and warnings about curves and their severity), alert drivers that they are leaving the road (e.g. rumble strips), improve the chance of recovering control of the vehicle if it does leave the road (e.g. shoulder treatments), or reduce the severity of the outcome if a vehicle leaves the road (e.g. clear zones, frangible poles and crash barriers).

Design safer intersections

Intersections are associated with high rates of collision and injury because they include a large number of pedestrian, cyclist, motorcyclist and vehicle conflict points *(37)*. Safer intersection design typically focuses on reducing the impact of speed and potential conflicts. One of the most effective options to reduce death and injury is the provision of well-designed roundabouts that reduce approach speeds and reduce the angle of potential impact to lower-severity side swipes or rear-end crashes.

The provision of overpasses and underpasses (grade-separated interchanges) are cost-effective where large volumes of through traffic have to be managed and well-designed merge lanes are provided.

Signalized intersections are designed to separate traffic and potential conflicts through time separation, although they require a level

of compliance and road user judgement depending on the detailed design at the location.

In the case of uncontrolled intersections, risks for all road users remain high and the inclusion of lower-cost traffic calming, engineering and technology measures (e.g. raised platform intersections, turning lanes, priority control, vehicle-actuated warning signs, speed reduction) should be considered to reduce risk at such highly dangerous locations in the road network.

Separate access roads from through-roads

The planning of road space that separates major through traffic and freight needs from transit priorities, local neighbourhood access and commercial precincts provides wide-ranging safety as well as economic and social benefits.

Prioritize people by putting in place vehicle-free zones

Given the general historical neglect of pedestrians and cyclists in roadway and built-environment design and planning, it is necessary to address such omissions through new designs and redesigns. Improving pedestrian and cyclist safety requires supportive policies that may be specifically focused on these two modes of transport or form part of general transport and land-use policies. Guidelines that specify design standards for pedestrian and cyclist facilities help to ensure the safety of the most vulnerable on new roadways and through the correction of deficiencies on existing roads *(19, 20)*. Various existing guidelines, such as the *High capacity manual (5)* and *Complete streets (38)* can be adapted to the local setting.

In general, pedestrian and cyclist safety policies and guidelines should recognize pedestrians and cyclists as legitimate road users and promote recognition of this notion among planners, engineers and professionals who plan and manage the road transport system; set and enforce traffic laws that ensure the safety of pedestrians and cyclists; encourage an inclusive approach in planning new roads and/or retrofitting existing roads; and pay attention to the specific needs of people with disabilities, children and the elderly. One way of ensuring this is to include road user groups, local communities and important stakeholders (such as rescue services) in the planning process.

Restrict traffic and speed in residential, commercial and school zones

The creation of low-speed environments in residential areas and school zones ensures safety for communities living in such areas and has little or no impact on transport efficiency because of the typically short travel distances involved. The survivability of pedestrians involved in a crash decreases rapidly at speeds in excess of 30 km/h (20 mph), and the creation of self-explanatory neighbourhood streets that engineer, encourage and enforce safer speeds is a priority in these locations. Solutions are typically achieved through road design (traffic calming, road narrowing, chicanes, raised platforms and speed bumps), technology (portable speed warning signs), policing and the enforcement of traffic laws (speed cameras and police patrols).

Provide better, safer routes for public transport

Pedestrian safety is a key issue to consider in the design of any mass transport system, including routes and stops. Prioritizing safe and efficient public transport options is one way of encouraging the shift from the use of the private car to public transport, walking and cycling. Combined with other land-use planning and travel-demand management options, such as the provision of services closer to residential areas, mass transport route design and efficient public transport options, the need for and extent of travel can

be reduced. In some countries, mass transit systems can themselves be a danger because of their overcrowded and dangerous vehicles, as well as poorly skilled and exhausted drivers. In such cases good fleet safety management can both reduce road casualties and encourage more public transport use.

Benefits of infrastructure improvement solutions

The following can be achieved by improving road infrastructure:

- reduction in road traffic fatalities, injuries and related socioeconomic costs;
- reduction in emissions when speed management initiatives are included in infrastructure improvement measures;
- promotion of walking and cycling, complementing other global moves to fight obesity, to reduce noncommunicable diseases, such as heart disease and diabetes, and to improve air quality and urban life; and
- contribution to the modal shift from private car use to public transport and also to a reduction in unnecessary travel through the provision and improvement of safer public transport options and mass transit design, combined with other land-use planning options.

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More than
440 000
deaths and serious injuries could be prevented and up to
US$ 143 billion
saved if basic UN vehicle regulations were applied in key Latin American countries by 2030.

Vehicle safety standards

Currently exceeding one billion, the world's fleet of motor vehicles is likely to at least double by 2030. Yet the application of vehicle safety regulations differs greatly around the world, being adequate in some countries and regions but weak or non-existent in others *(1)*.

Over the past few decades regulation and consumer demand have led to increasingly safe cars in high-income countries/areas. Many of the features that began as relatively expensive safety "add-ons" in high-end vehicles have since become much more affordable and are now considered basic requirements for all vehicles in some countries/areas. Rapid motorization in low- and middle-income countries/areas, where the risk of a road traffic crash is highest and where motor vehicle production is increasing in tandem with economic growth, means there is an urgent need for these basic requirements to be implemented globally.

It is important to ensure that the design of vehicles adheres to recognized safety standards, but in the absence of such standards automobile companies are able to sell obsolete designs that are no longer legal in well-regulated countries. Alternatively, automobile companies frequently "de-specify" life-saving technologies in newer models sold in countries where regulations are weak or non-existent.

The United Nations World Forum for Harmonization of Vehicle Regulations is the primary global body responsible for the development of international motor vehicle safety standards and its regulations provide a legal framework for UN Member States to apply voluntarily. Through the World Forum, motor vehicles can now be internationally approved without further tests, provided they

meet the relevant UN regulations that include crash-worthiness (providing protection when an incident occurs) and crash avoidance (preventing a collision from happening at all). Among the most important vehicle standards promoted by the World Forum are the following seven regulations: seat-belts; seat-belt anchorages; frontal impact; side impact; electronic stability control; pedestrian protection; and ISOFIX child restraint anchorage points *(39)* (Figure 2.3).

A new report commissioned by Global NCAP and the Inter-American Development Bank (IDB) revealed that 40 000 lives could be saved and 400 000 serious injuries prevented by 2030, if UN vehicle safety regulations were applied by four key countries in Latin America *(40)*. Economic assessment suggests that these casualty reductions could save up to US$ 143 billion over the 2016 to 2030 period.

Solutions

Existing evidence shows that vehicles that meet and exceed the requirements of the most important UN safety standards contribute substantially to the avoidance of road traffic crashes and to a reduction in the likelihood of serious injury in the event of a crash. However, currently only 40 countries meet all seven priority safety regulations regarding seat-belts, seat-belt anchorages, frontal impact, side impact, electronic stability control, pedestrian protection and ISOFIX child restraint anchorage points *(1)*. In countries where UN standards are already implemented, there is

Figure 2.3
Global NCAP's road map for safer vehicles 2020

Road Map for Safer Vehicles 2020 UN Regulations* for:	All New Vehicles Produced or Imported	All Vehicles Produced or Imported
Frontal Impact (No.94) Side Impact (No.95)	2018	2020
Seat Belt & Anchorages (No.14 & 16)	2018	2020
Electronic Stability Control No. 140 (GTR. 9)	2018	2020
Pedestrian Protection No.127 (GTR. 8)	2018	2020
Motorcycle Anti-Lock Brakes No.78 (GTR.3)	2018	2020
Autonomous Emergency Braking Systems	Highly Recommended	Highly Recommended

*or equivalent national standards such as US FMVSSs

Source: Based on reference *(39)*.

a need to sustain the effort; in countries yet to establish relevant regulations, there is an urgent need to do so and also to enforce these regulations. The key solutions to improving vehicle safety are summarized below.

Establish and enforce vehicle safety standard regulations

The seven international standards that are increasingly accepted as basic minimum standards for vehicle manufacture/assembly are:

- **Standards on frontal and side impact** regulations protect occupants and ensure that cars withstand the impacts of a frontal and side impact crash when tested at certain speeds.

- **Electronic stability control** prevents skidding and loss of control in cases of oversteering or understeering. Electronic stability control is effective at reducing crashes and saving lives.

- **Pedestrian protection** includes softer bumpers and modification to the front ends of vehicles (e.g. removal of unnecessarily rigid structures) that reduce the severity of a pedestrian impact with a car.

- **Seat-belts and seat-belt anchorage regulations** ensure that seat-belts are fitted in vehicles during manufacture and assembly and that seat-belt anchorages can withstand the impact incurred during a crash, so as to minimize the risk of seat-belt slipping and to ensure that passengers can be safely removed from their seats if there is a crash.

- **Child restraint regulations** ensure that instead of holding the child seat in place with the adult seat-belt, the vehicle is equipped with ISOFIX child restraint anchorage points that secure the restraint directly to the frame of the vehicle.

Establish and enforce regulations on motorcycle anti-lock braking and daytime running lights

These devices prevent wheels from locking during braking. They help motorcyclists to maintain stability and steering control when braking hard by allowing the wheels of a powered two-wheeler to maintain tractive contact with the road surface. In certain emergency conditions, anti-lock braking systems help to reduce stopping distance.

Running headlights during the day increase the visibility of motorcycles to other road users, reducing visibility-related crashes. Manufacturers can play an important role in promoting the use of daytime running lights by installing automatic lights on motorcycles. This strategy ensures that the headlights come on as soon as the ignition is turned on.

Benefits of vehicle safety solutions

The following can be achieved by adhering to approved vehicle standards:

- reduction in road traffic fatalities, injuries and related socioeconomic costs; and

- utilization of expanding technology options for vehicle safety, offering complementary possibilities beyond the traditional focus on infrastructure, legislation and enforcement.

Enforcement of traffic laws

The key behavioural risk factors for road traffic injuries are drinking and driving, not wearing a helmet, not using a seat-belt or child restraint, and speeding. Speeding and drink-driving significantly increase the risk of involvement in a crash, while the non-use of seat-belts, helmets and child restraints has a great impact on the severity of the consequences of a crash. Establishing and enforcing laws to address these risk factors is effective in reducing road traffic fatalities and their associated injuries *(4)*.

Although many countries have laws that address drink-driving, speeding, seat-belts, child restraints, helmet wearing and mobile phone use, these laws do not always meet best practice requirements and are not consistently enforced. While more than half of countries have satisfactory laws that address the use of seat-belts, only about a quarter have satisfactory laws that address the use of child restraints, speeding in urban areas and the wearing of standard motorcycle helmets; and only a fifth of countries have satisfactory laws that address drink-driving *(1)*. Another problem identified is inadequate, or lack of, enforcement of traffic laws due to factors such as lack of political will, limited financial and human resources, competing priorities at national level and corruption *(1, 41, 42)*.

The establishment of traffic laws is a vital step but laws alone are not sufficient to bring about the expected reduction in road traffic fatalities. It is necessary to ensure that laws are enforced and appropriate penalties administered to deter drivers and other road users from committing road traffic violations or repeating such offences, and to increase the potential of laws to save lives *(3)*.

Strong and sustained enforcement of road safety laws, accompanied by public education, has positive effects on road user behaviour and thus has the potential to **save millions of lives.**

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Solutions

Research shows that evidence-based traffic laws improve road user behaviour when they are introduced and enforced effectively. The key solution of establishing and enforcing traffic laws is briefly described below.

Establish and enforce laws at national, local and city levels

When establishing new laws or amending existing laws that address the key behavioural risk factors of speeding, drinking–driving, motorcycle helmet use, seat-belt use and child restraint use, it is important to consider existing evidence on best practice *(3, 4)*. Figure 2.4 provides a summary of best practice criteria related to these key behavioural risk factors. A traffic law that does not incorporate these key best practices will not be able to achieve the desired reduction in road traffic fatalities and positive change in behaviour.

The best practice criteria summarized in Figure 2.4 can be used in the drafting and implemention of good road safety laws by countries embarking on road safety legislative reform, though it should be recognized that

Figure 2.4
Criteria for best practices in road traffic legislation

Risk factor	Criteria representing best practices					
Speed	National speed law in place	Speed limits on urban roads ≤ 50 km/h	Local authorities have the power to modify national speed limits			
Drink–driving	National drink–driving law in place	Drink–driving law is based on BAC or equivalent BrAC	BAC limit for general population ≤ 0.05 g/dl	BAC limit for young/novice drivers ≤ 0.02 g/dl		
Motorcycle helmets	National motorcycle helmet law in place	Law applies to motorcycle drivers and adult passengers	Law applies to all road types	Law applies to all engine types	Law requires helmet to be properly fastened	Law requires helmet to meet a national or international standard
Seat-belts	National seat-belt law in place	Law applies to drivers and front seat passengers	Law applies to rear seat passengers			
Child restraints	National child restraint law in place	Law is based on age-weight-height or a combination of these factors	Law restricts children under a certain age-height from sitting in front seat			

Note: *Blood alcohol content; **Breath alcohol content.
Source: Based upon reference *(1)*.

Box 2.4

Reforming drink–driving legislation in Jalisco, Mexico

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The State of Jalisco, Mexico, amended its drink–driving legislation in November 2010 by lowering the blood alcohol concentration limit from 0.15 g/dl to 0.05 g/dl (in line with international best practice), and introduced stiffer penalties for transgressing this law. The 2010 law did not specifically provide for the establishment of random alcohol checkpoints, which have proved to be effective at reducing drink–driving. Hence, between 2010 and 2012, civil society and international road safety organizations engaged with policy-makers to advocate for regulations that would allow for random breath testing. This process culminated in 2013, when the Jalisco State Government adopted an amendment to the 2010 law that formally provided for the establishment of random alcohol checkpoints and a protocol for their implementation.

Source: Based upon reference *(1)*.

road safety legislation is a dynamic field and that best practice evolves over time. This means that countries constantly need to review their legislation, revising and updating it to meet the latest evidence base (Box 2.4).

Evidence related to appropriate interventions for emerging risk factors such as mobile phone use, drug-driving and e-bikes is evolving rapidly *(1, 43–45)* and should be considered when introducing or amending corresponding legislation. Evidence shows that distraction caused by talking on mobile phones can impair driving performance in a number of ways – including longer reaction times (particularly braking reaction time), impaired ability to keep in the correct lane and shorter following distances *(1)* – and that texting on smart phones is even more problematic. However, the association between mobile phone use and road traffic crashes is unknown in many countries, as these data are not routinely collected when a crash occurs: only 47 countries collect data as part of regular police crash reports, while another 19 carry out regular observational studies to obtain such data *(1)*. In addition, there is little information on the effectiveness of interventions to reduce mobile phone use while driving *(1)*. As a result, a number of countries are following an approach that has been known to be successful in addressing other key risk factors for road traffic injuries. Legislation prohibiting the use of hand-held mobile phones while driving exists in 138 countries, and a further 31 countries prohibit both hand-held and hands-free phones.

The enforcement of traffic laws needs to be evidence-based, with an emphasis on approaches that have been demonstrated to deter illegal road user behaviour. For example, primary enforcement (when violators can be stopped and sanctioned for any traffic offence independently of the commission of any other traffic offence) has been shown to be more effective than secondary enforcement *(4)*. In the same way, random breath testing and automated speed enforcement have both been shown to be effective in reducing violations

related to drink–driving and speeding *(4)*. While there is clear evidence that enforcement is critical to the success of laws, the levels of enforcement required for maximum impact are often less readily available and depend on factors such as political will, available resources and competing priorities at a national level. In countries where legislation has not previously been accompanied by enforcement, particularly visible and high levels of enforcement may be needed to persuade the public that breaking the law in future may well result in a penalty.

Enforcement strategies must be backed up by a good communication strategy that can guarantee public support and the involvement of local stakeholders to maximize compliance and ensure that enforcement is evidence-based. Similarly, steps need to be taken to prevent corruption in road safety enforcement, which undermines public support and legislative effectiveness. Systems can be introduced that include both high-tech solutions (e.g. camera enforcement) and low-tech policies (training, building police professionalism and hiring more female police officers).

Benefits of implementing enforcement solutions

The following can be achieved through the strict enforcement of good road safety laws:

- reduction in road traffic fatalities, injuries and related socioeconomic costs; and
- improvement in compliance with traffic laws.

Survival after a crash

Injury care is extremely time-sensitive: delays of minutes can make the difference between life and death. Fatality rates from severe injury are dramatically higher in low- and middle-income countries than in high-income countries with well-developed emergency care systems. While there is limited literature on which components of emergency care contribute most to such differences in outcome, modelling studies suggest that over a third of global injury deaths could be prevented if outcomes in low- and middle-income countries approached those in high-income countries.

Timely emergency care saves lives and reduces disability, but there is great global disparity in access to emergency care. If fatality rates from severe injury were the same in low- and middle-income countries as they are in high-income countries, up to 500 000 road traffic fatalities could be averted every year *(46)*.

Solutions

Existing evidence shows that key solutions include the development of organized and integrated prehospital and facility-based emergency care systems, the training of all frontline providers in basic emergency care and the promotion of lay first responder training (Figure 2.5).

Develop organized and integrated prehospital and facility-based emergency care systems

While the prevention of crashes is the central goal of road safety, crashes still occur and take lives in all countries. Timely and effective emergency care is an essential component of a safe system and can mitigate the consequences when a crash does occur, reducing both deaths and disability from injury.

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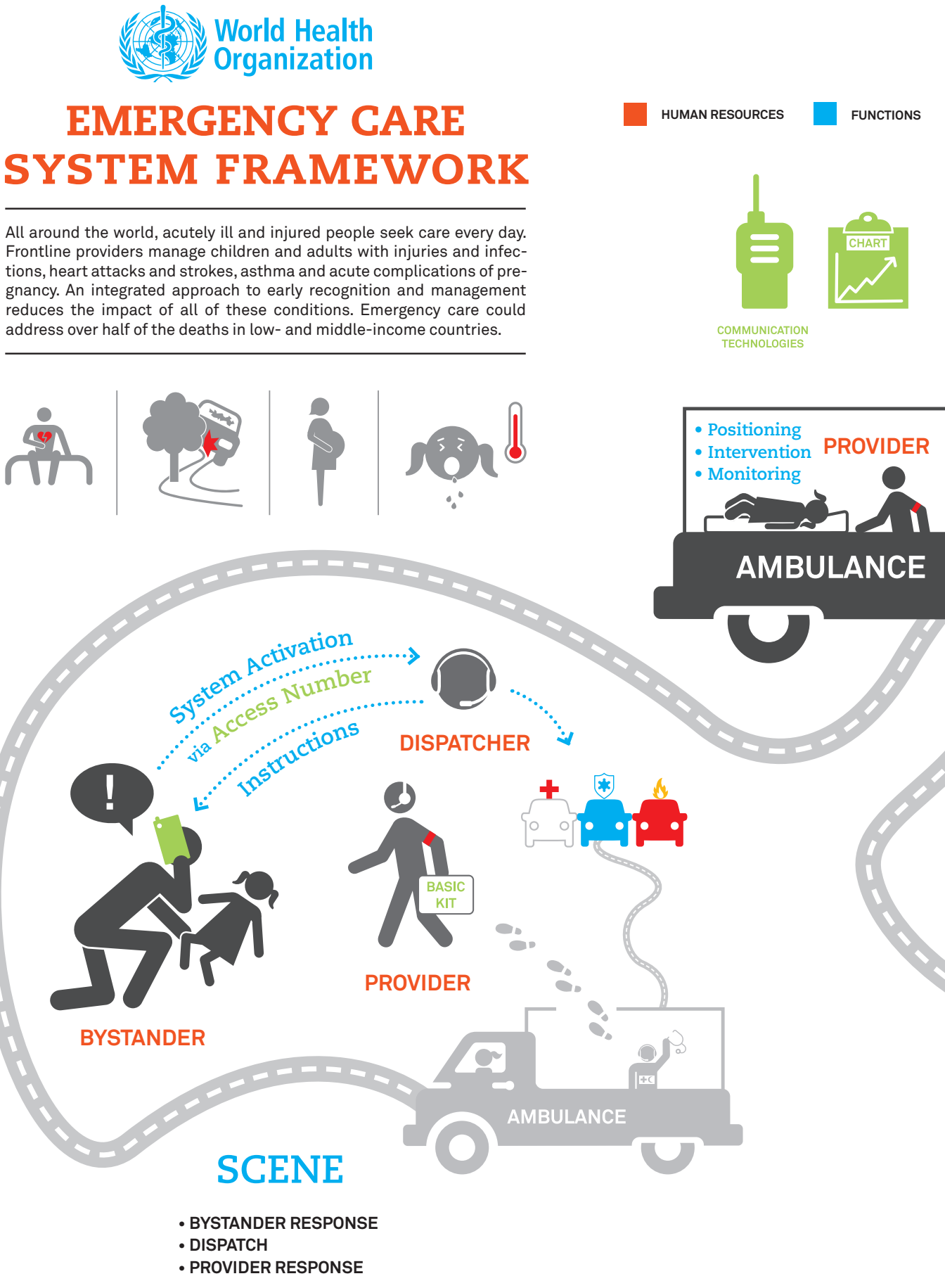
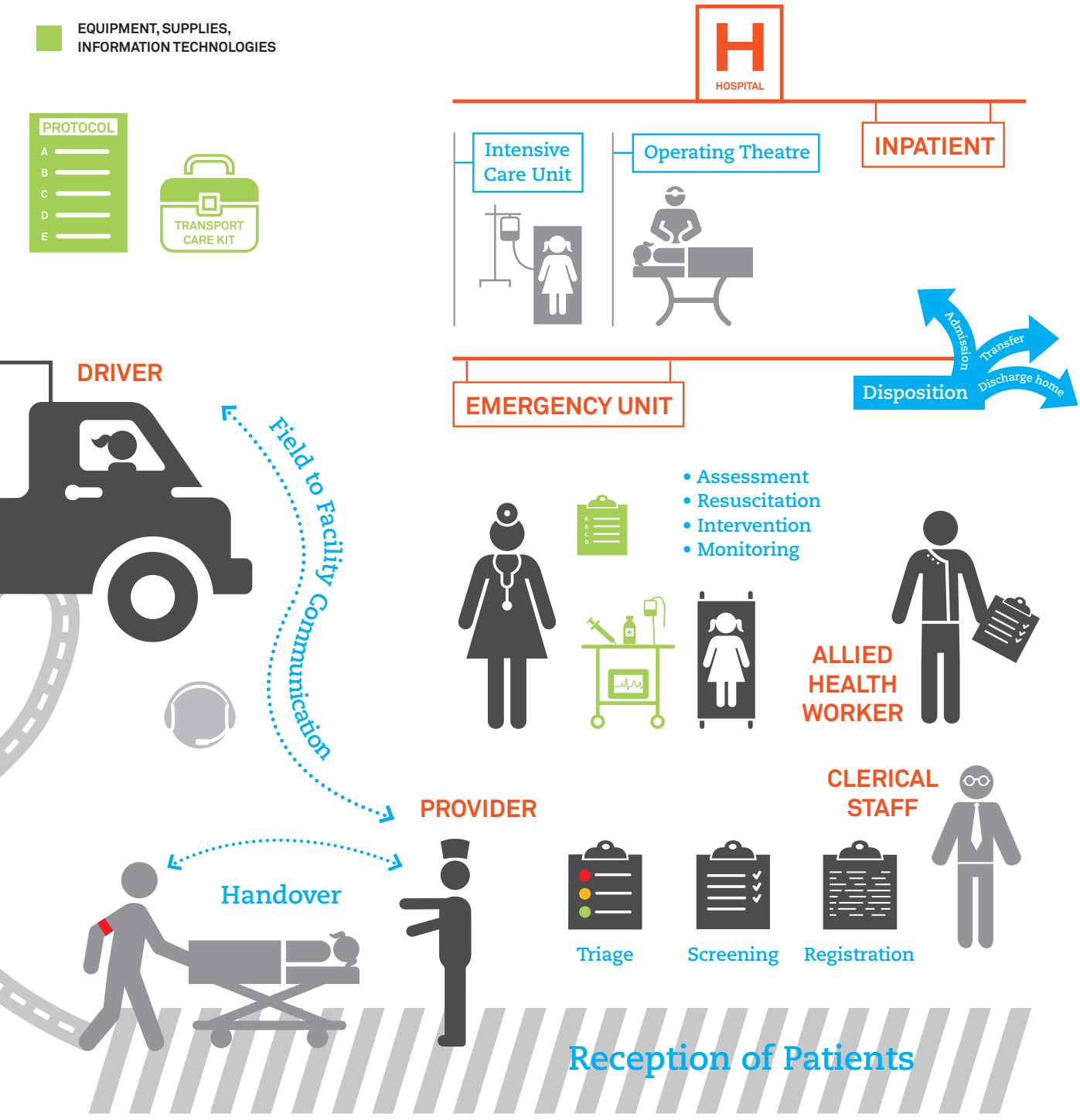
If fatality rates from severe injury were the same in low- and middle-income countries as they are in high-income countries, up to

500 000

road traffic fatalities could be averted every year.

Figure 2.5
Trauma care





TRANSPORT

- PATIENT TRANSPORT
- TRANSPORT CARE

www.who.int/emergencycare

FACILITY

- RECEPTION
- EMERGENCY UNIT CARE
- DISPOSITION
- EARLY INPATIENT CARE

Effective emergency care begins at the scene of injury, with action taken by bystanders, and continues through prehospital care and transport to facility-based services. The key aspects to address are as follows:

- **Ensure access to emergency care.** Emergency care is an essential component of Universal Health Coverage. Two key aspects to address are: legislating mandatory universal access to emergency care free of payment at the point of care; and explicitly integrating prehospital and facility-based emergency care into national health strategic plans and into national pre-payment health funding schemes.

- **Ensure key organizational components of prehospital care.** Up to half of deaths among the severely injured have been shown to occur prior to arrival at a healthcare facility, even though very simple low-cost prehospital systems have been shown to save lives. Key elements include a single universal access call number, a mechanism for the centrally coordinated dispatch of ambulances and providers, and a system of trauma centre designation to ensure the injured are taken directly to a facility with the capacity to meet their treatment needs.

- **Establish a basic package of emergency care services for each level of the health system.** People with injuries present themselves at all levels of the health system. Establishing basic standards for appropriate emergency care services at all facilities ensures timely recognition, resuscitation and referral of injured patients.

- **Establish a lead government agency at national level** (such as a ministry directorate) with the authority to coordinate prehospital and facility-based emergency care. Effective emergency care requires a range of organizational, logistical and clinical elements, and an integrated approach ensures the most effective delivery of services within available resources.

- **Conduct a standardized national assessment of the emergency care system** (e.g. WHO Emergency Care System Assessment, or similar) with action plan development. WHO has established consensus-based standards on essential functions of emergency care systems and an associated assessment tool for use at national level. Organizational, equipment and governance gaps persist and cost lives even in highly resourced systems. Standardized assessment ensures that critical system functions are accounted for and helps set high-impact, feasible priorities for action.

Train those who respond to crashes in basic emergency care

Much emergency care around the world is delivered by non-specialist providers. Simple training initiatives (e.g. WHO Basic Emergency Care course) promote a consistent approach to all injured patients and improve early recognition of life-threatening conditions.

Promote community first responder training

Especially in areas where prehospital services are limited and/or response times are long, systematic training of certain lay groups can greatly expand timely access to simple life-saving interventions. High-yield target groups include non-medical emergency responders such as police and firefighters, and others whose occupations frequently put them at the scene of road traffic crashes: for example, professional drivers, including taxi drivers and public transport drivers.

Benefits of survival solutions

The following can be achieved through improved trauma care:

- reduction in deaths and disability resulting from road traffic injury;
- reduction in related socioeconomic costs to countries, families and individuals;
- more efficient and effective utilization of existing healthcare resources at all levels of the system; and
- better emergency care capacity and system resilience to maintain service delivery in the face of multi-casualty events.

3

Making the package work

The reality of road safety policy implementation differs from country to country *(3)*, as does the capability of local government and decision-makers in individual countries to design and implement road safety measures. This technical package is not a one-size-fits-all solution but rather a guide for supporting decision-making on road safety policy response towards the achievement of SDG targets 3.6 and 11.2. Save LIVES cannot, therefore, be implemented without the consideration of national and local policy contexts and capability (see Box 3.1).

Simultaneous actions are needed at both national and local levels in the components of the Save LIVES technical package if a reduction in road traffic deaths and injuries is to be achieved. As to be expected in any effort that seeks to bring about change, a key approach for users of this technical package to keep in mind is to be innovative and strategic *(47)*. Road safety decision-makers and practitioners have to continually make the changes necessary in the way they approach road safety policy and use this technical package as they leverage opportunities within their national and local policy contexts. This section describes practical considerations for road safety decision-makers and practitioners to look into as they draw on the Save LIVES package to strengthen their country's road safety policy.

Know where you are now

Countries may have been implementing road safety measures for a number of years, but there is always room for improvement and even for the innovation of technical and institutional aspects of road safety policy. For this reason, there is a need for road safety practitioners to conduct a situational assessment to determine:

- the magnitude of the road traffic injury problem;
- key risk factors;
- the effectiveness of intervention measures;
- the efficiency of the institutions responsible for road safety policy; and
- the availability of road traffic injury data.

It is necessary to conduct this assessment from time to time to know where your country stands in relation to the development and implementation of road safety policy. An appropriate assessment tool can be used to generate information to answer the questions: What is the magnitude of the road traffic injury problem in my country? What are the main problem areas that need to be addressed? What are the current road safety policy implementation gaps?

The Appendix presents a tool that can be used to assess the road safety situation of a country or a region within a country. The tool is for assessing an overall road safety situation, but tools also exist for assessing and implementing specific aspects, such as speed management *(48)*, road design *(19–22)*, road safety audit *(49)*, the purchase of vehicles, the safety compliance of vehicles *(50)*, fleet safety management *(50)*, emergency care *(51)* and legislation *(52)*.

Establish where you want to be in the next five years and beyond

Achieving sustained reductions in road traffic injuries requires road safety decision-makers and practitioners to have a long-term vision and strategy for road safety in their country, and to define the objectives to be attained within the time period of the strategy. A road safety strategy should comprise the following elements *(53, 54)*:

- **A well-formulated vision.** The vision identifies the ultimate goal of the strategy. The vision statement should take into account the different views of the stakeholders and be agreed on by all. It should also be simple and able to portray an image of the result and future desired.

Box 3.1

How Save LIVES applies to children

The interventions in the Save LIVES technical package apply to all age groups, but a particular focus on children is required given their vulnerability in traffic. Over 500 children under the age of 18 years are killed on the world's roads each day and thousands more are injured. Road traffic injury is a leading killer of children in their second decade of life and the vast majority (95%) of child road traffic fatalities are in low- and middle-income countries *(55)*.

Limited by their physical, cognitive and social development, children are more exposed to risk in road traffic than adults: physically, children tend to be more susceptible to serious head injury than adults; they may have difficulty interpreting images and sounds that may impact on judgement of proximity, speed and direction of moving vehicles; and as they grow older, adolescents may be more prone to take risks *(55)*. While directly contributing to the SDG road safety targets, providing a safe journey to school also contributes to other key SDG priorities including access to education and eradicating poverty *(56)*. This also makes protecting children on the roads a requirement in line with the UN Convention on the Rights of the Child *(57)*.

A policy designed to protect children effectively on the roads should also strengthen protection for all vulnerable road users and indeed the wider population. Child-focused interventions should be a key feature of all six elements of the Save LIVES package:

Speed management

Low-speed zones (30 km/h limits), particularly around schools, have proved effective in protecting children and reducing road traffic injury *(58)*. This can involve applying road design solutions (road narrowing, traffic calming, speed bumps, signalized crossings, etc.) to locations in neighbourhoods, including around schools, where there are high volumes of child pedestrians. Enforcing speed limits with measures such as automatic speed cameras in areas with high volumes of child pedestrians and traffic is also effective.

Leadership on road safety

Countries that have reduced road traffic injury among children have begun by improving data collection to develop effective policies and target interventions. Key activities include disaggregating data by age and collecting data to identify high-risk areas where children are exposed to high traffic speed and where safe infrastructure is lacking. Collaboration and coalition building among institutions and stakeholders, and between diverse sectors (e.g. education, health, local government, transport and police), to improve protection for children on the roads is also vital. One effective approach is to engage schools and students in road safety policy decision-making.

Supervision is of particular importance for protecting children on the roads, particularly in poorer communities and complex and risky road environments. Parents, teachers and caregivers can play an important role in this with education and supervision schemes, which are most effective when complementing other key interventions such as those related to speed and safe infrastructure. Partnerships between local communities, schools and the police to manage school crossing patrols and walking-bus initiatives can be effective, particularly when parents are at work and unable to supervise children.

Infrastructure design and improvement

Safe infrastructure provision (sidewalks, safe crossings, traffic calming measures, speed bumps, etc.) should be a priority for protecting children on the school journey *(59)*. The built environment in schools and densely populated neighbourhoods should be designed or reconfigured to prioritize pedestrians and cyclists as part of policies to promote child health and tackle obesity. Infrastructure for traffic calming, when linked to speed enforcement, can create effective low-speed zones around schools.

Vehicle safety standards

To improve vehicle safety for child passengers, countries should apply the UN minimum safety regulations to new vehicles and include measures such as ISOFIX child restraint anchorage points. New Car Assessment Programmes can promote consumer awareness and demand for higher standards of safety for all car occupants including children.

Enforcement of traffic laws

In many countries legislation to protect children on the roads requires strengthening and enforcement: laws addressing the use of child restraints need to be improved in many countries; where motorcycles are the main means of family transport, helmet legislation focused on child passengers as well as adults is required; laws and regulations to ensure seatbelts on school buses and the safety of school vehicles is often absent and needed; and enforcement of speeding and drink–driving legislation is vital. Communication and social marketing strategies focused on the need to protect children are often an effective means of promoting public support for road safety enforcement.

Survival after a crash

Trauma response that can accommodate the needs of children is required. This ranges from training teacher and school transport drivers in safe immediate stabilization of injuries; equipping emergency vehicles with child-sized medical equipment and supplies; and improving paediatric-specific rehabilitation services for children *(51)*.

- **A well-defined problem.** The main purpose of the situation assessment is to provide a comprehensive picture of the national and local road safety situation. Based on this assessment, a road safety strategy needs to clearly define the problem to be addressed, focusing on the most important issues and solutions.

- **Clear objectives.** The strategy may be comprehensive, addressing a wide range of risk factors, or it may start with a more focused approach, covering a few very specific objectives. Objectives should be clear and specify a measurable outcome in a defined time period. Keep the objectives SMART: specific, measurable, achievable, relevant and time-bound. Objectives should be evidence-informed, deriving from the situation assessment as well as from available literature. Objectives should include reductions in fatality and injury, as well as reductions in other risks that may result from improving road safety conditions. Both short-term and medium- to long-term objectives are desirable.

- **Realistic targets.** Targets specify the improvements expected within a certain time period, and setting targets has been shown to strengthen commitment to improving road safety. Targets provide a benchmark to monitor ongoing progress in achieving objectives. They enable better use of resources and better management of road safety programmes by providing an opportunity to adjust activities along the way and thus increase the likelihood of specified objectives being achieved. Targets can be set based on the objectives of the national or local road safety strategy and/or the historical experience of results achieved during the implementation of road safety measures. It is important for countries to set specific, realistic and quantified targets as much as possible. Targets should be set in consultation with government agencies responsible for taking action on road safety. Baseline measures for targets should be indicated and/or collected. Ambitious targets may sometimes be appropriate, for example, to increase public awareness of the road safety problem in order to intensify pressure on stakeholders to strengthen their efforts.

- **Performance indicators.** Performance indicators are used to measure progress towards objectives. They indicate changes and improvements in the baseline conditions being addressed: for example, the number of road traffic fatalities and injuries, or the amount of funding allocated to road safety. Performance indicators help to define key activities, deliverables and outcomes for the road safety strategy. Each performance indicator should have specific targets, either quantitative or qualitative.

- **A realistic timeline and milestones.** A strategy needs to indicate the timeline for executing different activities and milestones that can be used to measure progress. Some flexibility is required, however, to adjust the timeline when necessary to accommodate changes that may occur during implementation.

- **Adequate resources.** Successful implementation of the strategy depends on adequate resource allocation. The strategy should identify and, when possible, allocate funding for each component. Resources may come from the reallocation of existing funds or the mobilization of new funds at local, national and/or international levels.

- **A monitoring and evaluation system.** Continuous assessment of progress requires the definition of a monitoring and evaluation system that incorporates the performance indicators and targets. The

plan should specify data collection and analysis methods, dissemination channels and a framework for utilization of the results to adjust pedestrian safety activities.

- **Sustainability.** In addition to considering immediate resource allocation priorities, the strategy will be most effective if it includes mechanisms to ensure adequate funding levels on an ongoing basis. Public demand for road safety can put pressure on politicians and government officials to demonstrate long-term political and financial commitment, which can in turn strengthen the sustainability of the strategy. The strategy may therefore include some indicators to gauge public demand for road safety and government responses.

The process for developing a national or local strategy should involve a considerable degree of stakeholder engagement at national level so that all relevant sectors – health, transport, police and nongovernmental agencies – invest in a strategy that is itself based on the best possible evidence.

As you consider utilizing the Save LIVES technical package, key questions need to be addressed:

- What national or local road traffic fatality reduction target have you set?
- What are the priority actions that you will undertake to achieve your target?
- Do you need to develop or revise your national and local road safety strategy?

Establish how you will reach your target

To achieve the goals and objectives indicated in your national and local road safety strategy, a number of activities need to be organized and implemented, which should be discussed and agreed upon among different agencies. Once the key activities required to achieve an objective have been identified, each one should be considered in detail in order to identify the steps and actions involved in implementation *(53)*.

As you consider utilizing the Save LIVES technical package, further key questions need to be addressed:

- What key actions will you undertake and when will you achieve your national and local SDG 3.6 and 11.2 targets?
- What national and local Save LIVES technical packages have you developed?
- What monitoring and evaluation approaches have you created?
- What human and financial resources have you allocated to your national and local SDG 3.6 and 11.2 targets?

Take practical steps to get where you want to be

While the preparation of a quality road safety plan is important, it will not deliver the expected results if not implemented. It is also important, therefore, to start implementing your national and local Save LIVES technical package priority interventions. You can begin with just a few interventions but sustain the implementation over time as you expand the range of measures being implemented.

A good of example of a country taking practical steps is France, where road safety policy was revived and prioritized as one of three key issues when a new government came to power in 2002 *(28)*. The implementation of

road safety measures such as the enforcement of traffic law was intensified, and institutions responsible for road safety policy engaged in more strategic planning, including organizing consultations among stakeholders and strengthening local level capability and action. However, while this example shows the proactive involvement of political leadership in road safety policy, there are other examples where it is lacking.

Monitor and evaluate the implementation of your strategy

Evaluation is a critical component of road safety interventions. A thorough evaluation, properly implemented, measures the effectiveness of the programme and assesses whether its desired outcomes are being achieved. It can enable the identification of successes as well as constraints, and provide insight into how to adjust programmes so that targets are achieved. The results of evaluations are key inputs for decision-makers involved in road safety programmes and they also provide content for the dissemination and improvement of ideas and initiatives, as well as contribute to international learning.

There may be some variation in the specific ways different agencies plan, choose evaluation methods and disseminate results, but the basic principles to bear in mind in the evaluation of road safety programmes remain the same *(53)*:

- **Plan the evaluation.** Ensure that monitoring and evaluation are included in any road safety plan, strategy or intervention at national or local level. It is better to plan for evaluation from the outset rather than once implementation has begun. Determining the aims of evaluation, type of evaluation and indicators to adopt during the planning phase of a programme will improve the ultimate quality of the evaluation.

- **Identify existing monitoring and evaluation activities in your setting as well as the agencies responsible for these activities.** This exercise helps with the identification of relevant existing data and can develop partnerships with the agencies responsible for monitoring and evaluation. Collect baseline data using surveys and existing databases, if available.

- **Identify suitable indicators to monitor processes, outcomes and impacts.** You are encouraged to look at your national and local strategy, in which you identified indicators about which data can be collected for monitoring and evaluating progress in implementing the package.

- **Conduct the evaluation consistently, as planned.** Once the appropriate evaluation design and methods have been specified – with respect to the unit of analysis, population, sample and methods of data collection and analysis – conduct the evaluation according to those methods. Data for evaluation can be collected by examining existing databases as well as by conducting surveys and observations, by testing blood alcohol content in drivers and pedestrians, and by road safety audits and perception assessments. Many of the methods used for the situational assessment are also applicable to evaluations.

The results of the evaluation then need to be disseminated and discussed by programme staff, the relevant government departments, sponsors of road safety initiatives and members of the public to establish what the programme needs to do better and what it needs to avoid in order to improve road safety at national and local levels.

4 Conclusion

The scientific evidence on the magnitude, risk factors and effective interventions for the prevention of road traffic injury is reasonably well documented and readily available. As with other policy areas, such knowledge alone cannot bring about a change in the road safety situation *(60)*; the real challenge is how to translate that knowledge into sustainable solutions in different contexts. The evidence presented in the Save LIVES technical package and the inclusion of road safety and sustainable transport targets in the Sustainable Development Goals are both essential, but the real issue is the leveraging of opportunities and challenges in different policy contexts. The users of this package need, therefore, to reflect on how to act and to take practical steps towards the improvement of the road safety and transport situation at local, national, regional and international levels.

Change in road safety policy, as in other areas of policy, is generally a progressive and iterative process that requires continued improvements and innovations in the solutions summarized in this technical package. If Save LIVES is to be more than just another road safety document, those who use it need to realize that improving road safety policy is not a one-off event, but rather the pursuit of a long-term collective action. To do so is to see the road safety targets of the Sustainable Development Goals as the beginning of a journey to change in road safety policy – a journey that needs to run its full course at both national and local levels.

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Appendix

Road safety policy implementation

A country assessment tool

Introduction

It takes a sustained effort over a period of time to improve the road safety situation in different countries. A country or a region within a country may begin with a few measures at the highest-risk locations and increase the geographic coverage and number of interventions implemented over time. It is therefore necessary for a country to assess its ongoing implementation of road safety measures to determine what works and what needs to be improved. Conditions change and it is necessary to assess the road safety situation regularly.

The inclusion of a road safety target in the Sustainable Development Goals to halve road traffic deaths and injuries by 2020 has generated interest in countries to strengthen the implementation of road traffic injury prevention measures to help meet that target. Information on assessing the road safety situation in countries is available in several documents *(1–7)*. By consolidating that information, this document provides a key single resource that countries can use and complement with other existing resources.

Approach

Key contributions to the situational assessment will come from various existing data sources, including from agencies responsible for roads and transportation, law enforcement, urban and regional planning, public health, finance, as well as from nongovernmental road safety organizations. Additional data in the form of observational studies, surveys and/or road safety audits may be required to supplement existing data sources.

Assessment tool

This tool will help a country conduct an assessment of its current road safety situation to determine where it is. The tool is helpful in assisting road safety decision-makers and practitioners to generate information to answer the following key questions: What is the magnitude of the road traffic injury problem in my country? What policies and traffic laws exist? What institutional arrangements exist? What are the main problem areas that need to be addressed? What are the current road safety policy implementation gaps?

Scope of assessment

A situational assessment of road safety in any country at any given time entails collecting and analysing information on the following variables *(1–7)*:

- magnitude, trends and patterns of road traffic fatalities and injuries;
- risk factors for road traffic injuries and fatalities;
- existing road safety programmes, policies, legislation and institutions; and
- contextual factors related to politics, environment, economics and capacity.

Assessment tool

The tool presented in Table A.1 provides questions to guide the extraction of information for assessing the road safety situation in a country.

Taking action based on situational assessment results

Information collected using the questionnaire in the Appendix should be analysed to improve understanding of the national road safety situation – the extent and pattern of road traffic injuries, relevant risk factors, and the people, institutions, policies, programmes and resources that are currently (or could be) involved in road safety initiatives. The information should help prioritize risk factors and target groups, and identify gaps in existing initiatives. Relevant considerations include what risk factors or issues to address, public support, funding and responsible agencies. The existing road safety action plan may be revised to take into account these considerations.

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Table A.1

A questionnaire for assessing the road safety situation in a country

Component	Key information/data	Complementary information/data
Data collection and systems	**What information or data are available?** • What information or variables are collected? • In addition to road traffic injuries and fatalities, are there data on the cost of road traffic injuries? • In what format are data recorded or kept? In hard copy only or also electronically? How is it coded? • What system is used to store the data? **What data systems exist?** • What data collection and processing systems exist? • What is the extent of collaboration and sharing of data among different systems or agencies, and with the public? **What is the quality of data?** • What definitions of a road traffic death and injury are used? • How complete is the reporting of road traffic injuries? • Are data for certain types of crash missing systematically? • What errors exist in measurement, data recording, coding and entry?	
Magnitude, trends and patterns of road traffic fatalities and injuries	**How big is the problem?** • Number of crashes involving all road users. • Number of all road users killed in road traffic crashes. • Number of all road users injured in road traffic crashes. • Total number of road traffic fatalities and injuries, preferably disaggregated by road user types. **What types of traffic conflict lead to crashes?** • Involvement of cars, trucks, heavy goods vehicles, public transport vehicles, motorcycles, bicycles and animal-drawn carts, etc. • Vehicle manoeuvres (e.g. turning). **On what day of the week and at what time do road traffic crashes occur?** • Date and time of injuries. **How serious are the injuries?** • Severity of road traffic crashes. **What types of crash lead to disability or life-threatening outcomes?** • Outcome following collisions. **Who is involved in road traffic collisions?** • Age and sex of those killed or injured in road traffic crashes. **Where do road traffic crashes occur?** • Place of crash (specific location such as urban, rural and type of road). • Dangerous road locations.	**How many people live in the country being assessed?** • Total number of persons in the population under study (including disaggregation by urban and non-urban, by age and income). **How and why do people typically travel around the country?** • Origins and destinations of trips. • Transport modes used. • Trip distances. • Trip purposes. **What is the socioeconomic condition of the country under assessment?** • Gross domestic product. • Proportion of adults employed. • Household income.

Component	Key information/data	Complementary information/data
Risk factors for road traffic injuries	**Speed** • What is the extent of speed involvement in road traffic crashes? • What are the prevailing speed levels? • Is there a law on speed limit? • What is the status of speed compliance? • What are the prevailing attitudes to speed? • What is the level of compliance with and awareness of the existing law? • What is the level of enforcement of the existing speed law? • How good is speed signage? **Drink–driving** • What is the scale of the problem of alcohol-related crashes in terms of the number of crashes and the number of fatalities? What proportion of all road traffic crashes does this comprise? • What are the prevailing blood alcohol content (BAC) levels in drivers? • Is there a law on BAC and/or breath alcohol content (BrAC)? Are there different BAC levels for different driver groups? (e.g. lower BAC levels for novice and commercial drivers.) • Are all those involved in a crash tested for blood alcohol or breath as a matter of routine? • What are the prevailing attitudes to drink–driving? • What is the level of compliance with and awareness of the existing law? • What is the level of enforcement of the existing drink–driving law? • Is a law required to give police the authority to conduct random checkpoints? • What type of equipment is used by police for breath tests? How many types are available? • What are the existing penalties for drink–driving? **Helmet wearing** • What is the scale of the problem of crashes related to non-helmet use in terms of the number of crashes and the number of fatalities? What proportion of all road traffic crashes does this comprise? • What are the prevailing helmet-wearing rates among drivers and passengers? • Is there a law on helmet wearing? • What are the prevailing attitudes to helmet wearing? • What is the level of compliance with and awareness of the existing helmet law? • What is the level of enforcement of the existing helmet law?	

Component	Key information/data	Complementary information/data
Risk factors for road traffic injuries *(continued)*	**Seat-belts** • What proportion of vehicles do not have seat-belts installed? • What is the scale of the problem of crashes related to the non-use of seat-belts in terms of the number of crashes and the number of fatalities? What proportion of all road traffic crashes does this comprise? • What are the prevailing seat-belt wearing rates among drivers and passengers? • Is there a law on seat-belt wearing? • What are the prevailing attitudes to seat-belt wearing? • What is the level of compliance with and awareness of the existing seat-belt law? • What is the level of enforcement of the existing seat-belt law? **Child restraints** • What is the scale of the problem of crashes related to the non-use of child restraints in terms of the number of crashes and the number of fatalities? What proportion of all road traffic crashes does this comprise? • What are the prevailing child restraint use rates? • Is there a law on child restraints? • What are the prevailing attitudes to child restraint use? • What is the level of compliance with the existing child restraints law? • What is the level of enforcement of the existing child restraints law? **Road infrastructure** • What is the scale of the problem of road infrastructure-related crashes in terms of the number of crashes and the number of fatalities? What proportion of all road traffic crashes does this comprise? • What are the prevailing road infrastructure conditions with regard to the presence or absence of medians, traffic control devices, pedestrian and cyclist crossings, kerb ramps, pedestrian- and cyclist-directed signs and signals, street lights, pedestrian and bicycle lanes, parked cars adjacent to the traffic lane, design speeds, posted speed limits, number and width of lanes, and other infrastructure hazards to road safety? • Is there a law on minimum road safety design? • Are legal road safety design standards adequate? • What is the level of compliance with and awareness of the existing law? • What is the level of enforcement of the existing law?	

Component	Key information/data	Complementary information/data
Risk factors for road traffic injuries *(continued)*	**Vehicle safety standards** Are the following UN safety regulations (or equivalent national standards) applied: • Seat-belts • Seat-belt anchorages • Frontal impact protection • Side impact protection • Pedestrian protection • Electronic stability control • Child restraints • Anti-lock braking systems in motorcycles?	
Policy environment and existing initiatives on road safety	**Leadership and stakeholder engagement** • Government leadership: Is there a lead agency responsible for road safety? What is it and what is its main function? • Government stakeholders: What government agencies have a road safety function, including broad activities in road design and land-use planning? How is responsibility for road safety shared among government ministries? What is the relationship between the various government agencies involved in road safety? • Nongovernmental stakeholders: What other people or institutions (nongovernmental) are working on road safety? What are their main activities? What is the nature of the collaboration between these stakeholders and government agencies? • Partnerships: What are the foci, interests and resources of different agencies and individuals working on road safety? **Existing plans, policies and programmes** • Is there an official road safety plan of action or strategy for the country under assessment, or are there multiple plans? What resources are dedicated to the implementation of this plan? • Does the road safety plan have targets and indicators? • Do the transport, land-use and public space policies promote road safety? • Are road safety audits conducted on major new infrastructure projects? Do road safety audits of existing road infrastructure and planned repairs/ modifications include the needs of all road users? • Does the transport and/or road safety budget have adequate funds? • Are the local authorities allowed to modify laws such as speed limits or drink–driving laws? • What road safety programmes are currently implemented, including those conducted by nongovernmental organizations? What agency is responsible for each programme, and what are its strengths and weaknesses? • Are existing road safety programmes evaluated? Is there evidence of impact? • Do local and national government agencies have sufficient human capacity to implement road safety programmes? • Are there advocacy efforts in the country?	

Component	Key information/data	Complementary information/data
Trauma care	• Is there a prehospital system (what percentage of the population has access)? • Are there 24-hr emergency units with fixed staff and triage at first-level hospitals? • Is there legislation mandating access to emergency care free of payment at the point of care?	

FOR MORE INFORMATION PLEASE CONTACT:

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