

**CHAPTER 5**

Conclusions and  
recommendations



Road traffic crashes occur on all continents, in every country of the world. Every year they take the lives of more than a million people and incapacitate many millions more. Pedestrians, users of non-motorized vehicles – including bicycles, rickshaws and carts – and motorcyclists in low-income and middle-income countries carry a large proportion of the global burden of road traffic death and serious injury. The elderly, children and the disabled are particularly vulnerable.

Despite the growing burden of road traffic injuries, road safety has received insufficient attention at both the international and national levels. The reasons include lack of general awareness and specific information on the scale of the problem, on the health, social and economic costs of road traffic crashes, and on the interventions that can prevent crashes or reduce the harm they cause.

Another reason is that the problem of road traffic crashes and injuries does not “belong” to any specific agency, either at national or international levels. Instead, responsibility for dealing with the various aspects of the problem – including the design of vehicles, the design of road networks and roads, urban and rural planning, the introduction and enforcement of road safety legislation, and the care and treatment of crash survivors – is divided among many different sectors and groups. There has usually been no leader to ensure that they coordinate their efforts and address the problem as a whole. In this environment, it is not surprising that political will has frequently been lacking to develop and implement effective road safety policies and programmes.

### Main messages from the report

This report, the first joint report between WHO and the World Bank on the topic, presents the current knowledge about road traffic injuries and the actions that need to be taken in order to tackle the problem. The following are some of the report’s key messages:

- Any road traffic system is highly complex and hazardous to human health. Elements of the system include motor vehicles, roads and road users, and their physical, social and economic environments. Making a road traffic system

less hazardous requires a “systems approach” – understanding the system as a whole and the interaction between its elements, and identifying where there is potential for intervention. In particular, it requires recognition that the human body is highly vulnerable to injury and that humans make mistakes. A safe road traffic system is one that accommodates and compensates for human vulnerability and fallibility.

- Road traffic injuries are a huge public health and development problem, killing almost 1.2 million people a year and injuring or disabling between 20 million and 50 million more. Both WHO and World Bank data show that, without appropriate action, these injuries will rise dramatically by the year 2020, particularly in rapidly-motorizing countries. Not only is 90% of the current burden borne by low-income and middle-income countries, but the increase in casualty rates will be greatest in these countries. Although data on the costs of road traffic crashes are sparse, particularly from low-income and middle-income countries, it is clear that the economic impact of these injuries on individuals, families, communities and nations is enormous, costing countries between 1% and 2% of their gross national product. In addition, there is the heavy and tragic burden on those directly affected, both physically and psychologically – as well as on their families, friends and communities. Health facilities and their often meagre budgets are greatly overstretched in dealing with survivors of road traffic crashes.
- Many countries have no injury surveillance systems that generate reliable data on road traffic crashes and injuries. Indicators, especially for non-fatal outcomes, may not be standardized, making comparisons difficult. There are frequently discrepancies between data – for example, between police and health-related sources. Furthermore, widespread under-reporting of road traffic fatalities and injuries – both in health and police data – limits the usefulness of existing data sources. Reliable

data are needed to provide a solid foundation for road safety planning and decision-making. Establishing simple, cost-effective injury surveillance systems is an important step towards improving road safety. However, the lack of reliable data should not impede immediate action. Much can be achieved by adapting and applying proven safety practices.

- A number of factors affecting the probability of a road traffic injury need to be considered within the systems approach. The various types of risk related to road traffic injury, and the factors influencing these risks, are:
  - For *exposure to risk*, the determinants include economic and demographic factors, level of motorization, modes of travel, the volume of unnecessary trips and land-use planning practices.
  - For *crash occurrence*, the risk factors include excessive speed, drinking and driving, unsafe vehicles, unsafe road design, and the related lack of effective law enforcement and safety regulations.
  - For *injury severity*, the risk factors include the non-use of seat-belts, child restraints and crash helmets; lack of “forgiving” vehicle fronts to protect pedestrians in a collision; roadside infrastructure that is unprotective in a crash; and human tolerance factors.
  - For *post-crash injury outcomes*, the risk factors include delays in detecting a crash and providing life-saving measures and psychological assistance; lack of or delayed emergency care on the spot and transport to a health facility; and the availability and quality of trauma care and rehabilitation.
- Road safety is a shared responsibility (see Box 5.1). Reducing the risk in the world’s road traffic systems requires commitment and informed decision-making by government, industry, nongovernmental organizations and international agencies and participation by people from many different disciplines, such as road engineers, motor vehicle designers, law enforcement officers and health professionals and community groups.

- Vision Zero in Sweden and the sustainable safety programme in the Netherlands are examples of good practice in road safety. Such good practice can also have other benefits. It can encourage healthier lifestyles involving more walking and cycling and can reduce the noise and air pollution that result from motor vehicle traffic. Colombia is an example of a developing country that is beginning to implement a similar strategy.
- The important role that public health can play in the prevention of road traffic injuries includes: the collection and analysis of data in order to demonstrate the health and economic impact of road traffic crashes; research on risk factors; the implementation, monitoring and evaluation of interventions; the delivery of appropriate primary prevention, care and rehabilitation for injured people; and advocacy for greater attention to the problem.

Road traffic crashes are predictable and can be prevented. Many high-income countries have shown sharp reductions in crashes and casualty numbers over the past couple of decades. This has been achieved by adopting a systems approach to road safety that emphasizes environment, vehicle and road user interventions, rather than solely focusing on direct approaches aimed at changing the behaviour of road users. Although solutions for low-income and middle-income countries may differ from those that have a longer history of motorization, some basic principles are the same. These include, for example, good road design and traffic management, improved vehicle standards, speed control, the use of seat-belts and the enforcement of alcohol limits. The challenge is to adapt and evaluate existing solutions, or else create new solutions in low-income and middle-income countries.

Transferring and adapting some of the more complex measures are more long-term goals and require country-specific research and development. In addition, more work is called for in all countries to find new and better road safety measures. For example, provision of safer fronts on new designs of motor vehicles is urgently needed to reduce the harm caused in vehicle collisions with pedestrians and cyclists.

**BOX 5.1****Actions for road safety****What governments can do***Institutional development*

- Make road safety a political priority.
- Appoint a lead agency for road safety, give it adequate resources, and make it publicly accountable.
- Develop a multidisciplinary approach to road safety.
- Set appropriate road safety targets and establish national road safety plans to achieve them.
- Support the creation of safety advocacy groups.
- Create budgets for road safety and increase investment in demonstrably effective road safety activities.

*Policy, legislation and enforcement*

- Enact and enforce legislation requiring the use of seat-belts and child restraints, and the wearing of motorcycle helmets and bicycle helmets.
- Enact and enforce legislation to prevent alcohol-impaired driving.
- Set and enforce appropriate speed limits.
- Set and enforce strong and uniform vehicle safety standards.
- Ensure that road safety considerations are embedded in environmental and other assessments for new projects and in the evaluation of transport policies and plans.
- Establish data collection systems designed to collect and analyse data and use the data to improve safety.
- Set appropriate design standards for roads that promote safety for all.
- Manage infrastructure to promote safety for all.
- Provide efficient, safe and affordable public transport services.
- Encourage walking and the use of bicycles.

**What public health can do**

- Include road safety in health promotion and disease prevention activities.
- Set goals for the elimination of unacceptable health losses arising from road traffic crashes.
- Systematically collect health-related data on the magnitude, characteristics and consequences of road traffic crashes.
- Support research on risk factors and on the development, implementation, monitoring and evaluation of effective interventions, including improved care.
- Promote capacity building in all areas of road safety and the management of survivors of road traffic crashes.
- Translate effective science-based information into policies and practices that protect vehicle occupants and vulnerable road users.
- Strengthen pre-hospital and hospital care as well as rehabilitation services for all trauma victims.
- Develop trauma care skills of medical personnel at the primary, district and tertiary health care levels.
- Promote the further integration of health and safety concerns into transport policies and develop methods to facilitate this, such as integrated assessments.
- Campaign for greater attention to road safety, based on the known health impact and costs.

**What vehicle manufacturers can do**

- Ensure that all motor vehicles meet safety standards set for high-income countries – regardless of where the vehicles are made, sold or used – including the provision of seat-belts and other basic safety equipment.
- Begin manufacturing vehicles with safer vehicle fronts, so as to reduce injury to vulnerable road users.
- Continue to improve vehicle safety by ongoing research and development.
- Advertise and market vehicles responsibly by emphasizing safety.

**BOX 5.1 (continued)****What donors can do**

- Highlight the improvement of road safety outcomes as a global development priority.
- Include road safety components in grants for health, transport, environmental and educational programmes.
- Promote the design of safe infrastructure.
- Support research, programmes and policies on road safety in low-income and middle-income countries.
- Make funding for transport infrastructure projects conditional on the completion of a safety audit and any follow-up required.
- Set up mechanisms to fund the sharing of knowledge and the promotion of road safety in developing countries.
- Facilitate safety management capacity building at regional and national levels.

**What communities, civil society groups and individuals can do**

- Encourage governments to make the roads safe.
- Identify local safety problems.
- Help plan safe and efficient transport systems that accommodate drivers as well as vulnerable road users, such as bicyclists and pedestrians.
- Demand the provision of safety features, such as seat-belts, in cars.
- Encourage enforcement of traffic safety laws and regulations, and campaign for firm and swift punishment for traffic offenders.
- Behave responsibly by:
  - abiding by the speed limit on roads;
  - never driving when over the legal alcohol limit;
  - always wearing a seat-belt and properly restraining children, even on short trips;
  - wearing a crash helmet when riding a two-wheeler.

There are many proven science-based interventions, as well as promising strategies still under study. Governments can make use of these to develop effective and cost-effective road safety programmes. With properly targeted investment, countries should derive considerable social and economic benefits from reduced road traffic deaths, injuries and disabilities.

**Recommended actions**

This report offers governments the opportunity to assess the current status of road safety in their country, review policies and institutional arrangements and capacity, and take appropriate actions. All the following recommendations should be addressed across a wide range of sectors and disciplines if they are to achieve success. However, the recommendations should be treated as flexible guidelines. They leave much room for adaptation to local conditions and capacities.

In certain low-income and middle-income countries with limited human and financial resources, it may be difficult for governments to apply some of

these recommendations on their own. In these circumstances, it is suggested that countries work with international or nongovernmental organizations or other partners to implement the recommendations.

**Recommendation 1: Identify a lead agency in government to guide the national road traffic safety effort**

Each country needs a lead agency on road safety, with the authority and responsibility to make decisions, control resources and coordinate efforts by all sectors of government – including those of health, transport, education and the police. This agency should have adequate finances to use for road safety, and should be publicly accountable for its actions.

Experience across the world has shown that different models can be effective in road safety and that each country needs to create a lead agency appropriate to its own circumstances. The agency might take the form, for example, of a designated, stand-alone bureau, or a committee or cabinet representing several different government agencies. It might also be

part of a larger transport organization. The agency might undertake much of the work itself or else it might delegate work to other organizations, including provincial and local governments, research institutes or professional associations.

Specific efforts should be taken by the agency to engage all significant groups concerned in road safety, including the wider community. Awareness, communication and collaboration are key to establishing and sustaining national road safety efforts.

National efforts will be boosted if one or more well-known political leaders can actively champion the cause of road safety.

### **Recommendation 2: Assess the problem, policies and institutional settings relating to road traffic injury and the capacity for road traffic injury prevention in each country**

An important element in dealing with road safety is ascertaining the magnitude and characteristics of the problem, as well as the policies, institutional arrangements and capacity within the country to deal with road traffic injuries. This includes an understanding not only of the volume of traffic deaths, injuries and crashes, but also of which road users are most affected; in which geographic areas the greatest problems are found; what risk factors are contributing; what road safety policies, programmes and specific interventions are in place; what institutional structures are addressing the road traffic injury problem; and what their capacity is. Intermediate outcome measures – such as mean speeds, rates of seat-belt wearing, and rates of helmet wearing – can also be useful and can be obtained through simple surveys.

Possible sources of data include: police; health ministries and health care settings; transport ministries; insurance firms; motor vehicle manufacturing companies; and government agencies collecting data for national planning and development. However, the accuracy, consistency and thoroughness of these data should be assessed before making use of them.

Information systems on road traffic deaths and injuries should be simple and cost-effective to implement, appropriate to the skill levels of the staff using them, and consistent with national and

international standards.

Standards that could be easily and profitably adopted include: the use of the 30-day traffic fatality definition; the International Statistical Classification of Diseases and Related Health Problems; the International Classification of External Causes of Injury (ICECI); and the injury surveillance and survey guidelines developed by WHO and its collaborating centres.

Data should be widely shared among the relevant authorities and concerned groups, particularly those responsible for traffic, law enforcement, health and education.

The economic impact of road traffic injuries in most countries is substantial. Where this is possible, assessing the direct and indirect economic costs of road traffic injuries, in particular relative to gross national product, can help increase awareness of the scale of the problem.

A lack of data, though, should not dissuade governments from beginning to implement many of the other recommendations made in this report.

### **Recommendation 3: Prepare a national road safety strategy and plan of action**

Each country should prepare a road safety strategy that is multisectoral – involving agencies concerned with transport, health, education, law enforcement and other relevant sectors – and multidisciplinary – involving road safety scientists, engineers, urban and regional planners, health professionals and others. The strategy should take the needs of all road users into account, particularly vulnerable road users, and should be linked to strategies in other sectors. It should involve groups from government, the private sector, nongovernmental organizations, the mass media and the general public.

A national road safety strategy needs to set ambitious but realistic targets for at least five or ten years. It should have measurable outcomes and sufficient funding to develop, implement, manage, monitor and evaluate actions. Once the road safety strategy is prepared, a national action plan, scheduling specific actions and allocating specific resources, should be developed.

#### Recommendation 4: Allocate financial and human resources to address the problem

Well-targeted investment of financial and human resources can reduce road traffic injuries and deaths considerably. Information from other countries on their experience with various interventions can help a government in assessing the costs against the benefits of specific interventions and set priorities based on which interventions are likely to be the best investment of scarce financial and human resources. Similar cost–benefit analyses of possible interventions in other areas of public health can help set overall government priorities for expenditure on public health.

Countries may have to identify potential new income sources to afford the investment needed to achieve road safety targets. Examples include fuel taxation, road and parking charges, vehicle registration fees and fines for traffic violations. Area-wide safety assessments, at the proposal stage of projects that may influence road safety, and safety audits, as projects are carried through to completion, can help make optimal use of limited resources.

Many countries do not have the human resources required to develop and implement an effective road safety programme and therefore need to develop these resources. Appropriate training programmes should be a priority. Such training should cover specialist fields – such as statistical analysis, road design and trauma care – as well as fields cutting across disciplines – such as urban and regional planning, policy analysis and development, road traffic planning and health planning.

WHO is currently developing a curriculum for teaching the prevention of road traffic injury in schools of public health and other settings. Several international networks, including the Injury Prevention Initiative for Africa and the Road Traffic Injury Network, currently provide training, as do many schools of public health and engineering.

International conferences – such as the World Conferences on Injury Prevention and Safety Promotion, the International Conferences on Alcohol, Drugs and Traffic Safety (ICADTS), the conferences of the International Traffic Medicine Association (ITMA) and the congresses of the World Road

Association (PIARC) – provide opportunities to exchange knowledge, establish networks and potential partnerships, and strengthen country capacity.

Efforts should be made to increase attendance by representatives from low-income and middle-income countries at these conferences and to involve them in setting global and regional agendas for road safety.

#### Recommendation 5: Implement specific actions to prevent road traffic crashes, minimize injuries and their consequences and evaluate the impact of these actions

Specific actions are needed to prevent road traffic crashes and to minimize their consequences. These actions should be based on sound evidence and analysis of road traffic injuries, be culturally appropriate and tested locally, and form part of the national strategy to address the problem of road crashes (see Box 5.2).

Chapter 4 discussed road safety interventions in detail, in particular, their effects on reducing the frequency and severity of crashes, as well as their cost-effectiveness, where data were available. No standard package of interventions is suitable for all countries. However, all countries can follow several good practices, including:

- incorporating as a long-term goal, safety features into **land-use and transport planning** – such as the provision of shorter and safer pedestrian and bicycle routes and convenient, safe and affordable public transport – and **road design**, including controlled crossings for pedestrians, rumble strips and street lighting;
- setting and enforcing **speed limits** appropriate to the function of specific roads;
- setting and enforcing laws requiring **seat-belts** and **child restraints** for all motor vehicle occupants;
- setting and enforcing laws requiring riders of bicycles and motorized two-wheelers to wear **helmets**;
- setting and enforcing **blood alcohol concentration limits** for drivers, with random breath testing at sobriety checkpoints;



**BOX 5.2****The Costa Rican experience of promoting road safety**

Costa Rica has a population of around 4 million, some 900 000 vehicles and a road network of 29 000 km, 9000 km of which are surfaced. Only 20% of the surfaced roads are in a satisfactory state of repair.

In Costa Rica, traffic crashes and their consequences are clearly a public health problem. They are the leading cause of violent deaths, the leading cause of death in the 10–45 years age group, and the third leading cause of years of life lost due to premature death. The cost to the country of traffic crashes amounts to almost 2.3% of gross domestic product.

Because of the seriousness and complexity of the road safety problem, a set of coordinated interventions, cutting across many sectors and disciplines, has been formulated. The National Road Safety Council, attached to the Ministry of Public Works and Transport, has been in existence for 23 years. A national road safety plan, aimed at reducing the mortality rate by 19% during the period 2001–2005, is being implemented, providing for action in the fields of traffic laws, police surveillance, education, infrastructure and research.

**Traffic laws and police surveillance**

The law has been changed so as to better protect pedestrians, and new laws have been introduced making the wearing of safety-belts by drivers and passengers compulsory. The police have stepped up operations to check for excess alcohol among drivers, to control speeding and to check on the wearing of seat-belts.

**Education**

Ongoing campaigns emphasize the importance of observing speed limits and wearing seat-belts, and discourage drinking and driving, in support of police enforcement campaigns. Special campaigns take place during the Easter week, when large numbers of people take to the roads. A specific safety campaign is aimed at pedestrians. The medical examination that drivers require has been updated and strengthened.

Within primary and secondary schools at all levels, the national plan provides for educational modules on road safety.

**Infrastructure**

Under Costa Rica's road safety plans, new infrastructure is being put in place to protect vulnerable road users, including pedestrian bridges, cycle tracks, and protective railings and pavements along dangerous portions of roads. New and better road signs and traffic lights are being installed.

**Research**

Systematic data on road traffic crashes and on the victims of crashes are compiled. Studies are also under way nationally on a range of issues, including:

- the safety of road travel to and from schools;
- risk behaviour among drivers and pedestrians;
- the wearing of safety-belts;
- the vulnerability of road users visiting health centres;
- safety audits of roads, and the identification of high-risk crash sites;
- the financial costs and economic consequences of traffic crashes.

- requiring **daytime running lights** for two-wheeled vehicles (the use of daytime running lights on four-wheeled vehicles should also be considered);
- requiring that motor vehicles be **designed for crashworthiness** to protect the occupants, with efforts to expand this concept to the design of the fronts of motor vehicles, so as to protect pedestrians and cyclists;
- requiring new road projects to be subject to a **road safety audit**, by a road safety specialist independent of the road designer;

- managing existing **road infrastructure** to promote safety, through the provision of safer routes for pedestrians and cyclists, traffic-calming measures, low-cost remedial measures and crash-protective roadsides;
- strengthening all links in the **chain of help for road crash victims**, from the crash scene to the health facility (for example, specific groups, such as commercial vehicle drivers, most likely to be first on the scene of crashes, might be provided with basic training in first aid, and health professionals might be provided with specialized training in trauma care);
- enhancing programmes of law enforcement with **public information and education** campaigns (for example, on the dangers of speeding or driving while under the influence of alcohol, and the social and legal consequences of doing so).

### Recommendation 6: Support the development of national capacity and international cooperation

The world faces a global road safety crisis that has not yet been fully recognized and that will continue to grow unless appropriate action is taken. International organizations – including United Nations agencies, nongovernmental organizations and multinational corporations – and donor countries and agencies have important roles to play in addressing this crisis and strengthening road safety around the world.

Dedicating World Health Day 2004 to road safety is one step WHO is taking in this direction. Beyond this, the donor community urgently needs to dedicate more of its resources to helping low-income and middle-income countries improve road safety. Currently, the level of support given to road safety is far below that for other health problems of comparable magnitude. Few multilateral donors have included road safety among their priority areas for funding. With some exceptions, such as the FIA, Volvo and Rockefeller Foundations, few foundations to date have provided significant funding for international road safety programmes.

Several global and regional United Nations or intergovernmental agencies are active in road safety. Although there have been joint efforts, little coordinated planning between these agencies takes place on any large scale. In addition, no lead agency takes responsibility for ensuring that such coordinated planning takes place. This situation must change so that responsibility is clearly assigned, specific roles are allocated to specific agencies, duplication is avoided and a firm commitment is forthcoming to produce and implement a global plan for road safety.

There first needs to be a forum where those involved can meet and discuss the development of such a global plan. The plenary meeting of the United Nations General Assembly taking place on 14 April 2004 is a milestone in this direction. A follow-up process, though, is needed. This process should include regular meetings of relevant government ministers so as to develop and endorse a global plan of action or charter for road safety, consistent with other global initiatives such as the Millennium Development Goals.

Finally, international nongovernmental organizations and the private sector can help raise awareness locally and globally, as committed citizens, employers and socially responsible corporate entities.

### Conclusion

This report attempts to contribute to the body of knowledge on road safety. It is hoped that it will inspire and facilitate increased cooperation, innovation and commitment to preventing road traffic crashes around the world.

Road traffic crashes are predictable and therefore preventable. In order to combat the problem, though, there needs to be close coordination and collaboration, using a holistic and integrated approach, across many sectors and many disciplines.

While there are many interventions that can save lives and limbs, political will and commitment are essential and without them little can be achieved. The time to act is now. Road users everywhere deserve better and safer road travel.