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Road traffic accidents in developing countries

Report of a
WHO Meeting

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CONTENTS

	Page
1. Introduction.....	6
2. Road safety and transport policy development.....	8
2.1 Formulation and implementation of policy.....	8
2.2 Resource allocation.....	8
3. Development and improvement of national reporting systems.....	9
3.1 Need for data collection and its objectives.....	9
3.2 Data management.....	10
4. Behaviour and education.....	12
4.1 Behavioural research.....	12
4.2 Safety education for the young.....	12
5. Screening and training.....	13
5.1 Driving tests.....	13
5.2 Medical fitness to drive.....	14
6. The road environment.....	15
6.1 Construction and maintenance of roads.....	15
6.2 Road use in developing countries.....	15
7. Safety factors in the design of vehicles.....	16
7.1 Design standards.....	16
7.2 Vehicle testing.....	17
8. Appropriate technology for protection against injuries.....	18
8.1 Injury prevention.....	18
8.2 Support from the health sector in preventing road injuries.....	19
8.3 Research.....	20
9. Alcohol and other drugs.....	20
9.1 Role of alcohol.....	20
9.2 Role of drugs.....	21
9.3 General policy formulation.....	22
10. Legislation and enforcement.....	22
10.1 Relevance of national legislation.....	22
10.2 Principles for formulation and enforcement of legislation.....	24
10.3 International coordination and support.....	24
11. Organization and management of road safety programmes.....	25
11.1 Fragmentation of responsibility.....	25
11.2 Responsibility for action.....	26
11.3 National council for policy formulation and implementation.....	26
12. The role of public health authorities.....	27
12.1 Primary care of the injured.....	27
12.2 Management of accident prevention.....	28
13. International cooperation.....	28
Acknowledgements.....	29
Annex 1. List of participants.....	30

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent data collection procedures and the use of advanced analytical techniques to derive meaningful insights from the data.

3. The third part of the document focuses on the role of technology in data management and analysis. It discusses how modern software solutions can streamline data collection, storage, and processing, thereby improving efficiency and accuracy.

4. The fourth part of the document addresses the challenges associated with data management, such as data quality, security, and privacy. It provides strategies to mitigate these risks and ensure that the data remains reliable and secure throughout its lifecycle.

5. The fifth part of the document concludes by summarizing the key findings and recommendations. It stresses the importance of continuous monitoring and improvement of the data management process to adapt to changing organizational needs and market conditions.

ROAD TRAFFIC ACCIDENTS IN DEVELOPING COUNTRIES

Report of a WHO Meeting

A WHO International Conference on Road Traffic Accidents in Developing Countries was convened in Mexico City, at the invitation of the Government of Mexico, from 9 to 13 November 1981. The President of Mexico, Mr José López Portillo, presided at the inaugural ceremony. The opening addresses were delivered by Dr Mario Calles López Negrete, the Secretary of Health of Mexico, and Dr H. R. Acuña, the Director of the Pan American Sanitary Bureau who, on behalf of the Director-General of WHO, thanked the Government of Mexico for its support in the preparation of the Conference.

Since the Nineteenth World Health Assembly in 1966, WHO has had a growing concern for the public health problem of road traffic accidents. Its initial programme concentrated on the developed regions of the world, but the disproportionate growth of the problem in developing countries has also given rise to concern. This newly emerging public health problem has been discussed on several occasions at the World Health Assembly, particularly in 1976 when WHO was requested to devote attention to the question and develop a specific programme for the prevention of road traffic accidents.¹

The objectives of the Conference were:

- to exchange experience and information on the nature of road accident problems in developing countries and to identify the various areas of concern;
- to consider to what extent methods developed for the prevention of road traffic accidents in developed countries can help in the formulation and implementation of measures appropriate to the requirements of developing countries;
- to promote awareness among governments of the public health consequences of road traffic accidents and to encourage interested

¹ *Handbook of resolutions and decisions of the World Health Assembly and the Executive Board*, Volume II, fifth edition, Geneva, World Health Organization, 1983 (Resolution EB57.30, p. 74).

authorities to implement desirable countermeasures, with special reference to the health aspects of the problem; and
—to define basic principles for the formulation of road safety policies at national and international levels.

1. INTRODUCTION

Throughout the world, the growth of transport systems has been—and continues to be—a key element in economic development. In both developed and developing countries, increases in gross national product are accompanied by greater movement of people and goods, and greater investment in both vehicles and transport infrastructure. In the developing world, current trends in population, industrialization, and urbanization are putting heavy pressures on transport networks in general, and on road systems in particular.

Some of the unwanted side-effects of this growth in traffic, such as congestion, noise, and pollution, are well documented and immediately obvious to the individual citizen; others, such as the growing numbers of deaths and injuries from road traffic accidents, are apparent only through aggregated statistics. These reveal a serious and growing problem, with absolute fatality and casualty figures rising rapidly in the majority of developing countries, and with death rates (relative to either population or numbers of vehicles) considerably higher than in the developed world.

The Conference commended WHO for its concern with this growing threat to public health, and for extending its activities from the developed countries of the world to encompass all the WHO regions. The Mexico Conference was the first WHO international conference on road traffic accidents in developing countries and as such it marked an important milestone in attempts at the international level to combat the problem.

The Conference recalled the wider aims of the WHO strategy for health for all by the year 2000, with its goal of the attainment of a level of health for all the world's citizens which would permit them to lead socially and economically productive lives. It considered a concern for road safety to be entirely consistent with these aims, bearing in mind the disproportionate number of young people involved in road accidents and the general nature and severity of the injuries and residual disabilities which stemmed from them. The

growing burden on the health services diverted scarce resources of skilled manpower and equipment, and humanitarian considerations apart, there was an overall economic loss to the community which demanded attention.

In framing its general recommendations, the Conference recognized each country's unique position with regard to the nature and extent of its traffic accident problem. Although countries can learn from each other, this does not remove the need for each one to examine its problems comprehensively, assess its national priorities, determine the demand for resources implied by accident prevention programmes, and judge that demand against the likely benefits of implementing those programmes. Professionals in the field should cooperate and collaborate, acting through institutions to ease the formulation of national road safety plans and policies. Such plans should be publicly discussed and understood, their demands on trained manpower and other scarce resources determined, and estimates made of the economic and other benefits likely to flow from their implementation. There is a clear and important role for applied research to guide, monitor, and assess road safety policies.

The Conference also recognized that the developed countries had several decades of experience in road safety matters, and had a considerable volume of research and practical experience. It was, however, critical of the unthinking transfer of methods and potential countermeasures to the developing countries where physical, social, and cultural conditions were usually very different. Failure to appreciate and cater for these differences could nullify the effects of traditional countermeasures and even, under certain circumstances, worsen the existing situation. It was important for developing countries to consider carefully their individual positions on the scale of increasing motorization and their individual — and usually unique — conditions, and use whatever the developed world had to offer that was appropriate and potentially useful. This was a theme which ran through all the discussions on various aspects of road safety, and it was recognized that it provided both an opportunity and a challenge to the objective and rational analysis of the problems and their solution. As in many other areas, professional "common sense" and conventional political judgement would play a role in the development of practical road safety measures, but it was more than usually important to adopt a scientific approach in proposing and evaluating actual policies. Intuition and common sense could, by themselves, too easily prove to be both misleading and expensive.

2. ROAD SAFETY AND TRANSPORT POLICY DEVELOPMENT

2.1 Formulation and implementation of policy

The improvement of safety on roads should not be considered as a purely technical exercise. It involves so many different sectors—government, industry, consumers, voluntary organizations—that it needs a political commitment at the highest level to ensure that the protection of users of the transport system against accident and injury is not subordinated to economic interests. Consequently, it is essential that road safety be an integral part of all transport development policy from the first step of its formulation.

In many instances the health authorities will have a fundamental responsibility to ensure the commitments of their governments to the formulation of national comprehensive road safety policies and to the implementation of these policies through the active involvement of all relevant technical and socioeconomic sectors.

2.2 Resource allocation

There is a common conviction that the reduction of traffic accidents and the alleviation of their consequences do not attract an equitable share of resources in any country. There are many reasons for this, but among them it is possible to list:

- the ignorance of politicians of the national burden imposed by road traffic accidents;
- the lack of a safety lobby;
- the lack of a major vested economic interest;
- the attitude of the public at large; and
- the inadequacy of the structure of public sector organizations to provide a focus for the problem.

The cost of a road traffic accident is widely spread, and it does not touch all individuals in an identifiable way as does a reduction of their mobility. The cost of travel is a phrase which in most people's minds does not include the risk of an accident, since they believe they are masters of their own fate.

It is therefore possible to draw some broad conclusions. First, the professions involved should recognize that their obligations extend

beyond their particular profession, and that there is a need for a professional lobby to:

- frame the case for greater investment;
- demonstrate its efficient use;
- devise ways in which to create a vested commercial interest in accident reduction;
- energetically promote the professional view within government departments, through professional institutions; and
- lobby governments to create a better organizational structure.

Secondly, the international organizations should use their influence and their resources to support these efforts, through dissemination, demonstration, and research.

The Conference saw the need for more information on the social and economic impact of road accidents, and the use of this information in major investment decisions in both transport and highway projects and the health services, including rehabilitation services. This would be essentially at the national or regional level, but at the global level there could be a role for WHO as a clearing-house or resource centre for information, or as a major provider of health-related data to one of the established transport data networks, such as the OECD International Road Research Documentation (IRRD) scheme. At the same time, when analysed and interpreted correctly, national data could be of use at the community level.

3. DEVELOPMENT AND IMPROVEMENT OF NATIONAL REPORTING SYSTEMS

3.1 Need for data collection and its objectives

It is sometimes remarked that the advanced countries of the world are moving into the “information society”, where information will be a more fundamental resource than agriculture or manufacture. Whether this is true or not, the Conference acknowledged that information was central to the whole question of a rational, scientific approach to the problems of road safety. Without adequate data sources and facilities for data collection, analysis and interpretation, there could be no efficient countermeasures, evaluations, strategies, and—perhaps most importantly—no clear case to put to national

policy-makers charged with allocating scarce resources to different sectors of the economy.

The objectives of data collection systems were seen to be:

- to monitor the overall national accident picture and the background data on traffic flows, traffic composition, population, etc., against which it had to be set;
- to monitor changes over time, particularly details of the accidents themselves, the injuries produced, and any residual disabilities;
- to provide norms and deviations from those norms, as indicators of particular problem areas or of incipient new problems;
- to provide information to *all* interested policy-making parties—the police, judiciary, legislators, traffic engineers, transport planners, health authorities, researchers (including epidemiologists), education authorities, insurance companies, and even banks;
- to provide the basis for both accident costing (economic and social) and the assessment of the benefits flowing from remedial measures; and
- to monitor the overall effectiveness of remedial measures, be they in the field of engineering, education, legislation, or health.

3.2 Data management

3.2.1 Techniques

Many of the bodies mentioned above collect and use data of which only a part is relevant to safety. Recent progress in electronic handling and storage of data means that for many developing countries, especially those that are industrializing, these techniques could offer the possibility of establishing a data network. The scale of the network would vary from country to country, but the basic principle holds for all. The health authorities could assist by coordinating and establishing such networks, and the Conference called upon WHO and the major aid agencies to be prepared to advise and assist developing countries in establishing data collecting and sharing systems.

The ideal basic accident reporting system would include information on:

- the physical circumstances of the accident, reported objectively with no attempt to guess at the cause;

- the features of the vehicle(s) involved and their movements;
- the characteristics (age, sex, etc.) of the road users involved;
- the nature and severity of the initial injuries sustained, and subsequent evolution; and
- related health data, such as the use of alcohol or drugs, and the general state of health of the road users involved.

3.2.2 *Police records*

The police have a statutory duty in many countries to investigate road traffic accidents, for legal as well as preventive purposes, and the Conference agreed that data collection systems should recognize this and take police records as their starting point. An important corollary of this was that training of individual police officers in accident reporting and providing them with suitable tools for the job were priority tasks.

3.2.3 *Standardization of terminology*

The second major input on health and injuries had to come from health sources, and the Conference urged that linkages be forged between the police and medical authorities at local and national levels. It put considerable emphasis on the value of analysing accident and injury data together, and called for more uniformity in the definitions of death as a result of an accident and severity of injury. For the former, a United Nations' definition was recommended,¹ while for the latter, further studies at the regional level should be conducted to clarify the matter. Many of the present systems, such as the Abbreviated Injury Scale,² were felt to be too sophisticated and complex for satisfactory use in developing countries, and simple proxy measures, such as length of stay in hospital (for injury severity) and the need to tow away vehicles (for non-injury accident severity) should be explored.

¹ In *Statistics of road traffic accidents in Europe*, Vol. XXV. New York, United Nations, 1979, the term "killed" (in a road traffic accident) is defined as: "Any person who was killed outright or who died within 30 days as a result of the accident."

² *The Abbreviated Injury Scale*, 1980 revision. Morton Grove, IL, American Association for Automotive Medicine, 1980.

4. BEHAVIOUR AND EDUCATION

4.1 Behavioural research

The Conference heard evidence from developed countries, based on detailed analysis of accidents, that behaviour of road users was the major contributory factor in the majority of accidents (behaviour in this context being voluntary actions taken under conditions of relatively free choice—such as observance of signs, choice of speed, and decisions on when to overtake or cross the road). Behavioural investigation could reveal important lessons for preventive measures, if it was directed to:

- observing the way road users responded to situations or events;
- discovering how these responses might change through training, enforcement or, more directly, through changes to the physical environment;
- predicting behaviour in a given environment and set of circumstances; and
- helping to identify the most appropriate investment which could modify behaviour for the better.

The Conference accepted that developed countries tended to equate changes in behaviour with education and enforcement, but suggested that it was more likely in developing countries that relatively simple changes in highway engineering might reduce or eliminate risk-taking behaviour.

Many of the basic mechanisms—such as visual perception—involved in driving a vehicle had been thoroughly researched and, while there would always be outstanding problems, these findings could probably be transferred with confidence to road users in developing countries. What could not be transferred was the ultimate response, depending as it did on basic attitudes, such as a deep faith in the protection of magic or fatalistic perceptions of death and injury. A close understanding and sympathy with local cultures and conditions was required to harness these forces in training, rehabilitation, and education schemes to induce better behaviour.

4.2 Safety education for the young

The Conference noted that developing countries had large and growing populations of young people, and suggested that this

pointed to the importance of safety education for the young. It saw opportunities for the rudiments of safe behaviour to be included in basic health programmes, utilizing the methods of working and the concepts outlined in WHO's seminal documents on primary health care.¹ Again, basic teaching principles—such as the use of appropriate methods for a given age group—probably apply throughout the world, although the content and approach would vary dramatically according to cultural and environmental differences. Formal training in road safety matters was best given to children of school age as part of the general curriculum.

The Conference called for high priority to be given to improving the framework for educating and training all road users in safe behaviour, with particular attention to the young. It repeated its warning that great care should be taken in transferring training methods from one country to another and in modifying any training and educational programmes originally devised in and for a different environment. The development of indigenous programmes should be encouraged.

5. SCREENING AND TRAINING

5.1 Driving tests

Many countries have some form of driving test but the preparations for it and the thoroughness of the test itself often leave much to be desired. The Conference noted that in many developing countries a high proportion of drivers were employed by fleet operators (public service vehicles and goods vehicles) and these offered a greater chance of improved training and rehabilitation. The Conference called for a demonstration to be prepared to show transport and haulage companies that better screening and training of their drivers could yield a positive commercial return. The authorities should be encouraged to search for new and imaginative ways in which economic pressures could be applied, bearing in mind that in very poor countries economic incentives would probably be more effective than penalties.

¹ *Alma-Ata 1978: primary health care*. Geneva, World Health Organization, 1978 ("Health for All" Series, No. 1).

The Conference heard of continuing attempts to improve the driver testing methods in developed countries and the search for behaviour-based testing methods which could be used to establish age criteria for driving licences and to exclude unsafe drivers. One such approach was to test an individual's ability to match his prediction of his performance with his actual performance in simulated driving situations, on the hypothesis that a poor correlation would be an important indicator of bad judgement (and hence poor behaviour) in real driving situations. While this and similar approaches were interesting, it was doubted whether they were yet ready for field application. Even if their validity were established, they were likely to encounter opposition from a society which increasingly regarded the use of the public highway as a basic human right. Developing countries as a whole still had considerable scope for exploiting simpler, and more direct, training and testing methods.

5.2 Medical fitness to drive

Medical screening of drivers is often used to decide whether an individual is fit to drive and hold a driving licence. The answer to this question is not unequivocal and calls for careful consideration of its scientific basis, social consequences, and use of resources. Experience from developed countries shows that for private drivers there is no scientific evidence to justify, on cost-benefit grounds, the periodic routine medical examination of drivers with a view to reducing injury-producing accidents. In addition, sudden illness resulting in loss of control of a vehicle is a relatively minor cause of accidents (about 1 per 1000). Medical examinations are also of variable predictive value, and it should not be assumed that they always provide an accurate assessment. On the basis of these considerations, developing countries, where health resources are scarce, should not require routine medical examinations of private drivers as a major accident-prevention strategy. Nevertheless, the range of health conditions or impairments which in developing countries could affect driving skills might be different from that in developed countries. A conventional public health approach should be employed to identify high-risk conditions or groups, and to give medical examinations on a selective basis, with a view to not so much disqualifying people from driving as informing them of the possible effects of a disease or impairment on their ability to drive. The case

for professional drivers is different, and stricter procedures are needed for this category.

6. THE ROAD ENVIRONMENT

6.1 Construction and maintenance of roads

The Conference recognized the strong interaction between the behaviour of road users and the road environment, and stressed the importance of consistency of experience. It called for highway engineers to design and build roads that avoided ambiguous and unexpected situations. There should be a discernible hierarchy in the road system so that drivers and others could recognize the type of road being used and experience no unusual or sudden deviations from their expectation. This principle of consistency should also apply to intersections, to highway furniture, to signing and signalization, to the provision of services, and to the control of maintenance and repair works. The increasing development of international highway networks and the growth in international travel have made the issue of highway engineering a global or regional one, rather than merely national. Consistency of experience implies a need for harmonization, and this is particularly necessary between countries where there is a large interchange of migrant workers and tourists.

It was acknowledged that these ideals were harder to meet in developing countries where, in addition to the basic lack of resources, lower traffic volumes often made it difficult on economic grounds to justify high design standards. The various investment models that balanced capital and maintenance costs against user cost savings paid little, if any, attention to the benefits of accident reduction. The Conference encouraged attempts to increase awareness of the probable safety benefits from better highway standards, and to incorporate these in the decision-making processes of transport planners and highway designers.

6.2 Road use in developing countries

Much of the basic physics and engineering of road design was well understood and accepted, and there was no need for the fundamentals to be re-researched in the developing world. The Conference, however, was critical of the unthinking importation into developing countries of standards and methods from developed countries, in

ignorance of the likely effects on road safety. In rural areas of developing countries, highways were often built to cater for high-speed traffic with little thought given to the needs and problems of other road users, such as pedestrians and animals. In urban areas, there was little appreciation of the wide range of vehicles, people, and animals competing for the limited road space; tractor-trailers, bullock-carts, bicycles, autorickshaws, hand-carts, motorcycles—all had their own needs and safety problems which had to be taken into account in pursuing traffic control and traffic management improvements.

6.2.1 *Segregation*

The value of segregating certain classes of road user was recognized and the Conference recommended that segregation should be introduced whenever possible, particularly of motorized vehicles and pedestrians. Ribbon development and the encroachment of pedestrian (or other) activity onto the highway should be controlled as firmly as possible, although the Conference did not underestimate the practical difficulties of doing this.

6.2.2 *Low-cost improvements*

The use of low-cost engineering improvements to the highway—better marking, channelization, signing, junction improvements, etc.—was seen as an important investment which should pay high dividends in affecting the behaviour of drivers and other road users in developing countries. The Conference recommended that international organizations should be encouraged to give the development and use of such improvements high priority, and encouraged national authorities to do the same. The benefits provided by such measures should be evaluated scientifically and the results disseminated widely among the developing countries.

7. SAFETY FACTORS IN THE DESIGN OF VEHICLES

7.1 Design standards

The Conference was reminded of the wide range of vehicle types used in developing countries; at least 18 distinct classes had been

observed in one Indian city, including several types of three-wheeled vehicle with their inherent stability problems. It recognized the importance of the vehicle in both reducing accident risk and alleviating injuries in the event of an accident, and noted that the traditional designs of private cars and goods vehicles had evolved through the efforts of relatively few experts in developed countries to meet the standards and requirements of the developed world. The implicit assumptions about road conditions, servicing, etc., inherent in this process were not valid for many of the developing countries which imported such vehicles; the Conference felt there was a case for encouraging developing countries to influence design standards to meet local safety priorities, such as the protection of pedestrians.

There was an appreciation of the fact that some standards necessarily had to wait until the national economy could afford them, but the Conference shared the doubts already expressed by WHO in the context of primary health care that economic growth alone would bring in its wake a solution to the problems. It noted that individual drivers and vehicle owners make their own, often unconscious, trade-offs between mobility and safety and, although these may be right for the individual, the point at which they collectively become a burden on the national economy was reached well before individual economic circumstances enabled a change to be made.

7.2 Vehicle testing

Maintenance of vehicles of all types clearly presented major problems in developing countries, with shortages of spare parts, high prices for imported spares, allegedly inferior quality of locally manufactured substitutes, and widespread improvisation. The average lives of vehicles were typically 2-3 times those of their counterparts in industrialized countries, but it was not known whether this had a significant impact on safety. Before committing costly administrative efforts to national schemes of vehicle testing and certification, the Conference recommended that an investigation into defects in vehicles involved in accidents should be conducted to see whether its importance could be confirmed or denied.

8. APPROPRIATE TECHNOLOGY FOR PROTECTION AGAINST INJURIES

8.1 Injury prevention

In the short term, little change in accident rates can be expected in developing countries from measures aimed at promoting safe behaviour among road users. In the countries where vehicle ownership rates are in general rising rapidly, the consequences of road trauma are becoming more and more severe. Polytrauma, head injuries, or spinal cord injuries resulting in para- or quadriplegia, especially in young males, constitute an emerging type of "hard morbidity" in developing countries. These cases draw heavily on medical services, and divert increased socioeconomic resources to the care of the long-term disabilities they create. In many countries, accidents rank first or second as causes of hospital admission. Consequently, policies aimed at preventing injuries or minimizing their severity should be given high priority and introduced at the same time as other measures aimed at preventing the occurrence of the accident itself.

One of the most effective methods of preventing or reducing injury for car occupants is certainly the use of restraint systems. Numerous studies have now well documented the fact that there is no other single practical measure that offers so great a potential benefit, namely a reduction by around a half in the incidence of severe injury or death following an accident. The Conference recommended that the fitting and use of seat belts for all occupants of cars, light trucks, and similar vehicles should be mandatory. It urged that the principles of occupant restraint be applied to the many other types of vehicle used in the developing countries. It appreciated the technical and procedural problems that this would entail, bearing in mind the frequent overloading of public service vehicles and the unconventional uses to which many vehicles were put, but felt the benefits would repay the effort. Legislation was probably an essential part of the motivation necessary for the use of restraint systems, even in the absence of substantial enforcement. Special measures could be applied to the vehicles and drivers of well defined fleets, such as bus companies and state-controlled goods vehicles. The Conference also saw opportunities for a more fundamental appraisal of the overall design of unconventional vehicles, and commented that this

was an area where linkages between accident records and injury data were invaluable.

Two-wheeled vehicles play an important socioeconomic role in the developing countries. In particular, motorcycles, because of their usefulness and low cost compared with cars, are increasingly used for many different purposes and represent in most cases the first step in individual powered transport. The riders of these categories of vehicle are very vulnerable. In addition, information collected in a few developed countries suggests that a positive correlation exists between accident risk level (and injury severity) and the engine capacity of motorcycles.

For two-wheeled vehicle users, an obvious measure for protection against injury is the wearing of safety helmets, which on average reduces the risk of sustaining a head injury by 30% and of being killed by up to 40%. The Conference recommended that their use be actively promoted and that their technical development, with particular reference to comfort and function in extreme climates, be further continued.

With regard to motorcycles, it was suggested that developing countries should consider issuing standards for importing, manufacturing, or marketing engines, the size of which would be compatible with local safety requirements.

It was also recognized that there was considerable scope for promoting the use of other low-cost measures, such as the wearing of brightly coloured clothing and the use of headlights during the day. Each country should develop these low-cost technologies according to its local needs.

8.2 Support from the health sector in preventing road injuries

It was emphasized that national health authorities should be made aware of their important role in the promotion of injury protection measures. At least three areas were defined where their contribution was needed:

- promotion of studies on the epidemiology of traffic injuries, about which very little is known in developing countries;
- improvement of health reporting systems for monitoring the effects of protective measures on patterns of injury morbidity, and improved feedback to car or road designers or other relevant sectors; and

—development of health education programmes for supporting and promoting the use of seat belts, safety helmets, and other safety devices.

8.3 Research

It was acknowledged that vehicles manufactured locally in developing countries are often designed without thought to safety requirements, especially as regards their collision performance. Mention can be made, for example, of the commonly used scooter-taxis in Asia, and the trucks produced in Latin America with a chassis made of wood. It is obvious that appropriate technologies adapted to local cultural and socioeconomic settings need to be developed in the developing countries for injury protection.

Nevertheless it was stressed that research in road accidents, particularly the setting up of multidisciplinary accident investigation teams, is an expensive process. The Conference therefore recommended that an appropriate information network should be built up to facilitate the transfer of basic data and research findings from the developed world to developing countries, and that cooperative mechanisms between institutions should be established to allow for research development in developing countries at a minimum cost. Cooperation between countries in the setting up of regional or subregional research centres for the study of road accidents should also be considered.

The Conference recognized that WHO, in concert with other international bodies, has a fundamental role to play in facilitating technical cooperation between the developed and developing countries, promoting the application of research findings, and assisting in the selection of priority research areas, taking into account the very different nature of traffic characteristics and injury patterns in developing countries.

9. ALCOHOL AND OTHER DRUGS

9.1 Role of alcohol

The Conference saw the problem of the drinking and drug-taking driver as universal. With regard to alcohol there is now widespread acceptance and well documented scientific evidence of its role in impairing driving ability and in increasing the risk of an accident as

well as the severity of its consequences. The Conference took note of the current increasing consumption of alcohol in most of the countries of the world, particularly among the young. Conclusions of surveys carried out in several countries have shown that alcohol is the direct cause of 30–50% of severe road accidents and road accident fatalities. National official statistics, where they exist, greatly underestimate the involvement of alcohol in road casualties and deaths, and do not properly reflect the disastrous effect of alcohol on safety in traffic. This is particularly true for the developing countries. In view of this, and in order to provide a sound basis for action at both the technical and the political level, the Conference recommended that WHO should encourage appropriate investigations into the exact role of alcohol in causing road accidents in selected developing countries.

9.1.1 Legal limits on blood alcohol

In most of the developed countries, legislation has been adopted to control driving under the influence of alcohol. In general, enforcement is based on a maximum permissible level of alcohol concentration in the blood. There is now reliable evidence that impairment from alcohol can occur at blood alcohol levels as low as 50 mg/100 ml, and that accident risk rises significantly between 50 and 80 mg/100 ml. In addition, for similar levels, the risk of accident is higher in youngsters and elderly people. There is also evidence that the effective control of alcohol in driving is linked to the maintenance of very firm regulatory and legal measures, in addition to any other factors such as education and rehabilitation. The Conference recommended that any proposed legislation should reflect these findings. It also saw the need for simple and inexpensive methods of measuring blood alcohol concentrations in developing countries and recommended dissemination of the knowledge acquired in developed countries where reliable and simple devices are available.

9.2 Role of drugs

With regard to the role and effects of drugs, either by themselves or in combination with alcohol, the Conference noted that there was less evidence on the extent of the problem. It was nevertheless

recognized that the use of stimulants was widespread in some countries, particularly among long-distance lorry drivers who worked long and difficult hours. In general, there was a need for more studies on the role of psychotropic substances, and the Conference called for the promotion of research and collection of more information on this topic.

It was also recognized that research in this field raised, considerable methodological issues and was rather costly. In view of this, international cooperation was desirable, particularly with regard to the transfer of knowledge and technology between developed and developing countries. The Conference recommended that WHO take the lead in this endeavour and strengthen its programme accordingly.

9.3 General policy formulation

Finally it was acknowledged that road accidents and the resulting injuries were among the most important public health problems associated with the use of alcohol and drugs. Consequently, it was felt that the control of alcohol and drugs as they relate to road safety was only part of the overall control of alcohol and drug abuse, and it was recommended that public health authorities ensure coordinated action in order to integrate the road safety element in the formulation of any alcohol and drug control policies in general. It was also emphasized that even if, in developing countries, epidemiological data were still lacking on the extent of the role of alcohol in road accident causation, it could fairly be assumed that it plays a major role in many circumstances. Governments should therefore, without delay, take steps to establish relevant legislation and ensure its strict enforcement. Educational programmes to involve communities in the problem should also be implemented.

10. LEGISLATION AND ENFORCEMENT

10.1 Relevance of national legislation

In organized societies, legislation embodies codified sets of rules which state what is—and what is not—acceptable behaviour. These rules apply both to individuals and institutions, and usually incorporate penalties and sanctions to be applied if they are broken.

In that laws lead to changes in behaviour which become the foundation for future laws, legislation is a dynamic process. The Conference noted that many developing countries had inherited their legal systems from former colonial powers and recommended that such countries review their safety legislation to see if it was still appropriate to contemporary social and cultural conditions. They were encouraged to be innovative, and the Conference noted with interest the suggestion that some safety legislation should contain a self-monitoring element.

In the sense that legislation was directed to changing or controlling behaviour the Conference accepted that most traffic and transport law covered the road user directly. Thus, most countries had laws governing what should and should not be done on the road, for example, insurance requirements, procedures in the event of an accident, how licences were to be issued, the necessary conditions of fitness to control a vehicle and how such fitness should be tested, etc. The Conference recognized the latter as an area where WHO had a special contribution to make.

10.1.1 *Highway engineering*

Legislation covers many areas and can have a partial influence on aspects of the overall safety problem which may not be immediately apparent. Planning laws, affecting land use and development, can influence ribbon development and the ways in which major transport arteries penetrate local communities. Highway laws cover both the standards of design of much of the road and the furniture upon and around it and—equally important—the statutory powers of central government departments to impose such standards on local authorities and agencies. The Conference saw these as an important part of attempts to achieve some level of engineering consistency in highway networks.

10.1.2 *Standards for vehicles*

Legislation is also employed to affect the construction and use of vehicles; the first of these affects manufacturers and importers rather than the general public directly, but in the developed countries such legislation has been the means of making “built-in” safety features a legal requirement. The Conference recognized the potential value

of this approach but appreciated the difficulties of applying it successfully to the vast range of vehicle types commonly found in developing countries. The same applied to legislation on vehicle use, in countries where for economic reasons vehicles were often used for purposes other than for which they were originally designed.

10.2 Principles for formulation and enforcement of legislation

Ultimately, any successful law relies on consensus, both within the community as a whole and within the professionals and pressure groups who influence the legislators. The Conference accepted that this implied that legislation had to be clear and simple, readily understandable, acceptable, and capable of enforcement. It noted that although "misbehaviour" on the roads was technically a criminal offence in most countries, it was popularly perceived as being in a different class from serious criminal offences such as, for example, robbery with violence. The Conference endorsed the principle that punishment should be appropriate and follow conviction for a safety violation as speedily as possible; it commended the use of separate "traffic courts" but queried whether legal punishment was always the most appropriate response. As with legislation itself, the Conference urged legislators in developing countries to be innovative in their approach and, an important corollary, to share the successes and failures of their new ideas with other countries.

A distinction was made between the effectiveness of a safety measure at the individual level and its effectiveness within the community at large, where much depends on the vagaries of application or enforcement. It was suggested that developing countries should concentrate their legislative effort in areas where there was a reasonable measure of agreement on its basic effectiveness (such as rear lights on moving vehicles at night) before moving into more contentious areas.

10.3 International coordination and support

The special problems of legislation in countries with a high proportion of visiting or migrant road users were raised, and the Conference recommended that the 1968 Geneva Traffic Convention on international driving licences be universally adopted. It recog-

nized the growing regional and international movement of people and goods, and commended attempts to draft common highway codes at the regional level, even though these did not have statutory power in themselves.

In more general terms, WHO could assist countries in the drafting of national legislation on road safety since it affects road users by making available the latest recommendations of intergovernmental organizations such as the United Nations economic commissions or OECD, and by monitoring legislative trends in this field. In particular, WHO could act as a clearing-house for national health authorities responsible for health legislation in areas relevant to road safety, such as the use of alcohol and drugs by road users, and the medical screening of drivers. WHO could also play a similar role on behalf of transport authorities responsible for the areas of environmental legislation that can affect the safety of road users.

11. ORGANIZATION AND MANAGEMENT OF ROAD SAFETY PROGRAMMES

11.1 Fragmentation of responsibility

The Conference observed that responsibility for road safety matters was often spread across many government or state departments, and was the concern of many public and private bodies who, while not carrying formal responsibilities, were often involved in policy formulation and safety activities. Effort was frequently diluted and uncoordinated, and the situation was made worse by the partial nature of the commitment to road safety displayed by any given body. Thus health authorities saw road traffic accidents as just one type of accident (albeit an important one), the vehicle engineer and the traffic engineer saw them as concerning single aspects of vehicle design and good traffic management, and so on.

This dissipation of interest and commitment has frequently led to the lack of an organized safety lobby, a failure to identify a clear (and possibly vested) economic interest to give weight to investment in road safety, and a weak public sector structure often incapable of focusing attention and resources on the problem. Many developing countries had no identifiable road safety budget at all.

The Conference contrasted this situation with one in which the relevant organizations had clear-cut responsibilities or interests; a

railway or airline company, for example, placed a high value on safety investment because there were economic penalties for not doing so. Similarly, safety at work was given a high priority in some countries where an economic loss in output caused by accidents could be identified, and where additionally there was often a well organized work force pressing for legislation on safety at work, and for measures to ensure that such legislation was implemented effectively.

11.2 Responsibility for action

The Conference proposed that as few national authorities as possible should have responsibility for road safety matters, and safety should be the prime concern of one leading organization. This was particularly important in the case of organizations concerned directly with the road user, such as the police, the medical authorities, and training and educational establishments. The Conference observed that the lead in providing and maintaining the highway infrastructure (and its attendant furniture) usually rested with public works departments, whose skills were basically in engineering and construction. In some countries, separate departments were responsible for transport planning, and both these and public works departments required a close working relationship with the road safety authority, with the latter setting clear aims and objectives which the other authorities would aim to meet as economically as possible, consistent with their own aims of improving mobility. In a similar way, a separate authority charged with setting policy on vehicle standards and inspection routines should work within the general guidelines of a road safety authority.

In calling for better organizational structures, the Conference recognized that these would inevitably make demands on scarce manpower resources. Those employed by the authorities would have to be specially trained, with commensurate screening in selection, salary, and status to ensure their dedication and incorruptibility. It stressed the value of a public sector organizational structure with clearly defined responsibilities for action, and obligations for inter-departmental cooperation.

11.3 National council for policy formulation and implementation

The Conference recommended that each country should establish a national road safety council with executive powers and matching

resources, together with a national transport or road research institute whose duties under the council would include the setting up and running of data networks and the conduct of appropriate research. In support of this, within each ministry of health (or its equivalent) there should be a statistician/epidemiologist with particular responsibility for the collection of road accident casualty data and their analysis, in collaboration with the relevant transport or safety authority. The national road safety council should ensure that emergency services are built into the local organizational infrastructure, and take every opportunity to encourage interest and practical self-help within the community itself.

12. THE ROLE OF PUBLIC HEALTH AUTHORITIES

12.1 Primary care of the injured

Traditionally, public health authorities have had to deal with the ultimate consequences of the accident process, namely treating the injured and rehabilitating the disabled. It is obvious that accidents will continue to occur, and that the organization of the curative and rehabilitation services should be optimized to provide efficient treatment and promote full recovery of the injured. The increasing proportion of road accidents compared with other acute medical situations has resulted in the development of emergency care services for prompt management of road accident victims, and in some countries hospital care is now even brought to the scene of the accident by means of medically equipped vehicles. Public health authorities, in developing as well as developed countries, should give these relatively new areas of activity due attention, while bearing in mind the highly skilled manpower and sophisticated equipment they call for.

Planning, organization, and management of trauma treatment and emergency care services should be one fundamental element of the overall health planning and health services managerial process. This is a field that particularly needs the development of an appropriate technology package as defined by the Alma-Ata Conference on primary health care,¹ as well as a structured organiza-

¹ See footnote on page 13.

tion at the primary health care level. In this respect, WHO should actively cooperate with developed and, especially, developing countries to promote relevant strategies for primary emergency care and primary injury treatment.

12.2 Management of accident prevention

The role of public health authorities, however, goes far beyond injury care. Reference should be made to the principles formulated during the Alma-Ata Conference on primary health care, where it was stressed that the health sector should "... take initiatives in ensuring that all factors affecting health receive the attention they deserve as well as working closely with the other sectors involved".¹

Public health authorities should first make a clear assessment of the resources that they devote to injury care and rehabilitation in order that politicians and other policy-makers can be informed about the exact extent of the trauma epidemic. They should secondly make a thorough review of the services, programmes, and activities in the health sector that could contribute to preventing accidents or minimizing their consequences. These will include: the improvement of health reporting systems on trauma; the training of health workers at all levels in accident epidemiology; the development of health education programmes focusing on major risks, such as alcohol and drugs, or specific population groups, such as children, adolescents, or the aged; the promotion of epidemiological research on road accidents; and the formulation of relevant health legislation. Finally, public health authorities should foster intersectoral action, either by ensuring active participation in coordinating mechanisms such as interministerial committees or national road safety councils, or by promoting and taking the lead in the establishment of such mechanisms.

13. INTERNATIONAL COOPERATION

All participants in the Conference were anxious that the many ideas and suggestions presented and discussed should help WHO and other influential organizations to combat the rising toll of death

¹ See footnote on page 13.

and injury from road traffic accidents. They looked to WHO to distil the Conference's recommendations into policy guidelines, both for its own internal use and for negotiations with other international and national organizations. They looked to these organizations to use their influence and resources to support road safety initiatives, concentrating on the issues of greatest common concern which had emerged during the Conference, such as promoting and harmonizing methods of data collection and measurement, and supporting the establishment of national road safety councils. A greater awareness was also called for among donor and lending agencies on the need for road safety programmes, either in their own right or as part of larger national investments. It was strongly recommended that the United Nations should designate an "International Year for Road Safety" to increase awareness of the problem globally and to provide a focus for national programmes and activities.

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