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A Guide for Policy Makers: on Reducing Road Fatalities

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Loughborough
University



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Executive summary

Every day, road traffic accidents claim more than 3,400 lives worldwide, with a total of 1.25 million deaths annually. The highest majority of victims are young people aged between 15 and 29 years old living in low-income countries.

The purpose of this report is to:

This report intends to support governments and policy makers in reducing road traffic fatalities by providing the necessary tools that help in the development of a successful road safety strategy. Moreover, this report has been informed by a review of successfully implemented strategies globally and by evidence-based reports, to serve as a baseline for governments at a national, regional or local level to tailor their own strategic plans and answer their unique challenges.

A

Provide frameworks to governments and other parties involved in road safety to develop strategies intended to improve road safety and reduce road traffic fatalities

B

Illustrate key evidence from countries that adopted successful road safety strategies that effectively reduced road fatalities

C

Support the delivery of the United Nations General Resolution adopted in 2010 which calls upon member states to take the necessary steps to make their roads safer



Our view: Characteristics of a Good Strategy

We have outlined three main characteristics of a good strategy. From addressing the risk factors involved to managing the data of causes and effects of road fatalities to execution through partnerships, we believe that planning and executing within this framework will prove effective to enhancing road safety.

1



A Holistic Strategy

that addresses all of the risk factors associated with road traffic fatalities

Many countries have adopted the “3 E’s” strategy which operates under the themes of Education, Enforcement and Engineering with others favoring the Safe System Approach, which involves an integration of approaches including Safer Streets, Safer People, Safer Vehicle, and Safer Speeds.

We recommend a hybrid approach that articulates the 3 E’s as inputs with the Safer Streets, Safer People, Safer Vehicles and Safer Speeds as outcomes.

2



Good Data management and analytical arrangements that ensure a full understanding of the causes and circumstances of road traffic fatalities

Understanding the ‘who, why, when what, where and how’ of road fatalities is essential to the design and execution of any plan intended to reduce the number of fatalities.

Data needs to be accurate and complete with a clear value chain from point of data capture through to collection and analysis of good data. Technology can play a significant role in this.

Accurate data also helps in 1) understanding the magnitude of the road safety problem; 2) evaluating the effectiveness of policy intervention in reducing road collisions; 3) providing insights on socio-economic costs.

Making data publicly available can support transparency and hold accountable the agencies responsible for road safety.

3



Effective and Inclusive Partnerships with a shared objective to reduce road traffic fatalities with a clear plan and accountability

The reduction of road traffic fatalities requires the contribution of a number of interdependent agencies and bodies. For example, aggregate police data on road traffic collisions can be invaluable to urban planners in identifying engineering solutions intended to reduce accidents.

The effective delivery of any strategy needs to have clear governance arrangements that include all contributing agencies with clear roles and responsibilities, as well as inputs that are quantifiable and monitored.

Any governance body has to have the authority to access resources necessary to deliver any strategy with the single objective of reducing the number of road fatalities.

Situation at a glance

Over 1.2 million people die each year on the world's roads, with millions more sustaining serious injuries and living with long-term adverse health consequences.

Road collisions incur huge economic costs at a national level, which includes a burden on the health, insurance and legal systems. Moreover, they can have negative social implications for the families of those involved as well as on local communities.

According to the World Health Organisation (WHO), road traffic accidents can cause a loss of up to 3% of the global GDP, and up to 5% of GDP for low and middle-income countries. As more and more countries realise this, improving road safety is becoming a higher global priority.

A global priority

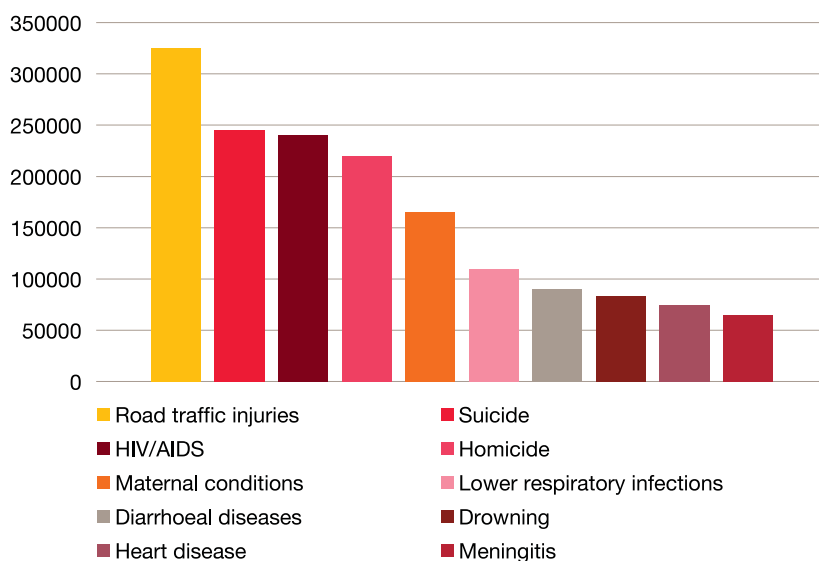
The United Nations General Assembly adopted a resolution in 2010 that led to the establishment of the Decade of Action for Road Safety (2011–2020). The resolution called on Member States to take the necessary steps to make their roads safer, and for the WHO to monitor the situation through its global status report on road safety.



Road injuries among youth

According to the WHO, road traffic injuries are currently estimated to be the ninth leading cause of death across all age groups globally, and are predicted to become the seventh leading cause of death by 2030. However, for people aged 15-29 years old, it is already the leading cause of death (See figure 1).

Figure 1: Top ten causes of death among people 15-29 years old, 2012 (WHO)





Road injuries by region and country income

Road fatality rates in low and middle-income countries are double those of high-income countries, and account for 90% of global road traffic deaths. According to the WHO, this is largely due to the fact that the development of infrastructure, policies, and enforcement measures have not kept pace with the increase in vehicle use.

The WHO report shows that 68 countries have witnessed a rise in the number of road traffic fatalities since 2010, of which 84% are low and middle-income countries.

The African region continues to have the highest road traffic death rates, followed by the Eastern Mediterranean region (as shown in figure 3). The lowest rates are in the European Region, notably among high income countries, many of which have been very successful in achieving and sustaining reductions in death rates.

Figure 2: Road traffic deaths per 100,000 population, by country income (WHO)

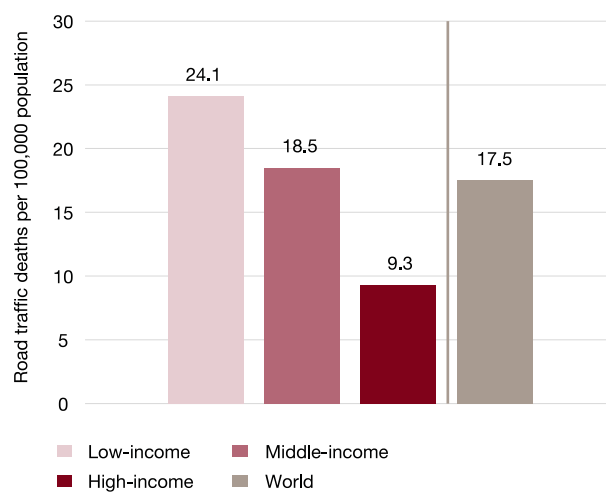
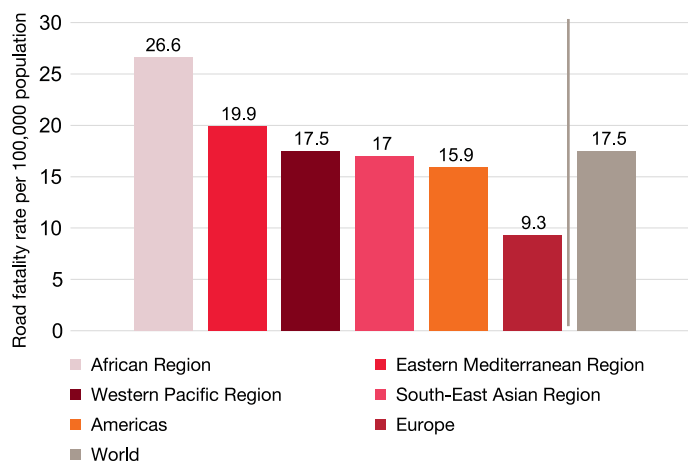


Figure 3: Road fatality rates per 100,000 population, by region (WHO)





Top 5 risk factors for Traffic Collisions Worldwide*

Speeding

An adult pedestrian's risk of dying is less than 20% if struck by a car at 50 km/h and almost 60% if struck at 80 km/h



Drink-Driving

Checkpoints and random breath testing can lead to reductions in alcohol-related crashes by 20% and have shown to be very cost-effective



Distracted Driving

Drivers using a mobile phone are 4 times more likely to be involved in a crash



Seatbelts & Child Restraints

Seatbelts reduce the risk of road fatalities among front-seat passengers by 40-50% and of rear-seat passengers by between 25-75%



Motorcycle Helmets

Wearing a motorcycle helmet correctly can reduce the risk of death by almost 40% and the risk of severe injury by over 70%

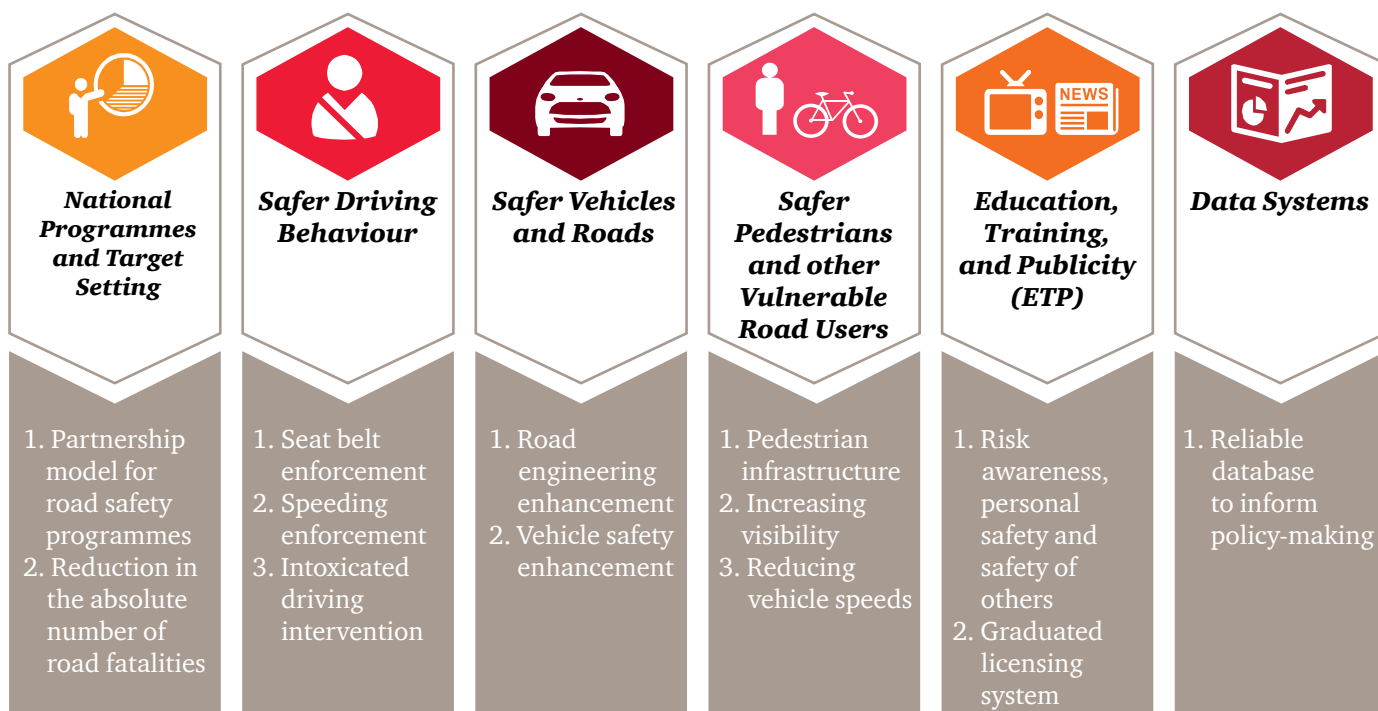


Source:  World Health Organization

What works in reducing road traffic fatalities



Leading practice suggests that successful strategies should focus on six main themes



The prerequisites of a successful Road Safety Strategy

A comprehensive strategy encompasses the safety approaches and systems that contribute to Road Safety as well as the agencies that have a role in contributing to the delivery of the strategy.

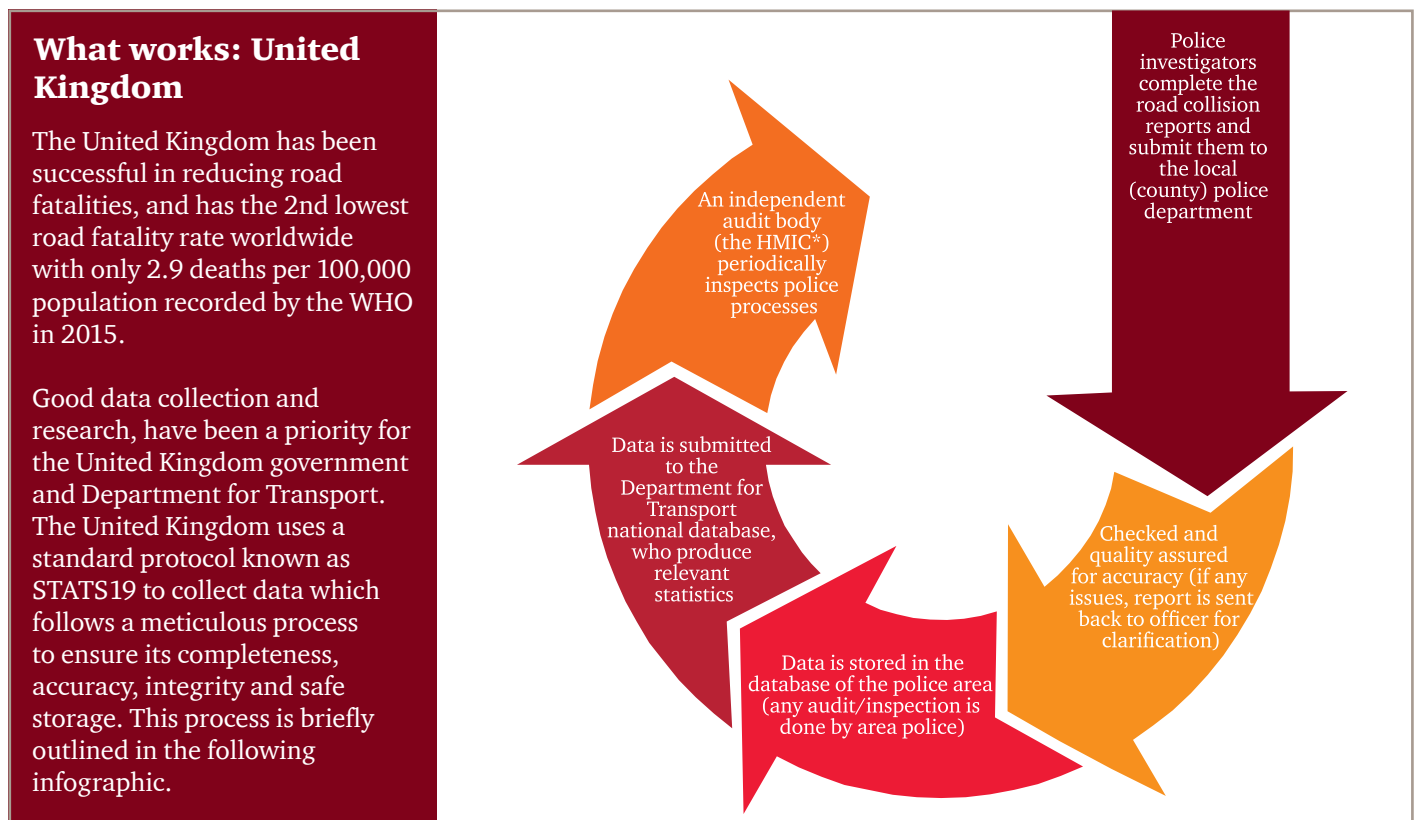
Our suggested model for a successful road safety strategy is based on good quality data, the 3 E's and the Safer System Approach. However, the pillar of this model is a matrix of effective partnerships.



1

Basing your strategy on Good Data

Any effective strategy needs to be built on reliable data. This ensures that activities are targeted at those factors most contributing to road traffic fatalities. All high performing countries have good quality data systems (with high accuracy and integrity) on which to base policies, regulations, and initiatives. The Safety Net project, a study undertaken by a consortium of key European Road Safety Research Institutes on behalf of the European Commission, found that data should be collected using a consistent, transparent and independent framework with no interference from stakeholders. It is also crucial to train investigators on how to investigate traffic collisions and accurately collect reliable data.



*Her Majesty's Inspectorate of Constabulary

A closer look: European Union

The European Union has in place the European Road Safety Observatory (ERSO) which provides the entire European Union road safety community with research and information related to road safety topics by publishing data and reports on their website which is accessible to the public.

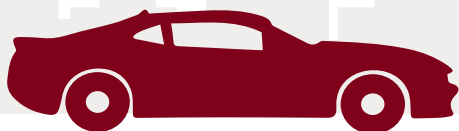
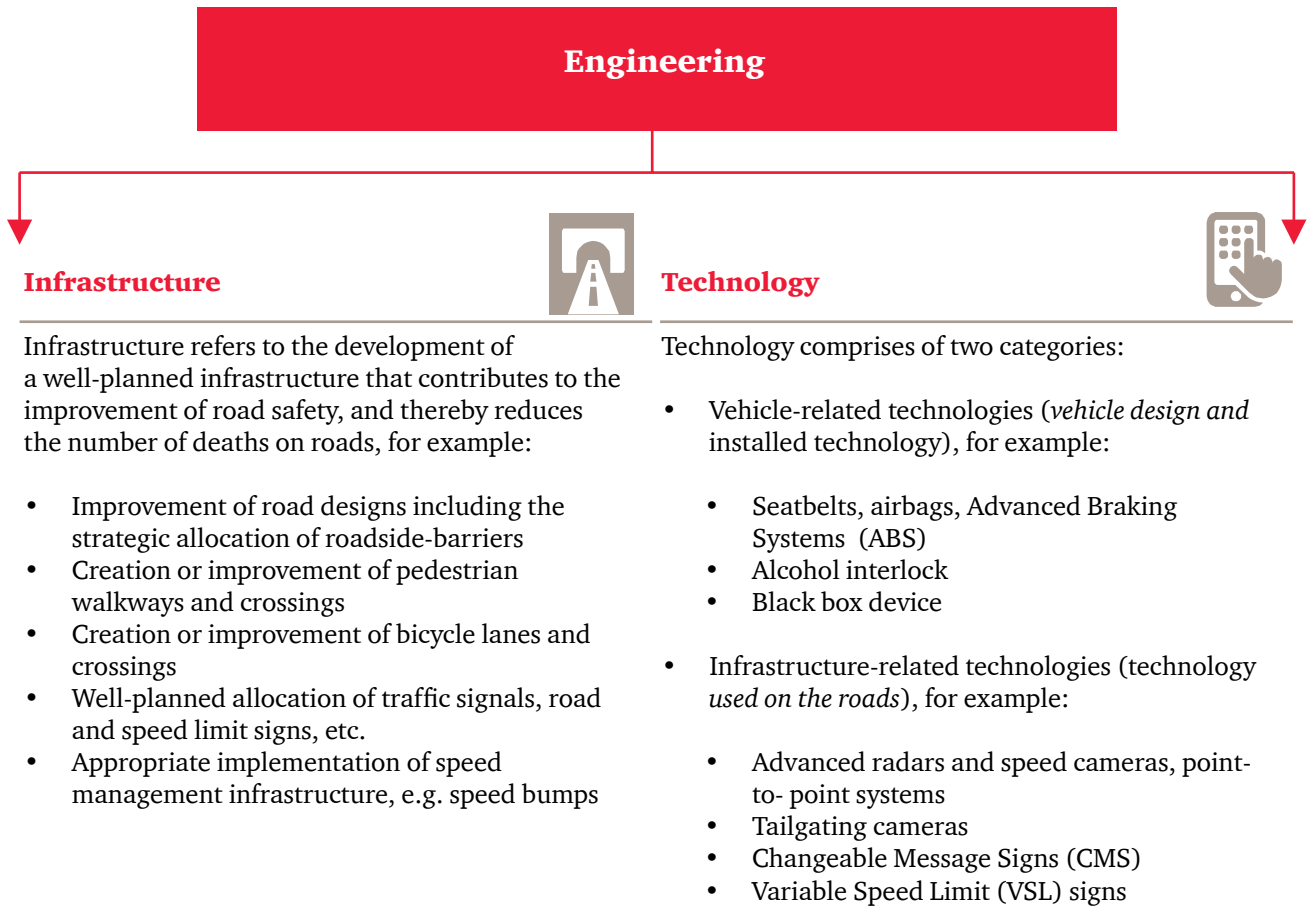
The way the observatory's information is organised is as follows:

- 1. Safety issues:** this includes information by way of fact-sheets relating to a number of key road safety challenges including issues related to Vulnerable Road Users (children/novice drivers/elderly drivers, pedestrians and cyclists), hazardous behaviour (e.g. drinking, using cell phones, fatigue, speed, post-impact care), road safety measures (e.g. infrastructure, enforcement, vehicles), and a section on benchmarking and policy targets
- 2. Country profiles:** which includes profiles for all the EU member states
- 3. Analytics:** includes data, performance indicators, attitudes and self-reported behaviour related to various topics
- 4. Accident information:** includes methodology of collecting data, the accident investigation network, etc.

2

Engineering for a Safer System

Effective engineering plans take into consideration both infrastructure and technology. A well designed infrastructure reduces road hazards and promotes the safety of road users. Moreover, vehicle and infrastructure related technologies increase road and vehicle safety while reducing fatal accidents.



3

Education for Safer People

Evidence based studies have shown that education is crucial to developing safer people and safer communities; therefore, road safety must be taught in schools as well as through driver trainings and safety campaigns.



Road safety education in schools aims to promote a better understanding of traffic rules/regulations. Hence, road safety courses should be embedded in both private and public to school curriculums and should target children as young as four to five years of age then continue through primary and secondary school. Evidence has proven that road safety education at school tends to positively affect children's attitude towards road safety, and increase their awareness towards personal safety and the safety of others.

Evidence based studies suggest that novice drivers, those who have been driving for less than two years, are at the highest risk of being involved in traffic accidents. Therefore, training courses have been put in place to improve road user skills and behaviors on the road by making them more aware and cautious. Stakeholders, such as traffic police, whose job is to keep the roads safe should also be well-trained. Moreover, advanced training targeting repeated offenders/re-offenders should be considered and should be coupled with crash investigation training for police officers in order to well-document the causes of accidents and collect reliable crash data.

Campaigns are designed to raise awareness and motivate a change in the behavior of road users. They take the form of safety and enforcement campaigns.

On the one hand, road safety campaigns are often directed at either improving the public's knowledge about a road safety issue or at changing attitudes towards a particular road behavior such as drink driving, speeding, using mobile phones, using seat belts, etc. On the other hand, enforcement campaigns are intended to educate the public about existing or newly introduced traffic laws and the legal consequences of breaking them.

A closer look: United Kingdom

In the United Kingdom, research undertaken by the Royal Society for the Prevention of Accidents (ROSPA) on behalf of the United Kingdom Department for Transport, stipulates that effective road safety education should be practical, proactive and take place at the roadside. For example, teachers may take their younger students out and teach them how to safely cross the road. Research has shown that children learn best when they are actively involved in their own learning.

4

Enforcing Road Safety Laws

Effective enforcement includes written laws and sanctioned schemes that are well thought out and contextualised, but still based on proven leading practice. Enforcement also includes physical enforcement mechanisms both through police and technology (e.g. radars, cameras, etc.). Enforcement is critical in putting education and engineering efforts into effect, in order to achieve a complete Safer System.

Effective laws

The WHO identifies standard legislations which increase road safety such as speed, drink-driving, seatbelts, and driving while distracted.

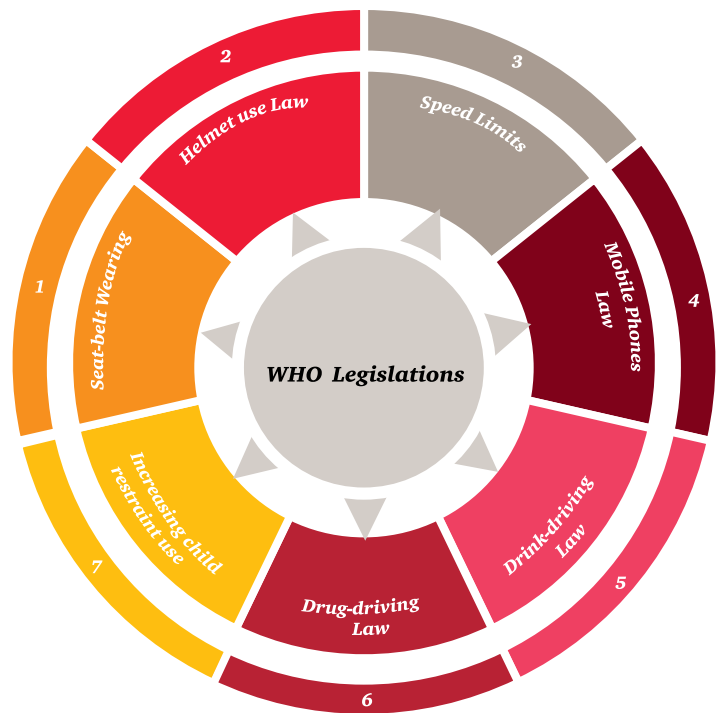
- 1 Seat-belt wearing should be mandatory for both front and rear-seat occupants as it reduces the risk of fatality among drivers and front-seat occupants by 45–50%
- 2 The helmet law should apply to both drivers and passengers, all road types and all engine types. Motorcycle helmets can reduce the risk of death by almost 40%
- 3 Where motorised traffic mixes with pedestrians, cyclists, and moped riders, the speed limit must be under 30 km/h
- 4 Legislation should prohibit the use of both hand-held and hands-free mobile phones
- 5 The law should be based on blood alcohol concentration (BAC) limits: For adult drivers BAC limits (≤ 0.05 g/dl), for young driver BAC limits (≤ 0.02 g/dl)
- 6 There must be a law clearly prohibiting drug-driving
- 7 There must be a law that applies an age, weight or height restriction on children sitting in the front seat

Effective sanctions

When a law has been observed to have been violated there are a number of enforcement penalties and sanctions that can be applied including: monetary fines, loss of demerit points, license suspension or disqualification, education programmes or incarceration¹. These are not designed to just punish the offender once caught but to deter traffic violations occurring in the first place. Deterrence is particularly effective when drivers perceive they are likely to be caught and punished and any punishment administered should be severe and administered in a timely fashion².

¹(Penzler, 2012)

²(Akers 2013)



Between 1980 and 2000, for the SUN countries (Sweden, UK and Netherlands), policies that targeted vehicle safety, seat belts, and drink-driving were responsible for the largest reduction in road fatalities

Fatality Savings*	Sweden	UK	Netherlands
Estimated total fatalities saved	426	3124	1455
Vehicle safety, seat belts, drink-driving	48%	54%	46%
Local road engineering	4%	10%	5%
Other vulnerable road user measures	10%	7%	18%
Other car occupant measures	10%	7%	18%

*Source: Koonstra, M et al (2002); SUNflower: A comparative study of the development of road safety in Sweden, the United Kingdom, and the Netherlands. Report to the European Commission

4

Enforcing Road Safety Laws (cont'd)

Enforcement through police & technology

Driving laws can either be enforced through the use of technology or through patrolling and police visibility.

Many existing technologies have the capability of catching violators (mostly for speeding) and automatically issuing fines. These technologies (i.e. cameras and radars) can be installed across the road network or they can be mobile operated by police officers, either mounted in their vehicles or in the form of hand-held devices.

While fixed speed cameras and radars are important and effective, mobile use of technology can be more effective in that drivers will not slow down at spots they know contain these radars as they cannot anticipate their location. Some technologies, such as point-to-point or average speed cameras also address the issue of drivers slowing down at known radar locations as they can calculate the average speed of drivers between two points.

Police officers can enforce legislation through technology either by covert or high visibility patrolling which includes stopping offenders on the road side. The first involves police presence while the second involves presence and visibility. Visibility of police has consistently proven to be a powerful deterrent for poor driving behavior.

Combined enforcement and publicity campaigns

To increase public acceptance of a road safety measure, road safety publicity campaigns should be launched simultaneously with enforcement programmes. This increases the public's awareness of the road safety issue that is being addressed and the measure taken against it. According to the Global Road Safety Partnership, the fear of being caught and penalised for traffic offences is a more powerful motive for reducing speed than the fear of being involved in an accident. Making the public aware of the magnitude of danger associated with unsafe driving provides legitimacy to the enforcement of these new measures and could alter drivers' behavior. Examples of countries that have had successful enforcement and publicity campaigns for speeding, drink-driving, and risky driving include New Zealand, Switzerland, and Australia.

Enforcement effects

Repressive effects

When drivers are caught offending, they receive a ticket electronically through:

- Fixed speed cameras and radars
- Black point scheme and related fines

Increasing fines and sanctions has shown, through various studies, to have a marginal effect on speeding behaviour in comparison to preventative measures.

Preventative effects

When drivers observe others being pulled over and fined for their driving behavior; it serves as a deterrent and prevents other drivers from committing driving offences. Therefore, offenders can see:

- On-view stopping and ticketing by police
- More police presence/visibility

Various studies have shown that increasing police visibility including publicly stopping drivers and fining them has led to a decrease in speed violations. This method of enforcement is thought to be much more effective than mailing fines to offenders who are identified as speeders by fixed speed cameras and radars.



Case studies from leading practices

A closer look:

Canada vs. United Kingdom

Different countries enforce different demerit point systems and sanction schemes. Good practices have been observed in Canada, Australia, and the UK. Black points have a 2 year validity in Canada, and a 3 year validity in Australia and the UK. Increasing the validity of the demerit points on the driver's record for a longer term emphasises the seriousness of committing driving violations.

In the UK, as well as other countries, retraining courses are given as an alternative to assuming fines and demerit points. The course can only be taken once every 3 years and has proven to improve drivers behaviour.

In Canada and the UK, a differentiation is made between experienced and novice drivers. A stricter demerit points system is applied for novice drivers by which they are disqualified from driving when they accumulate half the number of black points allowed for experienced drivers. This system keeps novice drivers in check and ensures an increased maturity in their driving behaviour.

France

In France, 1,823 fixed speed cameras and 933 mobile cameras were installed throughout the whole road network between 2003 and 2010. A study by Carnis and Blais showed that following the installation of these cameras, the number of monthly violations issued increased from 110,000 violators to 502,000. Within these 7 years, the fatality rate per 100,000 people decreased by 21% and non-fatal traffic injuries witnessed a dramatic reduction from 26.2% in 2002 to 12.1% in 2003, 3.5% in 2008 and just 0.8% in 2010.

European Union

A study performed by ICF Consulting before the EU enlargement in 2004, showed that, on a yearly basis, good enforcement practices could prevent up to 5,800 fatalities resulting from speeding, 4,300 fatalities resulting from not wearing seat belts and 3,800 fatalities resulting from drink driving. Moreover, 680,000 injuries could be avoided yearly.

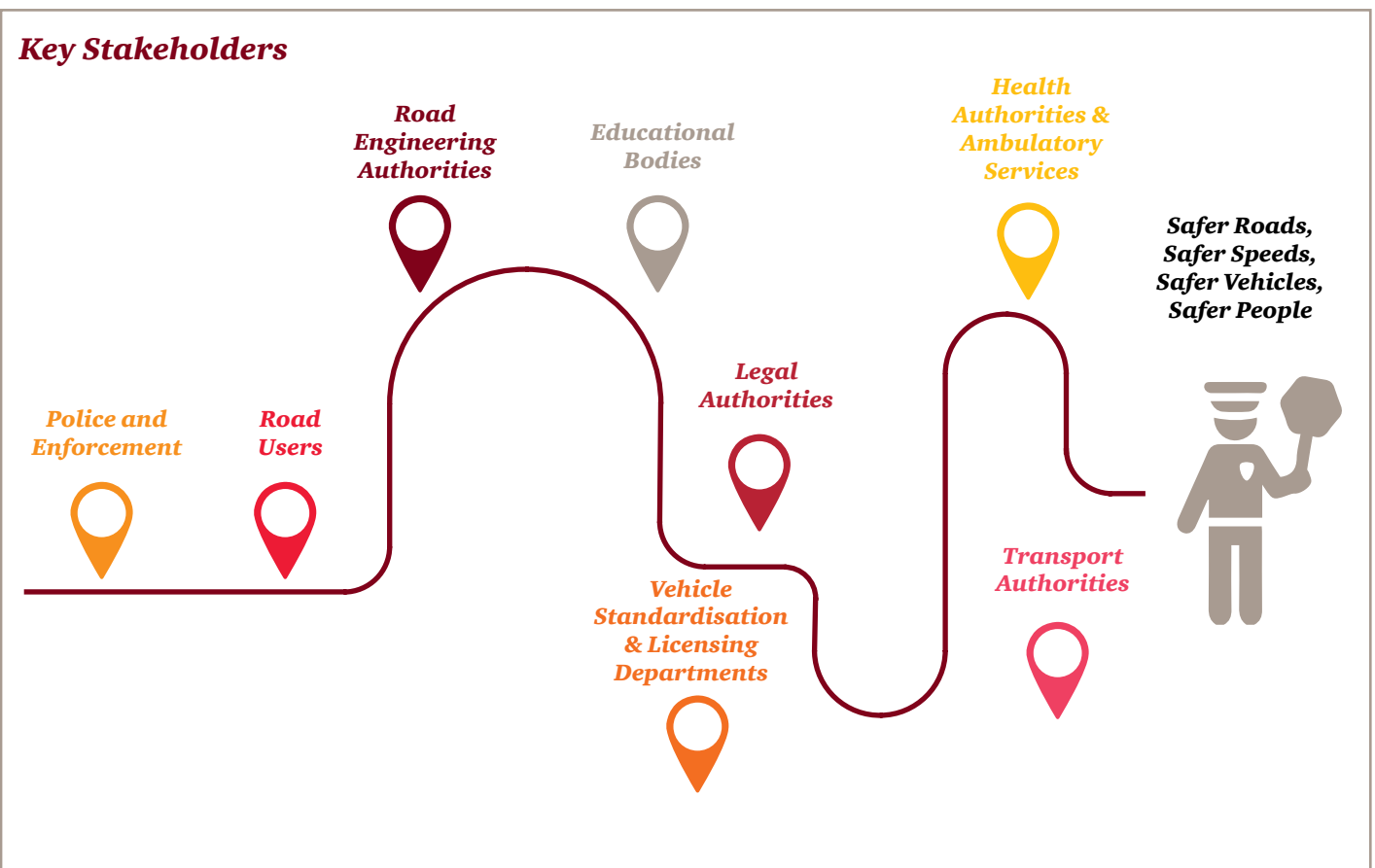


5

Delivering through Partnerships

Partnerships that include a range of expertise relating to the human, vehicle, environment and legal aspects of road accidents, are an extremely positive asset to a road safety strategy. Those partnerships involve a collaboration between different organisations that can leverage a diverse range of skills and work together towards the common goal of casualty reduction. Partnerships are effectively the back-bone for successful road safety achievements.

Strategies that empathise on the quality of collision data collection should also recognise the importance of road safety partnerships between the different stakeholders. Those stakeholders can help facilitate the sharing of information as well as the validation of data and statistics, for example, the range of data collected by the Ministry of Health, the Ministry of Transport and the Ministry of Interior.



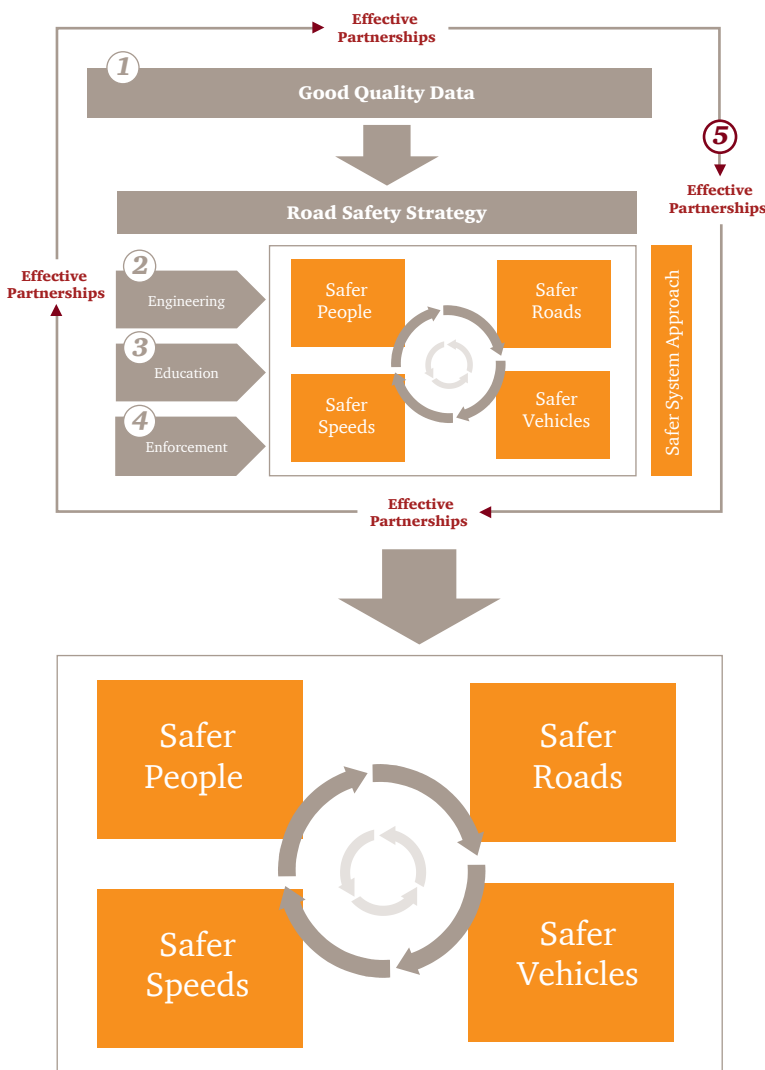
What works: United Kingdom

In the UK, the long-standing collection of national accident statistics using (STATS20) has been coupled with the collection of in-depth accident data (now known as the Road Accident In-Depth Study – RAIDS). Such data has been very influential in policy-making, formulation of regulations and technology development. Whilst the RAIDS programme is managed independently in order to avoid biases in the type of the data collected, the programme involves a unique cooperation between the police, the UK government, the medical community, vehicle manufacturers, road operators (Highways England) and independent research agencies based in universities and research institutions. This partnership structure proved to be an asset for the UK in developing road safety strategies.

6

Conclusion: Achieving a Safer System

PwC's proposed strategy framework is comprehensive and is based on a thorough analysis of leading practices and evidence-based studies. The designed strategy allows for global contextualisation and equips policymakers with enough tools to assess their current road safety strategy and address their country-specific needs. In addition, it comprises all the essential components required for a successful road safety strategy: data, engineering, education, enforcement and partnership. By combining those 5 elements, policymakers will have also covered all aspects of the **Safer System Approach**.



Safer Roads

Incorporating safety features that reduce the risk of collisions such as the segregation of both road users and traffic. This also includes the identification and elimination of hotspots and road maintenance

1

Safer Speeds

Enforcing existing speed limits and establishing appropriate limits based on road features. These intelligence led speed limits will work collaboratively to avoid collisions and reduce the severity of injuries

2

Safer Vehicles

Introducing technological features that reduce collisions (e.g. *alcolocks, speed limiters, stability control, automatic braking systems*), and encouraging the purchase and maintenance of safer vehicles

3

Safer People

Promoting safer usage of the roads through education and awareness campaigns that target all road users including children and high risk drivers

4

A closer look: Sweden

Sweden has applied the Safer System Approach as part of its 'Vision Zero' strategy for improving road safety and reducing road fatalities to zero. Sweden has witnessed success in reducing fatalities by implementing a combination of safer vehicle fleets, improved road infrastructure, lower average road speeds, and an increased focus on injury prevention.



Call for action

This document has been developed by the Middle East practice; the knowledge and expertise detailed within this report are intended for a global audience.

The WHO reported that the number of road fatalities has remained fairly static since 2007 along with an increase of 4% in the world's population and 16% in motorisation. This shows that more actions need to be taken to decrease the absolute number of traffic fatalities.

One of the most important duties of any government is the protection of life. Therefore, with road traffic fatalities being the single leading cause of death amongst those aged between 15-29 and with the significant impact it has on our human capital, reducing road traffic fatalities should become a priority for governments at every level.

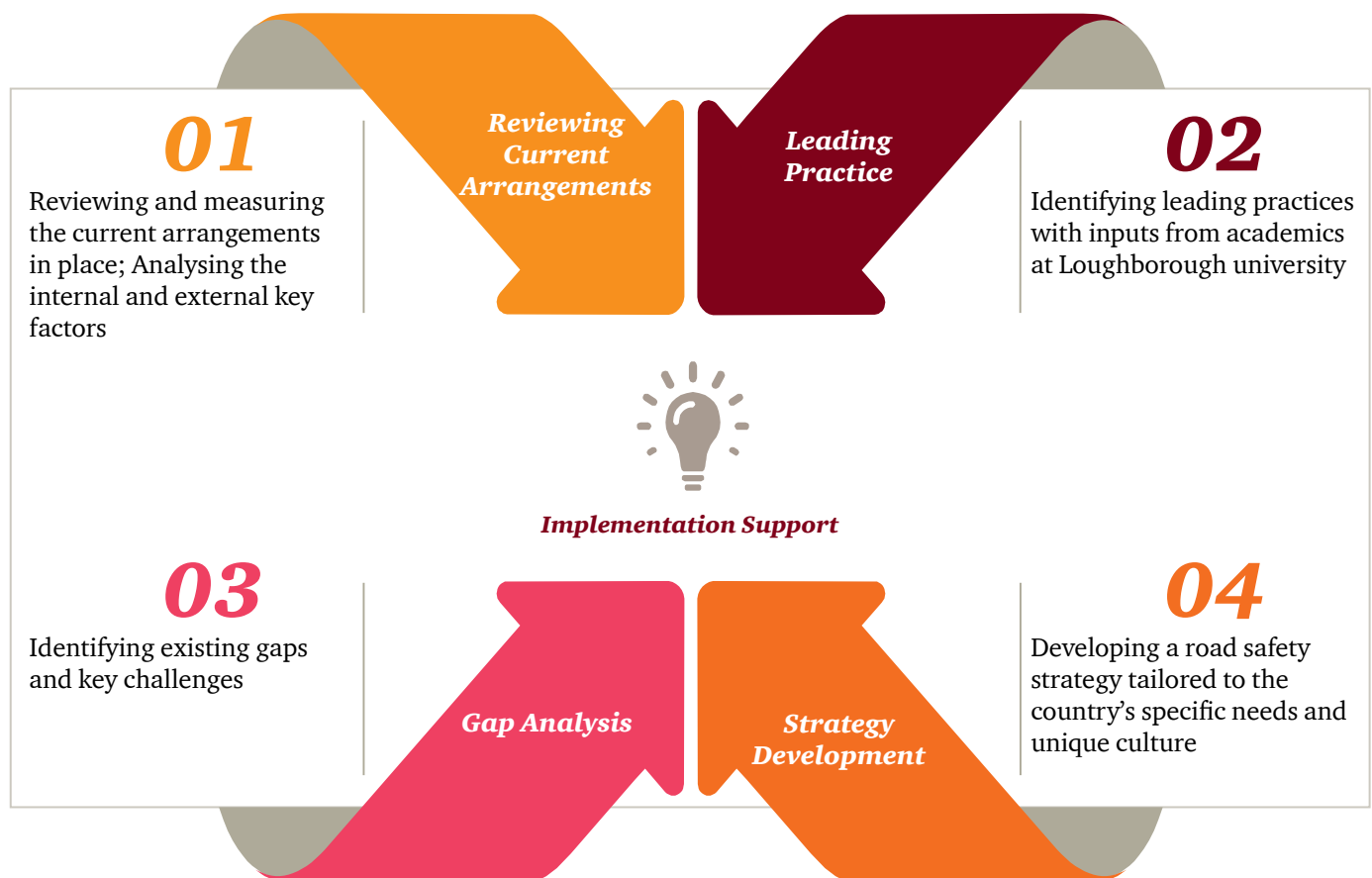
We hope that this report provides practical guidance to municipal, regional and national governments in developing their road safety strategies with the aim of significantly reducing the number of traffic fatalities and serious injuries.



How PwC can help

PwC has acquired extensive experience in assisting governments in meeting their targets around reducing the number of road traffic fatalities nation-wide. With the help of our global network of Subject Matter Experts, we have been successful in developing road safety strategies, organisational transformation and operational implementation both globally and in the Middle East. In addition, our operational experience has been complemented with our relationship with Loughborough University which adds academic rigour by identifying and contextualising the most effective road safety practices worldwide. Hence, this combination best positions us to provide innovative, practical and impactful solutions tailored to our clients' needs to address global issues.

Our approach focuses on four different stages :



Bibliography

World Health Organisation - Global status reports on road safety (2002, 2010, 2013, 2015)

International Transport Forum - Road Safety Annual Report (2015, 2016)

TISPOL - European Traffic Police Network, Annual Report 2015

ROSPA - The Royal Society for the Prevention of Accidents

Loughborough University - A literature Review on Fatal Road Accident Reduction - Strategies and Countermeasures

International Road Federation (IRF) - World Road Statistics 2015

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