



Road Safety: saving lives in cities



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Road Safety: saving lives in cities

Objectives




To present:


- Road safety issues worldwide
- Who are the main victims
- The impacts of poor road safety and how to prevent its detrimental effects
- The global efforts to improve road safety
- The Safe System Approach
- The financing options

This module presents a general overview of the road safety situation worldwide, who are the main victims what are the major causes of crashes, and what could be done to prevent the detrimental effects of poor road safety.

It identifies adverse impacts of poor road safety and the current efforts of risk/crisis management in the transport sector. It presents the global efforts to address road safety issues and the safe system approach. Financing options to finance the improvement of road safety are discussed and a list of links for further reading is provided.



GLOBAL STATUS REPORT ON ROAD SAFETY 2018



Road traffic injuries are the 8th leading cause of fatalities

- About 1.35 million people die every year
- About 20-50 million are injured non-fatally every year, with many incurring disability
- 1st leading cause of death for children & young adults aged 5-29.
- 59% of road deaths are adults aged between 15 and 44 (most productive years of life)
- 77% of road deaths are males

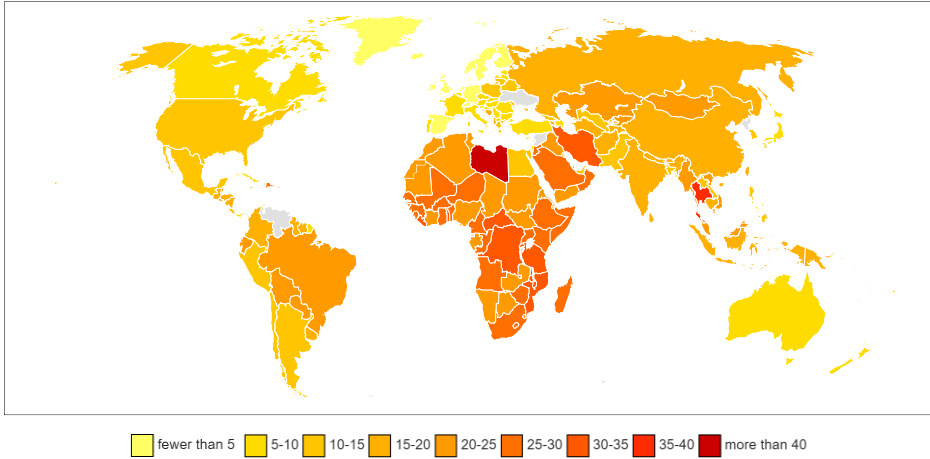
Road Safety: saving lives in cities

The number of deaths on the world's roads remains unacceptably high, with an estimated 3.700 people every day. More people die as a result of road traffic injuries than from HIV/AIDS, tuberculosis or diarrheal diseases. Road traffic injuries are currently the leading cause of death for children and young adults, stressing the need for a shift in the current child and adolescent health agenda which, to date, has largely neglected road safety.

The rate of death relative to the size of the world's population has remained constant overtime. In the context of the increasing global population and rapid motorization that has taken place over the years, this suggests that existing road safety efforts may have mitigated the situation from getting worse.

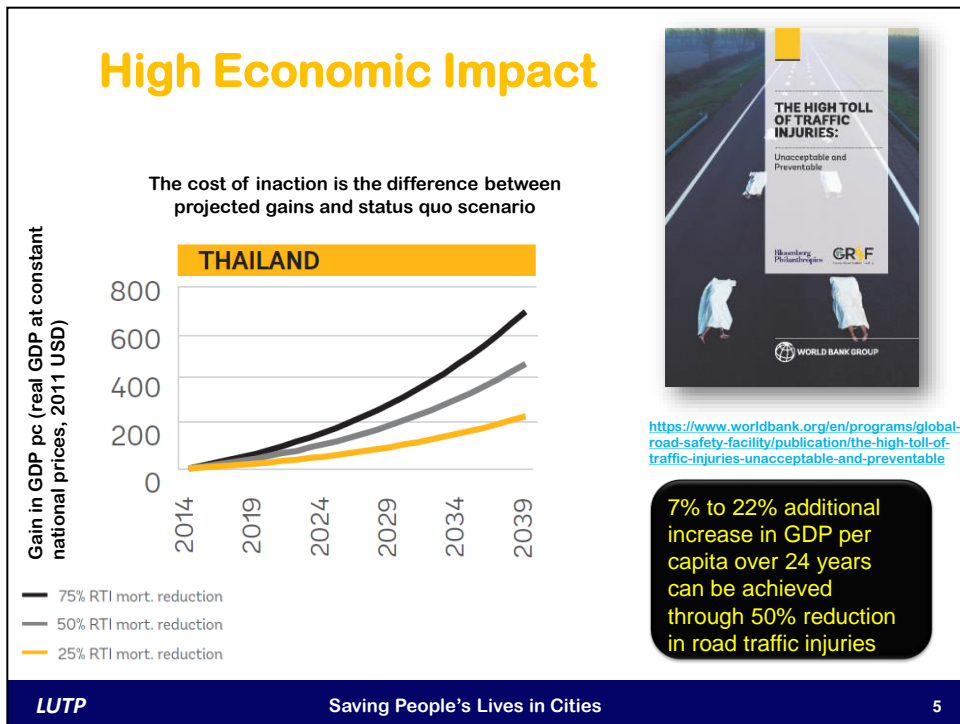
The developing world suffers most

Death Rates per 100,000 Inhabitants (WHO, 2015)



Source: <https://commons.wikimedia.org/w/index.php?curid=73917099>

Low and middle-income countries suffer 93% of the road crash deaths and injuries. With an average rate of 27.5 deaths per 100,000 population, the risk of a road traffic death is more than three times higher in low-income countries than in high-income countries where the average rate is 8.3 deaths per 100,000 population.



The 2017 World Bank report 'The High Toll of Traffic Injuries' noted that: "Reducing road traffic injuries in half could translate into an additional 7% to 22% of GDP per capita income growth over 24 years. This means in practice that failing to meet the UN Sustainable Development Goal target to halve road deaths by 2020 **accrues to about 2-3 percent points in unrealized per capita GDP growth for low- and middle-income countries** - —this is **the cost of inaction.** "

Global Commitments



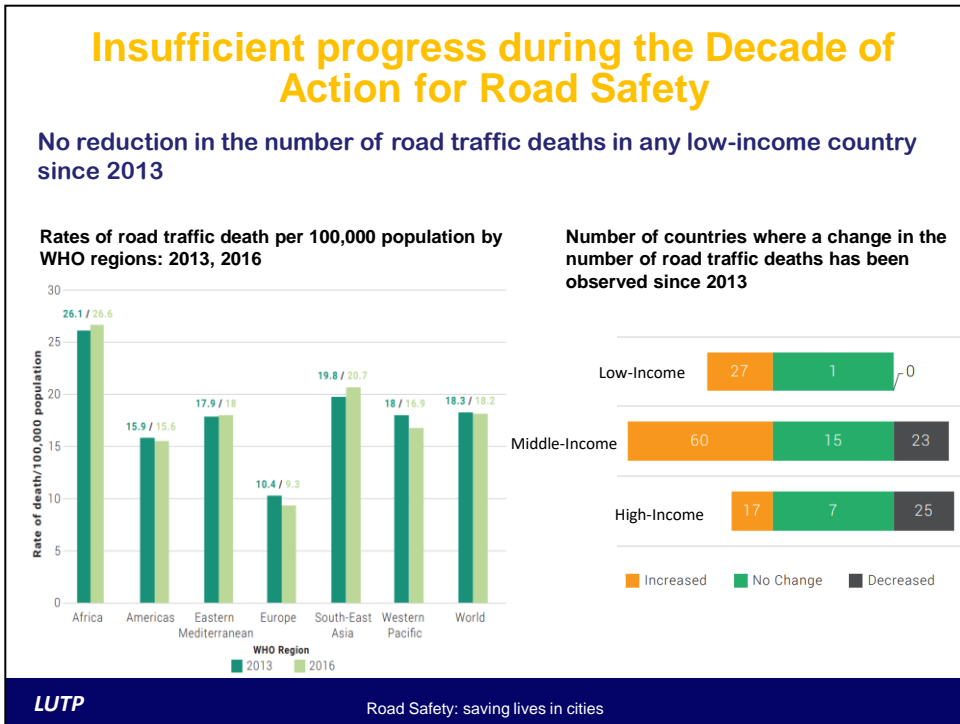
SDG 3.6 seeks to halve the number of global deaths and injuries from road traffic crashes by 2020, e.g., from over 1.3 million fatalities to 600,000 per year

Stockholm Declaration, at the completion of the 3rd Ministerial Conference on Road Safety (February 2020)



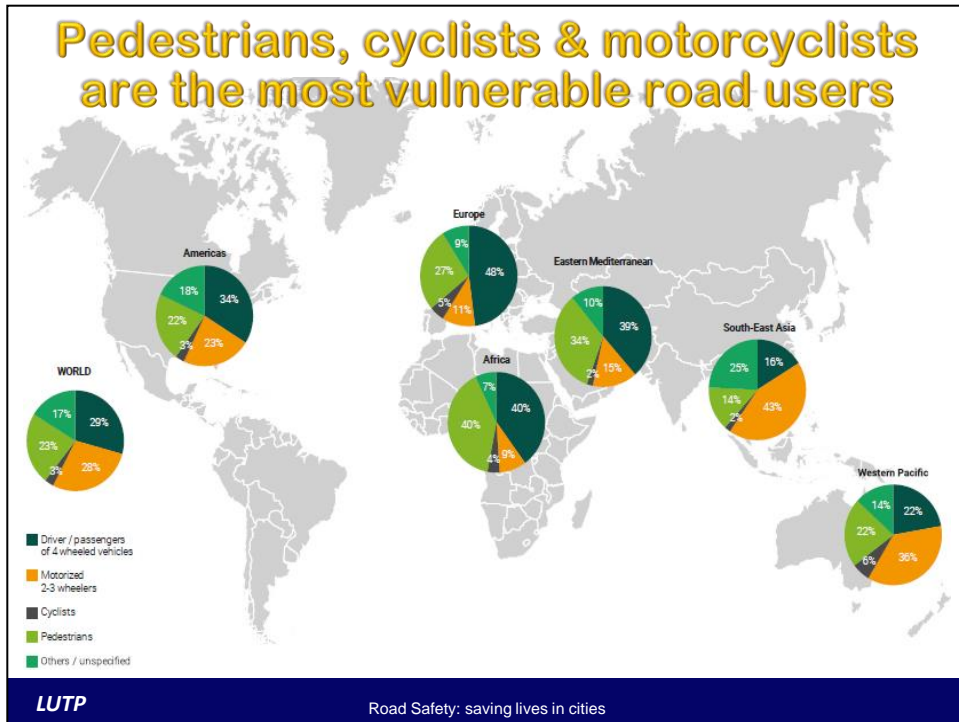
The **Decade of Action for Road Safety 2011–2020** was launched by the United Nations General Assembly on 11 May 2011 with a goal to reduce the level of road traffic fatalities by increasing activities conducted at the national, regional and global levels. It was estimated that 5 million lives could be saved on the world's roads during the decade. The targets set were not achieved.

The 3rd Global Ministerial Conference on Road Safety in Stockholm, in 2020, under the theme “Achieving Global Goals 2030” insisted to 1) Include road safety and a safe system approach as an integral element of land use, street design, transport system planning and governance, especially for vulnerable road users and in urban areas, by strengthening institutional capacity with regard to road safety. 2) Speed up the shift toward safer, cleaner, more energy efficient and affordable modes of transport and promote higher levels of physical activity such as walking and cycling as well as integrating these modes with the use of public transport to achieve sustainability; Focus on speed management and mandate a maximum road travel speed of 30 km/h in areas where vulnerable road users and vehicles mix in a frequent and planned manner, noting that efforts to reduce speed will also have a beneficial impact on air quality and climate change



Figures from the World Health Organization (WHO) report for 2018 show that a number of countries have been successful in reducing road traffic deaths over the last few years, but progress varies significantly between the different regions and countries of the world.

Unfortunately, no decrease in road traffic deaths has been noticed in LICs, while some good progress has been noticed in MIC and HIC. South East Asia and Africa have witnessed an increase in road traffic deaths.



In the world, more than 50% of all road deaths are among pedestrians, cyclists & motorcyclists. Low- and middle-income countries have higher levels of traffic deaths among pedestrians, bicyclists, and motorcyclists, which are also the main road users in cities. Africa has the highest proportion of pedestrian and cyclist mortalities. Between 2010 and 2015 pedestrians accounted for 88% of fatalities in Addis Ababa, Ethiopia, where there is a lack of adequate sidewalks and pedestrian crossings and vehicles move at unsafe speeds.

The continent of Africa has the highest proportion of pedestrian and cyclist mortality with 44% of deaths while in South-East Asia and the Western Pacific, the majority of deaths are among riders of motorized two and three-wheelers, who represent 43% and 36% of all deaths respectively

Impacts of traffic accidents

- Traffic deaths and injuries have a detrimental economic impact on the poor and are pulling them into further poverty
- Road collisions are estimated to cost around US\$518 billion or 1 – 4% of countries' annual GDP
- Reducing road traffic mortality by 50% and sustaining it over a period of 24 years could generate an additional flow of income equivalent to 22.2% of 2014 GDP in Thailand and a 7.2% increase in the Philippines
- **If no action is taken, road traffic injuries are expected to become the fifth leading cause of death globally by 2030**

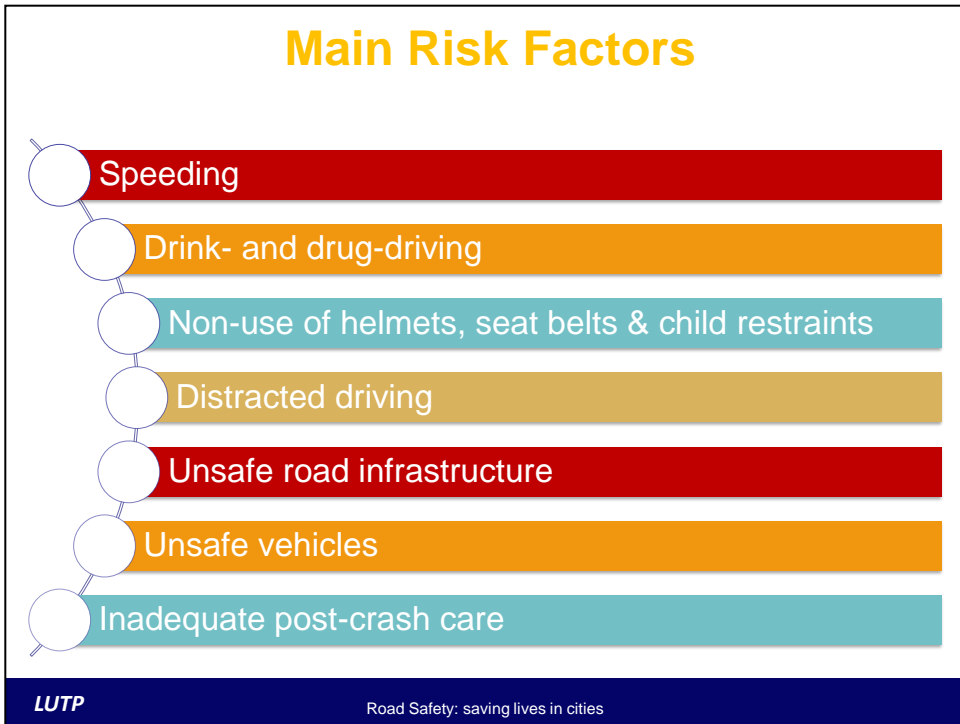


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Traffic crashes have a direct economic impact on individuals and families, perpetuating poverty or pulling people into it. The effect on poverty is compounded by the fact that poor communities are at significantly more risk of serious road traffic injuries than their more affluent counterparts, because they often live beside poorly designed roads that expose pedestrians and cyclists to fast-moving vehicles and are more likely to be walking (Silverman 2016).

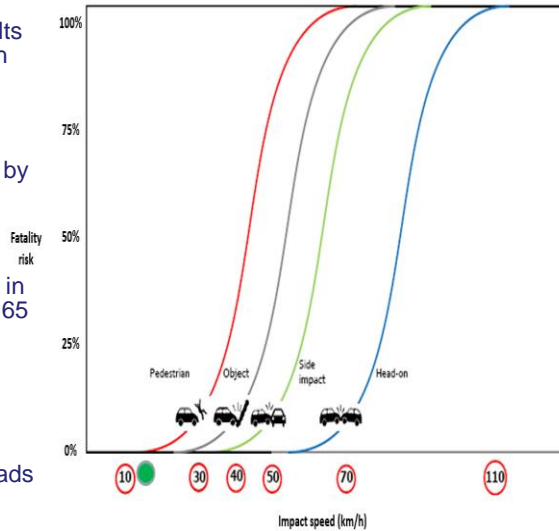
A detailed study of Bangladesh finds that 75 percent of poor households and 59 percent of nonpoor households experienced a decrease in their standard of living after suffering a road traffic injury. In a third of urban and half of rural cases, the decline pushed households into poverty. Employment and educational opportunities also suffer. On average, seriously injured victims in Bangladesh missed four to six months of schooling (Aeron-Thomas et al. 2004). A study of Nigeria finds that 30 percent of people who experienced a road traffic crash were permanently disabled and 14 percent were unable to return to work (Juillard et al. 2010).



The main risk factors fall under different categories which have each to be addressed specifically

Speeding

- Every 1% increase in speed results in a 4% increase in the fatal crash risk and a 3% increase in the serious crash risk
- The death risk for pedestrians hit by car fronts rises rapidly (4.5 times from 50 km/h to 65 km/h)
- The fatality risk for car occupants in car-to-car side impacts is 85% at 65 km/h
- **Best practice:** 30 km/h or less where large numbers of pedestrians are present and no more than 50 km/h on urban roads



Source: Wramborg, P. (2005).

The speed at which a vehicle travels directly influences the risk of a crash, the severity of injuries, and the likelihood of death resulting from that crash. Effective speed management is thus central to most road safety intervention strategies. The risk of a pedestrian death from traffic injury starts to steadily increase around a vehicle impact speed of 20–30 km/hour

Setting national speed limits is an important step in reducing fatalities and mortalities. Maximum urban speed limits should be lower than or equal to 50 km/hour, in line with best practices. In addition, local authorities should have the legislative power to reduce speed limits further, allowing them to take into account local circumstances such as the presence of schools or high concentrations of vulnerable road users.

Drink-, drug- & distracted driving

- **Drink-driving**, the risk of a road traffic crash starts at low levels of blood alcohol concentration (BAC) and increases significantly when the driver's BAC is \geq 0.04 g/dl.



- **Drug-driving**: the risk of incurring a road traffic crash is increased to differing degrees depending on the psychoactive drug used (e.g., the risk of a fatal crash occurring among those who have used amphetamines is about 5 times the risk of someone who hasn't).
- **Best practices** for drink-driving laws includes a BAC limit of 0.05 g/dl for the general population and a BAC limit of 0.02 g/dl for young or novice drivers.
- Drivers using mobile phones are about 4 times more likely to be involved in a crash than drivers not using a mobile phone.
- Hands-free phones are not much safer than hand-held phone sets, and texting considerably increases the risk of a crash.

Driving under the influence of alcohol and other psychoactive substances

It is estimated that 5–35% of all road deaths are alcohol-related. Driving after drinking alcohol significantly increases the risk of a crash and the severity of that crash. Blood alcohol concentration (BAC) limits provided for in legislation need to be at the core of efforts to address drinking and driving.

Distracted driving

The distraction caused by mobile phones is a growing concern for road safety. Using a phone while driving slows reaction times (notably braking reaction time, but also reaction to traffic signals), and makes it difficult to keep in the correct lane, and to keep the correct following distances.

Non-use of motorcycle helmets, seat-belts, and child restraints



- Head injuries are the leading cause of death and major trauma for two- and three-wheeled motor vehicle users
- Correct helmet use can lead to a 42% reduction in the risk of fatal injuries and a 69% reduction in the risk of head injuries

- Wearing a seat-belt reduces the risk of death among drivers and front seat occupants by 45 - 50%, and the risk of death and serious injuries among rear seat occupants by 25%
- The use of child restraints can lead to a 60% reduction in deaths

Best practices:

- **children at least until 10 y.o. or 135 cm in height shall be in a child restraint**
- **no children in the front seat**

Motorcycle helmets, seat-belts, and child restraints (December 2019)

- 49 countries representing **2.7 billion people** currently have laws on motorcycle helmet use that align with best practice.
- 105 countries representing **5.3 billion people** currently have laws on seat-belt use that align with best practice
- 33 countries representing **652 million people** currently have laws on the use of child restraint systems that align with best practice.

Unsafe road infrastructure



- Roads should be designed keeping in mind the safety of all road users including pedestrians, cyclists, and motorcyclists.
- Cycling lanes, safe crossing points, raised crossings, speed bumps, and other traffic calming measures are critical to reducing the risks for road users.



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Unsafe streets share many characteristics: lack of sidewalks, of accessible crossings for pedestrians, lane widths that invite unsafe speeds and expose pedestrians to long crossing distances.

The International Road Assessment Program (iRAP) surveyed nearly 250,000 kilometers of roads in 60 countries. It found that more than 80% of roads on which pedestrians were present and traffic flowed at more than 40 kilometers an hour had no formal sidewalk; 88% of roads with cyclists and speeds of more than 40 km an hour lacked bicycle facilities (iRAP 2015).

The problem is partly related to a lack of context-specific guidelines that reflect appropriate approaches to different street types and road designs catered only to motorized traffic.

Unsafe vehicles & inadequate post-crash care

Unsafe vehicles

Vehicle safety is not effectively regulated through design standards or maintained through mandatory vehicle inspection in many developing countries

80% of countries sell vehicles not meeting UN regulations (WHO 2015)

Inadequate post-crash care

Delays in detecting and providing care for those involved in a road traffic crash increase the severity of injuries.

Care of injuries after a crash has occurred is extremely time-sensitive: delays of minutes can make the difference between life and death

Safe vehicles

Safe vehicles play a critical role in averting crashes and reducing the likelihood of serious injury. There are a number of UN regulations on vehicle safety that, if applied to countries' manufacturing and production standards, would potentially save many lives. Without these basic standards the risk of traffic injuries – both to those in the vehicle and those out of it – is considerably increased.

Post-crash care

Improving post-crash care requires ensuring access to timely prehospital care, and improving the quality of both prehospital and hospital care, such as through specialist training programs

Public transportation is safer than private vehicles

- Reduction in fatalities and serious injuries in cities by up to 50% if bus priority systems are implemented
- “High Transit” cities with strong rail networks like Barcelona, Durban, Jerusalem and Toronto have the lowest rates of road injuries compared to ‘Informal’ type cities in other countries where poor urban design contributed to twice the injury rates.
- Potential reduction in fatalities could be achieved when transport safety policies are combined with land use and transport policies that minimize reliance on privately owned motorized vehicles and emphasize space for walking, cycling and public transport

Sources: WRI. “Traffic Safety on Bus Priority Systems.” 2015. <https://www.wri.org/publication/traffic-safety-bus-priority-systems>
Thompson, J., et al. (2020) A global analysis of urban design types and road transport injury: an image processing study. *Lancet Planetary Health*. [http://dx.doi.org/10.1016/S2542-5196\(19\)30263-3](http://dx.doi.org/10.1016/S2542-5196(19)30263-3)

Researches confirm that public transportation is much safer than individual motorized transport (cars or motorcycles).

A recent global study which was conducted by Australia, Spain and US and which results were published January 2020, concluded that “City design combining more public transport and rail networks with smaller, low speed blocks are the best to reduce road transport injuries.”

The conclusion of the study is "If reducing the road toll is your ultimate goal, it is better to invest in safer alternative transport options rather than continuing to focus on car-based safety interventions."

The Safe System Approach:

Errors are inevitable but traffic fatalities and serious injuries should not be

Roads should be designed so that human error does not have a serious or fatal outcome

Increased Cycling and Walking

Reduced Vehicle Travel

Reduced Emissions and Air Pollution

Fewer Crashes and Fatalities

Safer, Healthier Environment for All

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The “Safe System” approach requires a shift in responsibility from the people using roads to the people designing them and is based on a understanding of the underlying causes of traffic fatalities and serious injuries, particularly human fallibility and vulnerability and the responsibility of governments to protect their citizens. This approach is based on the principle that errors are inevitable but traffic fatalities and serious injuries should not be. Roads should be designed so that human error does not have a serious or fatal outcome.

The principles of a Safe System are drawn from the report published by the International Transport Forum of the OECD (OECD/ITF 2015):

1. People make mistakes that can lead to road crashes.
2. The human body has a limited ability to tolerate crash forces before harm occurs.
3. A shared responsibility exists among the people who design, build, manage, and use roads and vehicles and provide post-crash care to prevent crashes that result in serious injury or death.
4. A proactive approach should be taken to making the mobility system safe, rather than waiting for events to occur and reacting. All parts of the system must be strengthened to multiply their effects, so that if one part fails, road users are still protected.
5. No death or serious injury should be accepted in the mobility system. Lack of safety should not be a trade-off for faster mobility. Rather, the mobility system should be

Slide 17

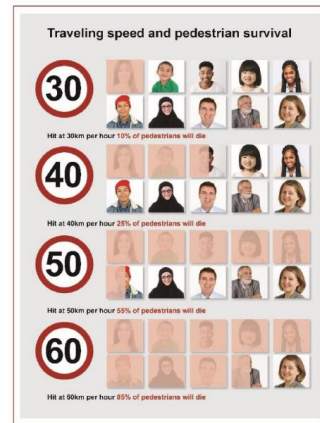
both safe and efficient.

The Safe System approach has been shown to be more effective in reducing traffic deaths and serious injuries than more traditional approaches. The action areas of a Safe System approach are based on evidence-based measures. The following slides explain some of the actions that can be implemented. Full list of action is in the annex titled: "Principles, Core Elements, and Action Areas of the Safe Systems Approach"

Speed Management

Speed determines the severity of crashes and injuries, affects the potential to avoid a crash, capacity to stop in time, reduce maneuverability and cause others to misjudge the timing of approaching vehicles.

Speed can be managed through sound road design and management, appropriate speed limits and education on the impacts of vehicle speed. Speed also determines the level of safety features and physical separation between road users required in the transport system.



Source: World Bank, 2019, Good Practice Note: Environment & Social Framework for IPF Operations

Guidance:

Measures such as the following could be enforced: Establish strong speed management, set speed limits that are appropriate for the type of road and the safety of road users: 30 km/h or less where large numbers of pedestrians are present and no more than 50 km/h on urban roads, design roads to limit driving speeds through features such as speed humps, crossings raised to pedestrian level, roundabouts, chicanes, and road narrowing.

Make signs highly visible in places where drivers are supposed to change from one speed limit to another, develop effective automated (camera) and police enforcement to discourage speeding, with strong communications in support of these programs, set penalties for speeding that are aligned with the risk speeding creates and that genuinely deter, such as high fines or a license demerit points system. Establish stronger penalties for speeding by novice drivers, such as license loss.

Enforcement of laws and regulations



- Consistent enforcement can contribute to a change in traffic culture over time.
- Laws and enforcement should consider risk factors such as speed, yielding to pedestrians or cyclists, seatbelt wearing, drunk driving, motorcycle helmet wearing, and use of child restraints.
- Speed and red-light cameras, data collection, and analysis can improve enforcement.

Guidance:

Establish and enforce safe speed limits with a low level of tolerance for exceeding the limit, enforce alcohol regulations that maintain strict limits on blood alcohol content, Establish laws on the use of car seats for children under the age of five and consider subsidies to ensure their accessibility to low-income families.

Establish laws to require seat belt use in both front and back seats of cars and taxis and require helmet wearing by drivers of motorized two-wheelers, including requirements that helmets be appropriately sized and correctly latched.

Establish and enforce regulations to prevent public spaces, such as sidewalks and cycling lanes, from being appropriated by automobiles, motorcycles, or commercial activities. Design elements such as bollards, which physically prevent such encroachment, should be included.

Education and capacity building



- Road safety education can help overcome misconceptions and lack of awareness. Behavioral norms should be addressed through media campaigns that address specific problems and are linked to education and enforcement actions.
- Educational programs can be developed in schools to help children be safer as pedestrians, cyclists, and motorized vehicle passengers.
- Communities or local governments can engage the public through active educational experiences, such as street-theater performances; street closure events; temporary street design changes, using road cones or other movable materials; and speed limit trials.

Guidance: Among measures to be taken are:

Design age-appropriate educational programs and classes in schools. Topics for children include safe street crossing, navigation of sidewalks, and lessons on how to ride a bicycle

and navigate streets safely. Topics for teenagers include the risks of drunk driving, distracted driving, and speeding.

Ensure that mass media campaigns target specific issues and conduct testing to determine how the public reacts to campaigns. Include promotion of enforcement and consequences in messaging.

Provide engaging public outreach experiences, through temporary street and intersection redesigns that develop community awareness of the benefits of road safety interventions. Educate system designers as well as road users.

Street design and engineering

Principles

Street design has a crucial effect on how people use and experience roads and a strong interrelationship with speed management and enforcement. It can reduce or eliminate conflicts between modes of transport and make it easier for people to understand how the space is divided or shared by different modes



Low-speed zones prioritizing pedestrian safety.
Source: Sustainable & Safe, WRI, GRSF.

By being more “forgiving”—that is, by reducing the opportunity for errors to occur and the impacts of those errors when they do occur—it can reduce the likelihood that a collision is fatal.

Guidance

- Craft designs that reflect proven solutions, prioritized or refined based on local data and analysis of traffic deaths and serious injuries
- Conduct traffic safety audits on new infrastructure plans and inspections of existing infrastructure
- Design roads to move traffic at appropriate speeds in cities, towns, and rural areas
- Provide safe spaces for pedestrians, bicyclists, and motorcyclists
- Use speed humps, curb extensions, medians and median refuge islands, roundabouts, and neighborhood traffic calming to reduce speeds

Further guidance

Use speed humps, curb extensions, medians and median refuge islands, roundabouts, and neighborhood traffic calming to reduce speeds.

Apply design techniques to control speeds and improve visibility at intersections.

Physically separate highways in urban areas from pedestrians, and avoid mixed land uses next to them. Change roads to urban streets with lower speeds if highways enter urban areas where pedestrians are present.

Avoid flyovers and underpasses in areas with a mix of land uses and where pedestrians are present. Provide connected networks of protected bicycle infrastructure in cities, with special attention to the design of safe intersections.

Apply distinct designs to account for the different needs of rural roads, urban streets, and highways

Road safety infrastructure upgrades in Addis Ababa, Ethiopia

Examples of what has been done:

- 90km of sidewalks built or underway
- 37km of improved signs and line marking
- 30km of pedestrian fences
- 1,300 bollards
- 3,500 street lights across more than 20km



In Addis Ababa, more than 500 carriageway-km were assessed with local partners over the five years. Since then, partners have been working to gradually improve the network. New sidewalks have been built, pavement line marking improved, new pedestrian fences that are designed to guide people to safer crossing points and street lights have been put in place.

There has been a measurable effect on the star ratings. Across the entire network assessed, 36% was rated 3-stars or better for pedestrians.

Vehicle design and technology

Vehicle design and technology is perhaps the fastest-growing area of road safety. Traditionally, it focused on keeping vehicle occupants safe from crashes.

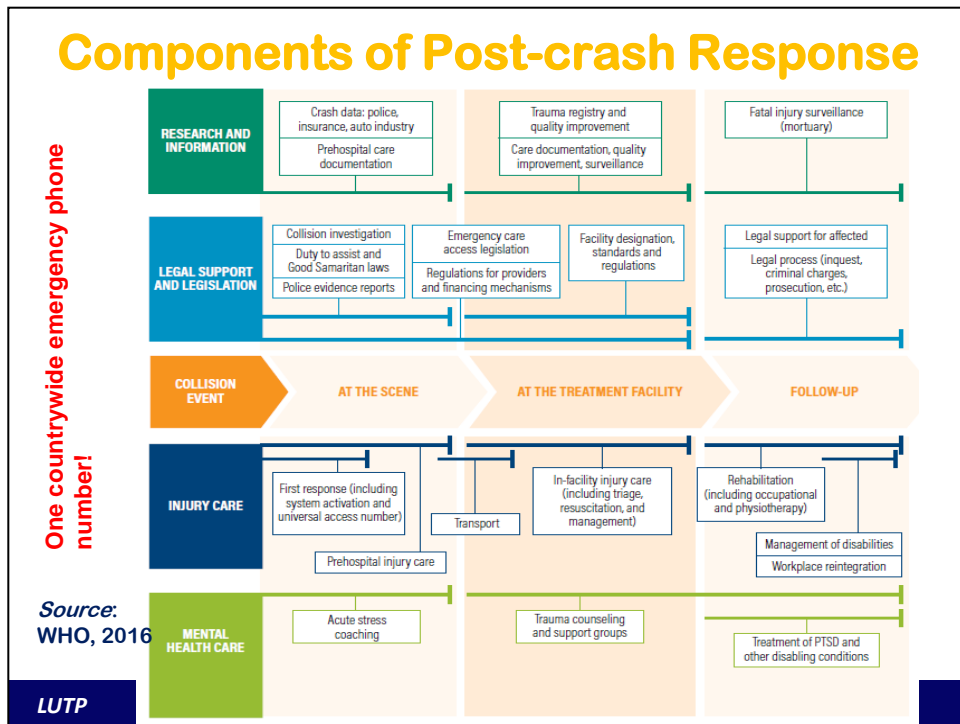
Recently, car design and technology has made it possible to increase safety for occupants of other vehicles, pedestrians, and cyclists in the case of a collision. Higher safety ratings can be achieved at relatively low cost.

80 percent of countries sell vehicles that do not meet UN priority safety standards (WHO 2015).

Guidance: Among measures to be taken are the following:

Require that all new cars adopt UN regulations and seat belt and child restraint anchorages. Ban the export or import of new or used cars with low safety standards, Consider vehicle technologies that help prevent dangerous behavior, such as alcohol ignition interlocks, seatbelt wearing systems, and intelligent speed control.

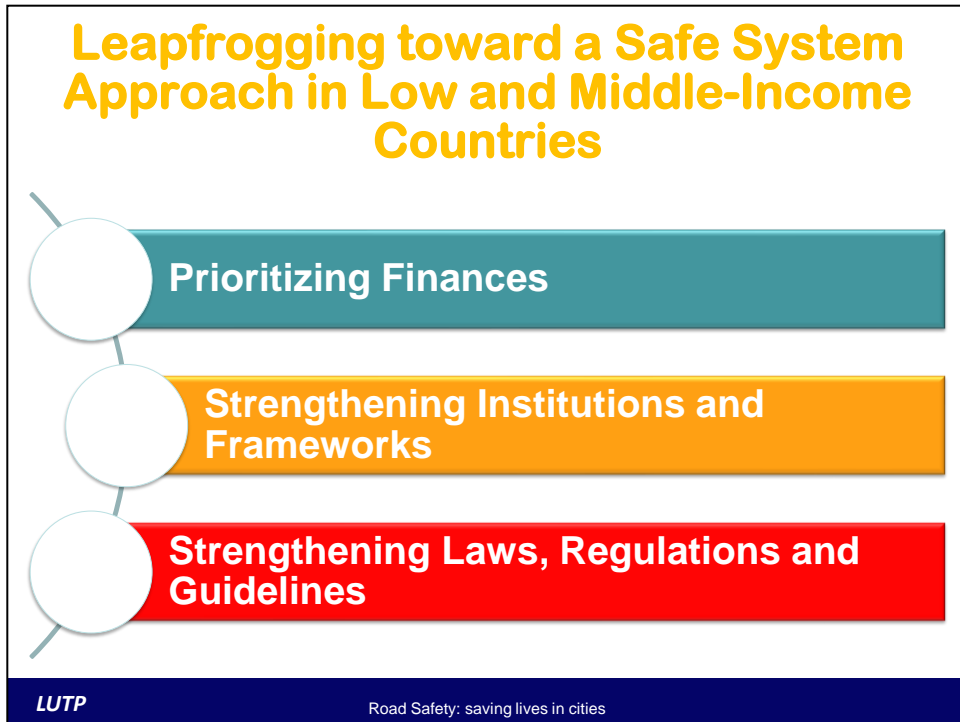
Review design and safety requirements of lightweight motor vehicles, and require safety standards for large vehicles, with particular attention to the safety of people walking or riding bikes or motorbikes. Establish vehicle registration processes that include vehicle inspection schemes, to ensure that basic safety features, such as safe tires and working brakes, are maintained.



The manner, in which injuries resulting from road traffic crashes are handled immediately after the accident determines the injured 's chances and quality of survival. In many countries, few victims receive treatment at the scene, and fewer still can hope to be transported to the hospital in an ambulance. Although around half of all road traffic deaths occur almost immediately at the scene of the crash, the outcome for the survivors at the crash site could be affected by the quality of the medical care that they receive.

The key elements of post-crash support are: (i) emergency care and rehabilitation for injury; (ii) mental health care; (iii) legal support; and, (iv) data on crashes and injuries. These are divided into three phases: (i) at the scene; (ii) at the treatment facility; and, (iii) post-treatment facility follow-up. The full consideration of post-crash support thus calls for a multi-sector response.

First responders and trauma centers should be coordinated within the road safety strategy and a nationwide emergency access telephone number set up. Robust trauma centers should be created and the health departments included in the institutional framework. Performance through measures such as the percent of crash victims brought to the hospital by ambulances and response time to crashes should be monitored. Encourage all road users to stop and call emergency services at the scene of a crash, in order to reduce notification time.



A Safe System approach to road safety is urgently needed in low- and middle-income countries. The opportunity exists to leapfrog over many decades of experimentation in high-income countries to take specific actions that are proven to be fast and effective at improving road safety and saving lives.

Prioritizing Finances: (please refer to the following slide)

Strengthening Institutions and Frameworks

A lead agency should take responsibility for a country's road safety performance and the direction of strategic partnerships targeted to improve it.

Strengthening Laws, Regulations and Guidelines

Few developing countries have adequate road safety laws and regulations and street design guides for specific urban or rural contexts. Few provincial-level governments or cities have road safety strategies, and in many cities enforcement of traffic regulations is so weak that there is little knowledge or motivation among road users to follow them. In many countries, vehicle safety is not effectively regulated through design standards or maintained through mandatory vehicle inspection schemes.

Funding for Road Safety

- Several options are available, such as:
- **Sustainable road safety dedicated funding**
 - Central and local government budgetary allocations
 - Road user charges (e.g., driver testing, licensing)
 - Levies on private sector operated insurance premiums
 - Traffic fines
 - Impact bonds
 - Levies on sales of new vehicles or tires
- **Better use of existing investments**
 - Use of broader transport budgets
 - Maximizing value of non-transport expenditure
- **Short-term seed funding**
 - Multi-lateral donor funding (e.g., grants, low-interest loans)
 - Private sector sponsorship
 - Philanthropic sources



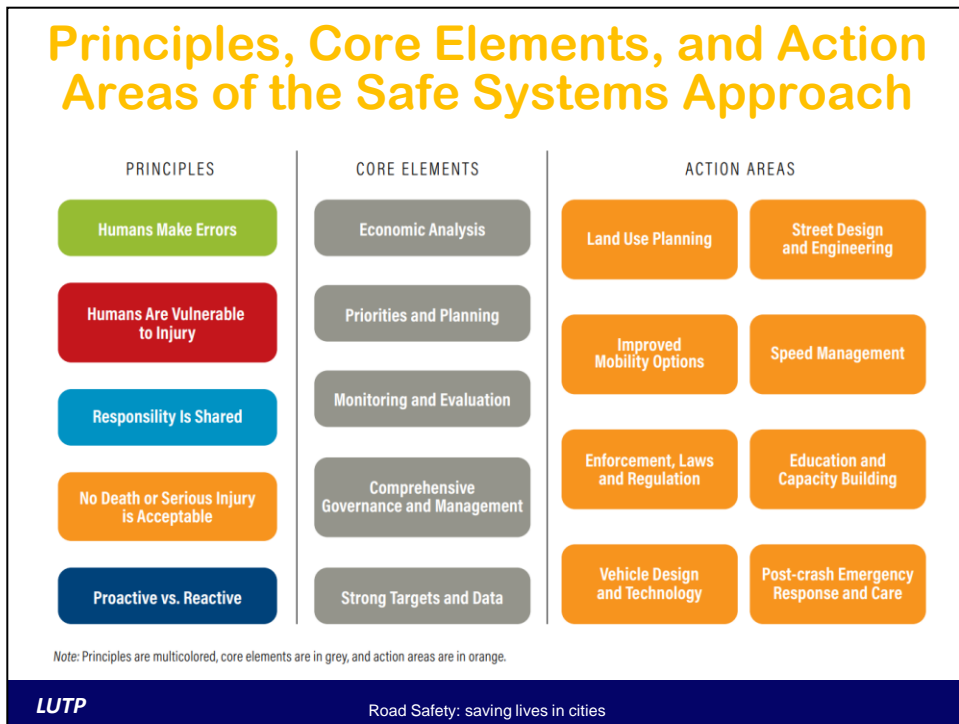

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The slide offers a number of funding options that could be considered for funding the improvement of road safety in countries. Allocating financial resources for integrated road safety management is a constant challenge but must be compared to life saves and its impact on countries GDP.

A study by the International Road Assessment Program shows that only 1–3 percent of road construction budgets are needed to increase road safety, suggesting that the problem is more about awareness, perceptions, priorities, goals, and design than lack of resources (iRAP 2013). Studies show the benefits of shifting from costly urban highways to well-designed streets with safe, attractive public transport and pedestrian and bicycling infrastructure, which comes at a lower price (Bocarejo et al. 2012). Furthermore, speed reduction, one of the fastest and highest-impact ways of improving road safety, can be obtained by relatively inexpensive road design options.

Thank you

Annexes to follow



Responsibility for safe roads should be shared by road users, road designers, municipalities and other levels of government, the police, vehicle manufacturers and regulators, and road authorities.

The core elements of a Safe System strategy are intrinsic to the systemization of a road safety strategy and action plan. They include comprehensive governance and management, strong targets and data, priorities and planning, and monitoring and evaluation.

Comprehensive Governance and Management:

responsibility for safe roads is shared by many actors, including road users, road designers, municipalities and other levels of government, the police, vehicle manufacturers and regulators, and road authorities. The WHO recommends that a lead agency be designated to coordinate all road safety activities (WHO 2004, 2015). It could take the form of a dedicated standalone road safety agency, a dedicated safety division within an agency, or a road safety council or standing committee coordinated by one lead agency. There is no prescribed form of institutional leadership and coordination but rather a requirement that an effective governance structure be in place that provides both leadership and coordination for road safety.

Strong Targets and Data:

Road safety targets make it easier to implement effective countermeasures and set priorities. Research on 14 countries that set quantified road safety targets between 1981 and 1999 finds that the targets had an appreciable association with improvement in road safety. (Wong and Sze 2010;

Allsop et al. 2011). Safe System strategies set ambitious targets to reduce road fatalities and serious injuries. They use targets to measure performance, ensure accountability, and generate public and political support. Targets should be ambitious but realistic. Many countries or cities may not be able to reach the Vision Zero target of zero fatalities. It is therefore wise to set intermediary targets that will help them advance toward an eventual goal of zero. Setting intermediate targets can also reduce the risk of public fatigue from failing to attain an overly ambitious goal despite heavy investment.

Data analysis is important for monitoring progress toward a target. It also plays a vital role in helping prioritize actions that can have the greatest impact. In low- and middle-income countries, a challenge to setting targets and tracking progress is that the data can be of low quality. Data collection systems are often inadequate or statistics are underreported. A Safe System approach should therefore include actions to improve data reporting systems, so that in the long term, targets can be set and monitored using reliable data that can be publicly shared. In the short term, policymakers can use what data they

have to set and reach targets.

Priorities and Planning:

A process to set priorities and actions appropriate to the context is needed to develop a Safe System strategy. Such a process requires a diagnostic that analyzes traffic crash data and identifies areas for highest-impact improvements to reach targets. Data for a diagnostic could include victim travel modes

and demographics, and road types or locations where serious collisions concentrate. This process helps guide the preparation of a set of actions that address each area of need and an action plan that includes short-, medium-, and long-term activities. The diagnostic should consider a wide array of

variables, including the needs of women, children, the elderly, poor people, and people with disabilities. This process should involve engagement with the public, civil society, and other groups, through meetings, workshops, focus groups, and surveys.

Understanding the types of interventions and the scales at which they are applied can help policymakers plan a Safe System, select areas of activity, determine timelines, and identify priorities based on the local context.

Monitoring and Evaluation

Monitoring progress and reporting on impacts is key for scaling up Safe System

approaches. Sharing lessons learned and successes can help leverage more political and public support for the Safe System approach and help countries learn how to adapt the principles to their own context. Some

indicators that should be monitored include the following (Bliss and Breen 2010):

FINAL SAFETY OUTCOMES: Final safety outcomes include deaths and serious injuries recorded by police, hospitals, health authorities, and other sources, such as insurance companies.

RISK: Risk can be calculated by measuring the number of traffic crashes, fatalities, and serious injuries by mode or passenger distance traveled.

PERCEPTIONS: The perception of risk or safety has a major impact on behavior and mode choice.

ACTION MILESTONES: Milestones can monitor strategy implementation progress in the short, medium, and long term.

SYSTEMS OUTPUTS. Over the longer term, outputs can measure wider changes associated with a Safe System.

Rationale for Safe System Investment: Economic Analysis:

An economic evaluation of crash costs can be a valuable tool for communicating the importance of a comprehensive set of Safe System measures. Road crash costs include medical costs, loss of work productivity, loss of quality of life, property damage, and other costs, such as those incurred by the police or the courts (SWOV 2014). Costs that are often overlooked or difficult to quantify include the following:

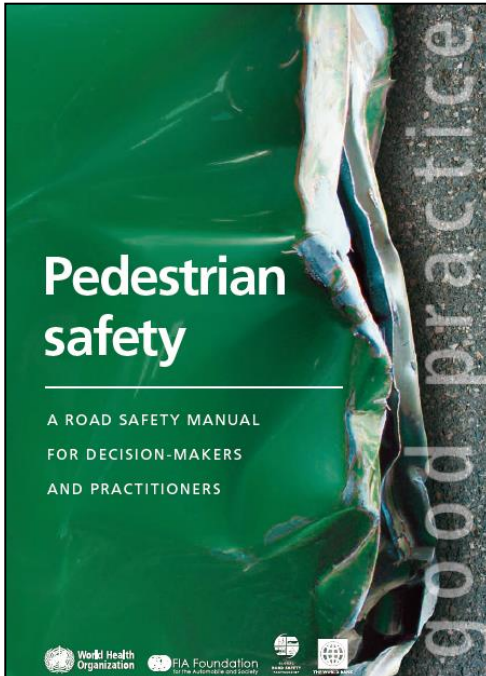
- Individual or household costs, such as premature funeral; disability-related; noneconomic (pain, suffering, grief); vehicle repair and unavailability; and legal and court costs.
- Business costs, such as workplace, recruitment and retraining, vehicle repair and unavailability, and travel delay and vehicle operating costs.
- Public or collective costs, such as road and other infrastructure repair, insurance administration, police, correctional services, ambulance and other emergency response, and coroner costs.

The high cost of road crashes and the immense fiscal burden that accompanies dangerous roads must be appreciated, and not undervalued, so that economically viable decisions on road safety interventions can be made. These costs are high even in high-income countries. New York City, for example, loses an estimated \$3.9 billion annually (1 percent of gross city product) as a direct consequence of traffic crashes—and these figures do not include social costs (for example, grief, posttraumatic stress, lost opportunity) (NHTSA 2010).

The main type of analysis is cost-effectiveness, which compares the benefits of improved health with the costs of the intervention. Cost-effectiveness can help

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prioritize investments. The Netherlands and other countries also use cost-benefit analysis to show that the costs of Safe System are lower than the economic benefits (Elvik 1997; SWOV 2014). **The safety benefits of BRTs and PT should be included in the economic analysis/business case for their implementation.**



Pedestrian safety

A ROAD SAFETY MANUAL
FOR DECISION-MAKERS
AND PRACTITIONERS

World Health Organization FIA Foundation

LUTP Road Safety
The World Health Organization's Global Road Safety Programme

LUTP

Road Safety: saving lives in cities

- Addressing Pedestrian Safety
- Pedestrian Safety in road design and land-use planning
- Prioritizing pedestrian safety interventions
- Implementing pedestrian safety plan of action
- Evaluating pedestrian safety programs

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Road Safety Management
Capacity Reviews
and Safe System Projects

Guidelines

Updated Edition

GRSF
Global Road Safety Facility

Tony Bliss • Jeanne Breen

Road Safety: saving lives in cities

- Identify a lead agency in government to lead RS effort
- Assess the problem, policies and institutional settings
- Prepare a national RS strategy and plan of action
- Allocate financial and human resources to address the problem
- Implement specific actions to prevent crashes, minimize injuries and their consequences
- Support the development of national capacity and international cooperation
- Evaluate and monitor

In order to mitigate collisions attributed to vehicle inadequacies or defects, one of the measures taken in Singapore was to enforce a **strict vehicle import policy**. Vehicle imports are permissible from countries that have adopted and comply with recognized high vehicle safety standards. Vehicle safety compliance is particularly focused on 52 items specified by the Land Transport Authority (LTA). In addition to strict vehicle import standards, Singapore enforces a **strict vehicle quota system**, which regulates the number of vehicles on the road network. Additionally, vehicles are required to undergo frequent inspections. Cars between 3 and 10 years old are required to have a biennial inspection, and cars older than 10 years are required to undergo annual inspections. Furthermore, taxis are required to undergo inspections every six months.

Road safety education and driver education are core tenants of Singapore's roads safety strategy. Road safety education is predominately undertaken by the Singapore Traffic Police, but nongovernmental organizations such as the National Security Coordination Secretariat contribute significantly to road safety education in Singapore.