Workshop on Development of a Feasibility Module for Road Traffic Injury Surveillance

(Supported by WHO India, Country Office)

11th -12th, July 2006

A report prepared by

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Foreword

Road traffic accidents have become a major public health problem in the last few years. India is passing through a major epidemiological transition, socio-demographic changes and technological revolution due to rapid industrialization, urbanization, economic liberalization and changing social, cultural and political situations. This has brought about a combination of communicable and non-communicable diseases to the forefront of the health care delivery system. With these changes, a number of other factors like increasing migration, large scale housing and construction activities, economic reforms and technology import have resulted in an increase in changing lifestyles of the people and there has been an alarming rise in number of injuries due to accidents, crime and violence.

Despite recent progress towards understanding the broad patterns, the precise magnitude of injury-related mortality and disability is not known. Thus, the first step towards achieving the goal of injury prevention is to provide better and more reliable data on the nature and extent of injury, the factors responsible for different types of injury and the magnitude of disability due to injuries. This data could then be used to inform policy-makers about the nature of the problem and, in turn, to argue for greater attention and allocation of more resources for prevention efforts.

It was with this objective in mind that this workshop was convened. It was able to bring together multiple agencies to discuss various issues regarding collection of road traffic injuries data. The working Groups have deliberated on the mechanism of data capture and have given recommendations to promote more scientific research on road traffic injuries. I hope these recommendations would be translated into actions for initiating preventive programs.

Prof. N.K. Ganguly
Director General

Preface

India is undergoing major economic and demographic transition coupled with increasing urbanization and motorization. Among the top ten causes of mortality in the country, Road Traffic Accident was the tenth cause two decades back. But with the increasing urban expanse and lifestyle changes, it is projected that road traffic accidents will occupy the fifth position in the list of major killers and third position among causes of disease burden in 2020. Every death is accompanied by several more that are injured and require hospitalization. Nearly 3% of our GDP is spent on the hospitalization of the accident victims.

In India, 11% of deaths due to non-communicable diseases are due to injuries and 78% of injury deaths are due to road traffic accidents. The ICMR study on "Causes of Death by Verbal Autopsy" has revealed that injuries rank among the first five major cause of death in adults. It is the leading cause of mortality for young adults less than 45 years and a major burden of disease across all age groups. Some of the factors that increase the risk of road crashes in India are unsafe traffic environment, poor road infrastructure such as traffic warning signs and encroachments that restrict safe areas for pedestrians; lack of safety engineering measures; traffic mix and an increasing number of motorized vehicles; unsafe driving behavior and lack of valid or fake driving licenses. Absence of reliable and quality information could be one of the reasons for the lack of initiatives on better road safety

measures. The existing data with the police, hospitals, insurance, and legal sectors is disintegrated and needs major revamping. The Integrated Disease Surveillance Project of the Ministry of Health and Family Welfare recognizing this problem, proposes to include the injuries module as an additional component. There is, however, a need to develop and test a model for surveillance of road traffic injuries for inclusion in the health information system.

This workshop was a step towards this objective. The participants from different sectors, directly or indirectly involved in data collection of road traffic injuries were invited to participate and deliberate on issues of data capture. These participants have discussed at length the issues of collecting information on road accidents and linking the police records. The discussions have brought forth the need for developing a simple recording system for data entry and analysis involving all the stakeholders.

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Dr. Bela Shah
Sr. Deputy Director General
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Acknowledgement

Indian Council of Medical Research has been planning to take up research on Road Traffic Accidents in its agenda for quite sometime. With the support of WHO, the Council has already conducted surveillance of non-communicable disease risk factors in six centres. Since road traffic injuries constitute a major public health threat, it was appropriate for the Council to initiate efforts to address this problem.

The WHO has once again come forward to support ICMR for this important endeavour. I express my thanks to WHO especially Dr Paramita Sudharto and Dr Cherian Varghese for supporting this activity.

I convey my gratitude to Professor Mohan for taking out his precious time to deliver the keynote address.

My sincere thanks are due to Dr Ganguly, Director General, ICMR for his sustained support for taking up this task.

I also thank Dr Bela Shah, Chief of the Division of Non-communicable diseases for her constant support and enthusiasm to hold this workshop.

I convey my gratitude to each and every participant without whom it would have been difficult to conduct this workshop.

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This activity would not have been possible without the help of the secretarial staff of the Division of NCD especially Mr P.K.Chawla. My earnest thanks to him for his assistance in overall coordination and smooth conduct of the workshop.

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Executive summary

Road Traffic Injuries (RTI) is a burgeoning public health problem the world over. Changing lifestyles and occupation, rural to urban migration in search of better livelihood, increasing population, urbanization and modern infrastructures has made man more and more dependent on motorized vehicles. In the quest for a better economy the developing world has resorted to acquiring faster means of transporting people and goods. Increasing number of vehicles coupled with haphazard city planning and unscientific road designs has resulted in making the general public vulnerable to road crashes every year.

The Indian road network is the second longest in the world covering more than 3 million kilometers. Eighty eight percent of the road length consists of village and other roads and 12% constitute major district roads. About 85% of the passenger load and 70% of the freight load is being carried on roadways daily. The uncontrolled movement of slow and fast moving vehicles leads to clashes resulting in crashes, injuries and deaths. It is estimated that in the year 2004, in India alone, nearly 1, 00,000 people were killed, 1.5 million hospitalized and about 7 million sustained minor injuries due to RTI. A recent review estimates the annual loss in India to be Rs.550 billion every year. Other available evidences from epidemiological studies have also brought to light the impact
of RTI on the national health and economy. Despite the overwhelming evidence, the government is not taking adequate steps to rein in substantive actions to reduce the problem. One reason could be that

there is lack of a national database on injuries. To understand the pattern and determinants of RTI and to provide that essential thrust for firm policy decisions it is essential to have a good quality data. There is need for a national system of collecting and analyzing Road Traffic Injuries data for making safety policies and promoting more research. This has also been a major recommendation in the World Report on Road Traffic Injury Prevention (2004). Realizing the importance of authentic data on RTI problem, the Ministry of Health and Family Welfare has included RTI as a major component in the Integrated Disease Surveillance Programme. This workshop was a major step in this direction.

A road traffic accident unlike other non-communicable diseases is a multi agency subject. It involves the participation of the transport sector, police, health sector, insurance sector, automobile manufacturers, legal sector, civic agencies and road designers. In order to get information from all these sectors it is essential in the first place to bring them all together on a common platform. The Indian Council of Medical Research which is the apex body of health research has taken a major initiative in this workshop to bring all these agencies together to discuss issues related to road traffic injury data collection, reporting, dissemination and utilization for policy. The participants discussed various issues related to RTI data capture and record linkages. The two day deliberations have brought forth the need for linking the databases from different sectors and develop a mechanism for systematic data capture system.

Workshop summary

Introduction

The UN Millennium Development Goals has been adopted by all countries as a blueprint for building a better world in the 21st century. Of the eight targeted goals 1, 2, and 4 include eradication of poverty and hunger, achieve universal primary education, and reduce child mortality. Reducing the burden of injuries would be one of the several ways of achieving these goals. Studies at family and community level have shown that road traffic injuries contribute to poverty (MDG 1) mainly because they affect predominantly young people, often the breadwinners because of the high costs of treatment and rehabilitation. Road traffic injuries are among the 15 leading causes of death for children under 5 years. We therefore need to address them if we want to significantly reduce childhood mortality rates (MDG 4). India spends 3% of its GDP on dealing with road traffic crashes, meeting the direct medical costs of treating the injured and on insurance of the accident victims. There is a need for a systematic method of road traffic data collection in our hospitals. Current data collection efforts are restricted to separate agencies and limited to their scope and collection procedures and generalizability. Thus, while the police records are good for providing number of fatalities, health records lack information on pre-hospital care, on-the spot deaths, data from intoxicated and unconscious states, injury details and e-codes. So is the case with insurance records and emergency records. Despite these limitations, the potential exists for using and linking data sources and to use

existing systems in other countries as models. This workshop was convened to explore these opportunities.

Obtaining high quality nationally representative RTI surveillance data will entail a cooperation of various agencies. Recognizing this, the Council invited speakers who represented different stakeholders interested in this area.

Objectives

1. To understand the nature of information systems from different sources and agencies.
2. To evolve a consensus of the multi-sectoral agencies on development of a comprehensive and coordinated surveillance system.
3. To draft a common protocol for data capture for RTI.

Structure

The early morning session of the first day was the inaugural session in which Dr Bela Shah, Chief of the Division of Non-Communicable Diseases welcomed all the participants. She informed the Group about the Ministry of Health's Integrated Disease Surveillance Programme to be initiated in a phased manner with the ICMR as the nodal agency for the NCD component. Recognising the importance of RTI, the Ministry has included Road Traffic Injuries as a separate component of the Programme in the 2nd phase in 2007 and that led to organising this workshop. She expected the two days debate to focus on a simple

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recording system that will cover tertiary hospitals, medical colleges, trauma centres, district hospitals and explore the possibility of linkages from the grass root level upto a sustainable reporting system, capacity building, manpower training and infrastructure building. Some of the issues on driving under the influence of alcohol, diversions during driving, legal aspects that were essential for facilitating authentic data reporting would also be discussed. The inaugural talks by the Director General, ICMR and Dr Paramita Sudharto, WHO representative from country office focussed on the role of ICMR in interconnecting the information gathered from the different agencies and putting forth for implementation. Dr D. Mohan from IIT, Delhi delivered his keynote address on the burden of RTI in India and other countries, strategies for effective prevention programmes and the need for a simple surveillance model.

The morning and afternoon sessions of the first day of the workshop were structured to address various aspects of the workshop's objectives. Five presentations from multiple stakeholders described the current knowledge and existing data collection systems and data gathering infrastructures. This was followed by presentations from injury researchers in Delhi, Bangalore, Hyderabad and Thailand on their experiences in Road Traffic injury data collection, limitations of the existing data systems including police, health, insurance and civil registration systems. Operational challenges in collecting such data were also considered. Core data requirements on determinants for understanding the nature and pattern of RTI was discussed.

Clinical issues on pre-hospital care were addressed in the morning session on the second day by Dr Mathew Varghese. He stressed the need for consensus on data elements like age, body region, mechanism of injury and co-morbidities, abbreviated injury scale and physiological parameters, level of consciousness, haematological/biochemical parameters and time variables. This type of data was essential to communicate between technocrats and politicians to mobilize public action. Dr Bela Shah invited discussions on the need for data collection on the type of roads, type of vehicles and age of the road accident victims, type of road users and the risk factors.

Workshop participants met in two working Groups in the evening session to consider appropriate methods of linking various agencies and identification of surveillance centres, use of information technology, identifying the data needs and methods of plugging the loopholes in collecting data on unreported cases. The working Group leaders presented their Groups conclusions and recommendations for consideration and discussion among the participants.

Keynote Address – Prof. D. Mohan, IIT, Delhi

It is indeed an honor to be invited to address this important gathering. The year 2006 seems to be particularly important because the Group of ministers with the PM of India has also appointed a committee under the ex-secretary transport Mr Sunder to propose what kind of an national agency should be established in India to deal with road traffic pressures. So the ICMR initiative along with this national agency which is going to be set up in the 11th plan would be a major step forward in what we want to do. I would also like to reiterate what Dr Bela Shah has said that we have been concerned about this problem for the last 25 years. Dr Ramalingaswami had a couple of meetings with us but the time was not right for India to take a major step forward. Many things have happened in the last 20 years. In the sense if you see the number of persons around this table who have developed expertise and interest over the last 20 years and we can now take a major step forward. I would like to point out that it's not a new issue. Motor vehicles have been around for a 100 years and they have killed 25 million people and disabled about a 75 million people. There is no other technology except war technology which has caused so much harm to people. That is why in the fitness of things, the WHO made the year 2004 as the year for road safety and the president of France released the volume published by the WHO on Road Traffic Injuries.

We have to go back to Mr M.K. Gandhi to gain some wisdom and he very rightly said that action without knowledge is a very dangerous thing than no action at all. This is particularly true for road safety because there are large numbers of things which we think should be

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done that have no or negative effect. Therefore collection of data to answer questions that people ask is terribly important. In the last 10 years one issue has been almost accepted by all professional that road safety is very important. Since everyone participates in that activity it is a public health issue. Just like breathing, drinking water, eating food is compulsory similarly using a road has become compulsory. In all other public health issues we have to shift from an individual focus to a system focus and the professionals in this field have accepted their responsibility. If you tell people to boil their water and drink they will never do it since it is expected that people get clean drinkable water. You cannot expect every child, every woman, and every man to boil their water for drinking purposes. Similarly, in using roads it is expected that the road design should be such that even teenagers who are rash do not get hurt. Because internationally it is accepted that even criminals do not get executed and given death sentence. Because they are horrible people. Likewise a road user deserves death sentence just because he/she made a mistake. So we have to make rules, design road and societies so that even if people are wrong the system forces, by design then not to do a wrong thing. I have sifted through some evidence based studies and came to some conclusions. Cochrane reviews have come out with a number of findings which are contrary to our current understanding. Out of 180 countries in the world only 17 or 18 have reduced road accident deaths. Therefore, it is not an easy thing to do. People don't do what you tell them to do. In the last 20 years it has been found scientifically that propaganda and education have a very little effect in a short term and the effect if at all occurs over a long period of time over generational shifts.

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Road Traffic Injuries policy should be followed like any other public health policy for any other disease. In the US as far back as in 1930, a Committee said the same things 75 years ago which we are saying now in India regarding road accidents. Even after 45 years since the Committee submitted its report accidents kept increasing till 1975 from 1500 deaths to 55000 deaths. After 1975 the accidents started decreasing. This is because Road Traffic Injury prevention as an academic and scientific discipline has not been developed even in western developed countries. In India, there is not a single academic institution in India where on the basis of Government initiative, an academic Group/department plan scientifically to study road traffic accidents. This was also the US experience. And it was only in 1965, when the National Highway Traffic Safety Administration was setup and scientific discoveries on what works and what doesn't, the traffic accidents deaths started decreasing. The decrease is not always continuous but will show a general decline. We must learn from the health field. The TB was identified in 1885, the streptomycin in 1945 and vaccination in 1950. Measles in children decreased in UK dramatically after 1910 and immunization came only in 1917 after most of problem has been solved. System and environmental issues therefore seem to be much more important than technical interventions for societal problems. Dealing with Road Traffic Injuries should also be like any other disease. For example introducing seat belts and air bags will reduce the deaths from 5% to 1.5% (30% reduction) but addressing this is not a national problem, not a critical issue. Injuries have been recognized as a major form of disease since a long time but it is only in the industrial age we started blaming

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people for getting hurt. We must delegalise the MLC procedure for collection of correct Road Traffic Injuries data.

Since injuries are defined as the transfer of energy, we must control this transfer of energy and identify the causative agent like any other disease. We need rapid evaluation techniques in the country, as no large surveillance system has come up with a new idea. They are very expensive and have no control of data anywhere in the world. We need very specific studies that give long term trends. We also need short focus surveys to answer specific questions. Data collection system should be able to assess the existence of a problem. Laws and legislation should be made after proper scientific evidence like night dippers. Teaching children under eight how to cross the roads is useless. We need to answer questions which are relevant for our country and what interventions work. Mortality data for India is good. But morbidity data for injuries in India is bad. We need to learn our lessons from other countries. In India, more than 30% of deaths on the roads are pedestrian deaths and lowest number are from buses. So any intervention on buses or cars will not serve the purpose. Also we need to collect data on pedestrian, bicycles and other vulnerable users on the highways and on the roads. Enforce legislations only after checking the facilities. The composition of traffic in India is different from western countries, so the data collection specific to the country should be used. We will have to setup a system that is representative of the area and type of traffic in 6-8 centres different in their modal composition stationed in tertiary teaching hospitals associated with a Research centre that can use that data and give a feedback. These should use the latest coding techniques, injury coding, severity score,

disability score, and GCS score to make it internationally comparable. The centre should also coordinate with the local police department. The police and hospital data should be compared. Few in-depth research studies to understand the phenomenon of road traffic accidents needs to be taken up. This is the best time to undertake more studies when the public, policy makers and researchers are all concerned about the problem.

Summary of presentations

SESSION I- EXISTING SYSTEMS FOR ROAD TRAFFIC INJURY DATA COLLECTION AND REPORTING

1.1 Accident Data Recording – Delhi Police Experience
Mr. G.S. Awana, Delhi Police

With the increasing number of vehicles per kilometer on the road and ever increasing population, the traffic police have to undertake extra steps for reducing the number of accidents on the road. Statistics shows that in Delhi in 1991 there were 19 lakhs vehicles plying on a road length of 22,487 kilometers. This resulted in 8065 accidents of which 1651(20.5%) were fatal. A decade later the number of vehicles on the road had almost doubled with a corresponding increase of 6000 kilometers of road length. A total of 9344 accidents occurred, of which 1768 (19.0 %) were fatal. Over the last four to five years the vehicle population continues to increase exponentially without a major increase in road length leading to more deaths on the roads. The Delhi traffic police seek to provide safe and smooth flow of traffic by enforcing traffic rules and regulations. It also aims to prevent road accidents by inculcating road safety awareness among the public. Although the enforcement amount realized was to the tune of 18.75 crores in 2005, it was felt that prosecution and enforcement was not enough to reduce accidents. To do a systematic study of accidents, the Delhi Traffic police has its own Accident Research Cell.

Mr Awana explained the flow of information on road accidents to the traffic police. When an accident occurred, the information is sent by

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the informer to the police control room (PCR). The PCR inform the PCR van, the traffic police and the police station. While the PCR van removed the injured to the hospital, the investigating officer examines the scene of the crime and registers an FIR that goes to the Crime Record Office. The traffic police collects the data on a proforma devised for this purpose and submits to the Accident Research Cell where the data is analyzed. The format includes information on the following:

- Age and sex of the injured and killed
- Total number injured and killed
- Type of collision, junction control
- weather, road character, area type, road type, surface conditions, road conditions
- seat belt and helmet use, fault of driver, driving license, victim particulars

The analysis marks the accident site on the digital map with latitudes and longitudes to get the exact concentration of accidents It includes preparation of digitalized maps, GIS based system, integration of data-base system and graphic system and structured and unstructured queries. Mr Awana informed the Group that the police is also equipped with the PDA device mainly for prosecution purposes but efforts are under to incorporate a module for recording road accident information. Efforts are also being taken to connect the PDA to the main computer using a GSM model. Based on the analyses appropriate corrective measures are taken by the engineering wing. He, however, admitted that the analysis wing lacks scientific skills to analyze the data and

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expressed the desire to interact with suitable organizations for scientific analysis.

1.2 Role of CRRI in preventing Road Traffic Accidents - Dr. P.K. Nanda, CRRI, Delhi

According to WHO, globally road traffic accidents was the ninth leading cause of death in 1998 and is expected to rank to the third cause of mortality in 2020. Developing countries bear 70-80% of the fatalities and South East Asia accounts for 25.6% of the global mortality due to Road Traffic Injuries. The burden is reduced in developed countries due to better facilities, better trauma and critical care and better road safety awareness. India accounts for only 1% of the world vehicle population but accounts for 6% of the accidents and 10% fatalities due to Road Traffic Injuries. Approximately, 80,000-100,000 fatalities occur per year (a fatality every 6 minutes) and there are 3, 42000 injuries due to road accidents. The financial burden is also tremendous as shown by the estimated figures by the Ministry of Surface Transport. While the official estimates for 1995 was Rs 7,000 crores, if the underreporting is taken into account this amounts to Rs 32,000 crores. It is estimated that for the year 2001 the total economic loss for the country is to the tune of Rs 55,000 crores which is about 2% of the GDP.

The Indian road network comprises of 2.6% national highways (primary network) 5.5% secondary network and 92% tertiary network. The severity of accidents and deaths per kilometer are more on the primary network as compared to secondary and tertiary network. One fifth of the vehicles on urban roads are buses while one-fourth are

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cars, 12% are 2-wheelers and 9% are light commercial vehicles. 86% of the accidents are caused by drivers fault and only 5% is attributed to bad roads. A comparison of the road safety scenarios in different countries show that India accounts for 26 fatalities per 1000 vehicles which is lower to only Nepal (63/1000), Bangladesh (86/1000) and Tajikistan (107/1000). This figure is much higher than Thailand (11/1000), Sri Lanka (16/1000) and Pakistan 19/1000.

The Traffic and Transportation engineering division of the Central Road Research Institute has been involved in major activities towards reduction of fatalities and injuries on Indian roads. It has developed the following documents for this purpose:

- Manual for Safety in Road Design for Highway Engineers
- Traffic Management at Construction Zones
- Road Safety Audit Manual for Existing and New Roadway Sections
- Road Sign Guidelines
- Guidelines for Hoardings
- Driver Evaluation
- Accident Recording Methodology

Dr Nanda, explained about the steps taken by the Government with the help of CRRI to prevent accidents. In 1983-84 the Government of India for the first time launched the scheme for Highway patrolling on National highways at five locations. 36 well equipped and manned traffic aid posts were set up in 50-60 km distance. There were well laid out functions ranging from constant patrolling , SOS for accidents, first

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aid, ambulance facilities to road repair maintenance, watch for traffic violations and encroachments and maintaining accidents data. The experience of this scheme was however not upto the mark due to lack of training and inadequate institutional backup. Emergency response services are at present being used at limited locations. A case study of the Haryana Highway Patrol system that is in place on four major highways in Haryana has shown a reduction in deaths from 1132 in 2000 to 821 in 2003. This venture has been encouraging and the Govt has directed every state to adopt this system in 2005. A case study of the Rajasthan Highway traffic and incident management system on NH-8 in 2001-02 using emergency telephone system CCTV and mobile radio system has shown a reduction of crashes by 22%, fatalities by 55% and traffic jams by 64%.

The CRRI has targeted to reduce the current figure of 80000 fatalities to 40000 fatalities by the end of the 11th five year plan by adopting the following measures:

- C Road Safety Audit
- C Highway Patrolling System
- C Establishment of Trauma Care Center
- C Sensitization Workshops for Road Users
- C Identification of Accident Prone Spots and Remedial Measures

He emphasized the need for data sharing and analyses between CRRI, ICMR and police.

1.3 Feasibility study on Road Traffic Injury surveillance - the Chandigarh experience Mr H. S. Sidhu, ARRIVESAFE, Chandigarh

Mr Sidhu presented the data capture mechanism that could be of use for best data capture. He emphasized the use of Information Technology as a major tool for developing a system that reinforces open enquiry and encourages diversity of analysis and opinions and suggestion. It also promotes new research and methods of analysis, linkage of data records. Mr Sidhu presented the data points that could be provided by various agencies. The information could be shared by the transport department, registration and licensing department, traffic safety committee, road engineering, medical department and the insurance department. He also proposed the formation of Regional Road Transport Coordination Committee involving safety professionals, Enforcement, Engineering and Emergency medical services, health professionals and economists. This committee would be responsible for ensuring complete, accurate and timely traffic safety data which would be available for decision making at the local, state and national levels. He underlined the need to delegalise the findings of the committee.

Mr Sidhu's presentation ensued discussion on the importance of coordination between traffic police and hospital, generation of public awareness and education of the community. Need for an agreement for delegalising road crash data that may be used for purely scientific evidence by policy makers and legislative agencies was emphasized.

1.4 Data on Road Vehicle Traffic Accidental Deaths through Medical Certification of Cause of Death
Mr. S.K.Jha, RGI, Delhi

Mr Jha described the role of MCCD in data collection of road accident deaths. He explained to the Group the flow of data from state hospitals to the office of the Registrar General. Data on mortality is also collected using Verbal Autopsy. The cause of death is assigned using ICD-10 codes. Road traffic accidents are the major causes of injury deaths that have increased almost two-fold in the last decade.

1.5 Road safety   Mrs. G.S. Lakshmi, Urban Transport, Delhi

Mrs G.S Lakshmi presented the initiatives of the ministry of shipping and transport in road safety and development of accident data base. The Road Safety cell conducts public awareness campaigns and Audio/Video campaigns on Doordarshan and AIR. It also assists the NGOs and the states for setting Model Drivers Training Schools. She informed the Group that the ministry had recently started the National Highway Accident Relief Service Scheme and the Road Safety Audit.

SESSION II- EXPERIENCES IN ROAD TRAFFIC INJURIES NATIONAL AND INTERNATIONAL STUDIES

2.1 Country experience in Injury Surveillance A case study: Thailand Dr Chamiaparan Santikaran, WHO, SEARO

Dr Santikarn explained to the Group of participants the origin of injury surveillance in Thailand. The Thailand Ministry of Public Health announced a policy on accident prevention due to an increase in road traffic accidents. Following a situational analysis to identify the different information systems and their limitations in terms of large system design, administrating surveillance database, and use of computer technology a Provincial Injury Surveillance System was initiated. The objective was to establish a database for assessing acute care and referral services; and facilitate injury prevention at provincial and national levels.

The existing trauma registry at Konkaen hospital was modified to accommodate external causes presenting at the emergency rooms (that occurred within 7 days) ICD 10 coding for nature of injuries and external causes and AIS 85 for characterizing severity. The emergency room nurses were involved in the development of the data collection form and data collection process to evolve a participatory approach. Data processing and analysis formats along with Software manual and coding manuals were prepared to facilitate local utilization and action. TRISS methodology was also provided as a screening tool to identify trauma cases with unexpected outcome for trauma audit. The surveillance module at the end of one year showed that

- The system was standardized and computerized,
- Technical supervision and data quality assessment was good
- Providers could utilize the information
- There was close collaboration with data providers
- There was a strong support from policy makers

Varying data quality between hospitals and inadequate human resources in medical record section were some of the limitations of this system.

With this initial experience the 2nd phase of the National Injury Surveillance System was initiated in 2001 in 22 sentinel centres. The reporting criterion was revised with only severe injuries and deaths and focus was on a better data quality and lesser resource need. This system is now in place in 28 sentinel surveillance hospitals and more than 15 provincial hospitals that operate the surveillance model at the local level. The reports are frequently disseminated to the government to take appropriate actions on alcohol consumption and safety initiatives.

2.2 Lessons learnt from Injury Surveillance in: Delhi, India & Asian Countries "Current realities and challenges" Dr Ravi Saxena, Department of Anaesthiology, AIIMS

Injuries are a major cause of morbidity mortality and hospital admissions in children, adolescents and elders. With many stakeholders in the collection of information on injuries it is very essential to have an effective surveillance system that combines data from different sources. This data then needs to be analyzed and

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interpreted into surveillance products and disseminated to public health professionals for evidence based decision making.

Dr Saxena described his experience in a hospital based study to determine the injury burden, identification of risk factors and high risk groups and its geographic trends in Delhi in 2001-02. The study used a format with standard definitions of data points on patient demographics, date, time and activity of and cause of injury, pre-hospital and emergency room care and patient outcomes. The data was obtained from National Crime Record Bureau, Sushrut Trauma centre-CATS, All India Institute of Medical Sciences and Safdarjung Hospital, medico legal records and cremation grounds. A total of 4100 patients were registered during the period of 5 months of data collection. The data showed that males in the age Group 21-30 were the most vulnerable Group (1276/4100) and street injuries accounted for the maximum injuries (1920/4100) closely followed by injuries at home (1595/4100). Transport injuries were the major type of injuries accounting for 40% and auto rickshaws were used to transport 43% of the victims to the hospital. Sixty five percent victims were treated and sent home and only 9% needed surgery. The study showed that no efforts were made to collect data on injuries by the hospital emergency or admissions departments. Dr Saxena highlighted the four major components of injury surveillance that need to be addressed viz.

C   Data collection- Sources of data, data on standards and
     definitions, type, extent, time, cause and location of injury
C   Integration – Need for a conceptual model to integrate the data
     repositories through standards using OLAP tools Need for a

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communication infrastructure and development of indicators that link programme impact to health outcome

C Analysis and interpretation- Need for specialized skills and standardization of approach to foster intersectorial consistency and collaboration. Interaction between surveillance scientists, researchers and decision makers is essential

C Dissemination of the surveillance products.

Thus to improve the injury surveillance mechanism there needs to be a better articulation of all options for moving forward and beginning the process of prioritization for overall national injury surveillance strategy to emerge.

2.3 Road Safety Information Systems in India, Road safety studies – Bangalore Experiences Dr G. Gururaj, NIMHANS, Bangalore

Road Traffic Injuries are the leading cause of deaths, hospitalization and disabilities in most productive years of life in the age Group 15-44 years. Three-fourths of these are men. Eighty percent of these injuries occur in the rural areas and significantly affect the poorer sections of the society .The public health approach to road safety has four components:

C identifying the burden and impact of the problem

C delineating the risk factors and determinants

C identifying, developing and implementing effective interventions and

C evaluating the interventions.

The first two components are covered under the surveillance.

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Dr Gururaj emphasized the need for good quality, reliable and sustainable information systems where we are able to identify precisely the agent, host and environment. In particular several studies have been conducted in Bangalore that has led to road accident data computerization, legislation against drunken driving, non-use of helmets and bad road engineering. In India there is no systematic linkage system of information available from police records, transportation sector, health sector, registrar of deaths and births, insurance sector and legal records. The National Crime Record Bureau figures show an increasing trend in road traffic accidents, especially, in states with rapid urbanization and road building.

Sharing his experiences in Bangalore based hospital survey, Dr Gururaj informed that $1/5^{th}$ of the total hospital registrations in the casualty were injury cases and half of the injuries were due to road accidents. among the deaths 20% are due to injuries and 36% of injury deaths are due to road accidents. There are wide gaps in the information provided by different agencies. The police is able to capture information on majority of deaths and approximately 50% of the data on post crash injuries. This data has minimal information on the nature of crash patterns, risk factors, severity of injury, and nature of body organs injured, type of hospital care and outcome. There is variation in the data collecting format across the states and union territories and the police data is not linked with transport or hospital data. The health sector has inadequate information of road accidents. Different hospitals have different forms and most of them do not use ICD 10 or ICECI classification. There is serious lack of money, manpower, time and other resources.

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Dr Gururaj stressed the importance of understanding the factors that contribute to the event before, during and after the event. It is also essential to understand the nature and severity of injury as a function of time to identify the agencies responsible for providing the relevant information. Road accident deaths as a function of time shows three peaks. The first peak is for early deaths (deaths on the spot and shortly afterwards) this data is available with the police and autopsy. The second peak occurs for deaths during transit and early hospitalization. This information would be available with the hospital and the police. The last peak corresponds to late deaths post hospitalization and post discharge. This information could be made available by the police, hospitals and the community. While the first peak is the target for primary prevention on roads, vehicles, people, systems, the second peak is the target for secondary prevention focusing on emergency care and trauma care and the last peak is the point of intervention on hospital care and rehabilitation. Therefore, a surveillance system calls for information on age, sex, road users, risk factors, protective equipments, medical conditions, injury details, nature, type, condition, brake light, deficiencies, road design and conditions. In order to bring about a reduction in the road accidents there is need to have Road Safety Interventions consisting of Policy Interventions, Regulatory Interventions, Educational Interventions, and Technological Interventions.

2.4 Road Traffic Injury Studies: Experience in Hyderabad
Dr Rakhi Dandona, ASCI, Hyderabad

Reliable, adequate and accurate data on road traffic crashes and the resulting fatalities and injuries are a critical first step in improving road safety. Dr Rakhi Dandona described her experiences in conducting road traffic studies in Hyderabad. In 2002 a study was conducted by the All India Institute of Public Health, in Hyderabad, to assess the adequacy of available data on deaths in road traffic crashes (RTC) with the Traffic Police of Hyderabad. Police database was reviewed and compared with the reporting of those accidents in a leading newspaper. There were 3039 road crashes during the study period of which 411 were fatalities. While reasonable information was available with the police on date, time and place and mode of transport, information on the other vehicle involved was missing most often. The nature of crash was primarily head on collision. The data when compared with newspaper reports showed that 14% of those reported as collisions by the police were actually due to some other cause like skidding, collision with a non-moving object, fall etc. The police records never attempted to report the actual cause of the crash and most often reported it as driver negligence. Forty seven percent of the on-the-spot deaths reported by the police were reported in the newspaper as died on the way to the hospital or on reaching the hospital. There was absolutely no data on type of road user, individual, vehicle, environmental risk factors and nature of injury. Dr Rakhi further described the study on in-depth assessment of RTI cases reporting to the emergency departments in hospitals in Hyderabad,

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revealed that the medico legal records registered in the emergency lacked important information on severity of injuries, mode of transport, type of road user, use of protective gear, alcohol/drug use, final disposition at emergency department. A household survey of 11,149 people in the age Group 5-49 years revealed that 76% of the victims, who were treated as outpatients in clinics and dispensaries, deemed it unnecessary to register the accident as a police case. Although this percentage is only 21% among the inpatients, 53% of them did not register. Seventy percent of death cases are registered by the police. There are therefore several barriers for a good surveillance system to be in place.

2.5 Core Data Requirement for Road Traffic Injury Surveillance
Dr Geetha R. Menon, ICMR

Dr Geetha Menon drew the attention of the participants to the use of various sources of information in research studies done in South East Asia on road traffic accidents and discussed the advantages and disadvantages of each one of them. Studies primarily done in India, Pakistan, Bangladesh and Srilanka focused on three areas viz.

- C Burden of RTI in the context of all injuries through cross-sectional surveys, cohort studies, police reports , ambulance records, hospital case reports , newspaper reports
- C Extent of burden of RTI in the context of trauma or specific types of injury victims through autopsy reports and hospital case reports

C Description of population who sustain Road Traffic Injuries through police reports, ambulance reports, hospital case reports and newspaper reports

There were, however, very few studies on the issues of RTI in a health policy context and on risk factors for Road Traffic Injuries and absolutely no studies on the effects of interventions to prevent or control of RTI. A review of the advantages and disadvantage of each of these sources showed that:

Police records: Advantages: easily available for on the spot verified cases using computerized systems. Disadvantages: Non-fatalities are unregistered.

Transport sources: Only in the form of regional annual reports on morbidity and mortality.

Health sources and emergency records: Advantages: Provides information on nature of injuries, pattern of care, cause specific death rates and case fatality rates.

Disadvantages: No information on pre-hospital care, on-the spot deaths, intoxicated and unconscious states, injury details and e-codes and tendency of multiple records.

Epidemiological studies although expensive and time consuming provides useful data for injury surveillance and is ideal for focused interventions. Trauma registries offer facility for computation of

burden indices using the mortality information from the civil registration system. The insurance and legal records provide information on cost of injuries.

Dr Geetha emphasized the need for taking advantage of each data capture system and link the data bases for obtaining the core data points. Some of the core data points that needed to be addressed for an effective surveillance were the following:

At the accident site
1. Direct or indirect information (through some source),
2. Date and time of occurrence,
3. Location details- urban/rural/, junction/mid-block, number of lanes, highway type, divided/undivided, GIS location ,
4. Vehicle details- type and model,
5. Collision type- hit pedestrian, head on, hit from back, from side, overturn, hit fixed object, run off road,
6. Approx. No. of persons traveling,
7. Victim details- Status (alive or dead) , user type, age, sex, occupation,
8. Type of injury-mild, moderate, severe,
9. Risk behaviors-alcohol, seatbelt, drugs/medication, helmet, mobile usage,
10. Transportation of the injured- ambulance, hospital name

At the medical aid centre- hospital, private institutions, any other medical centre, the following information need to be recorded

i. Date and Time brought to the centre,

ii. Method of transportation to the centre –vehicle used,

iii. Brought to the centre by whom,

iv. Severity of injury,

v. Pre-hospital care given or not,

vi. Victim given medical aid or sent to another hospital (for tracking the injured) if admitted when, and

vii. Detailed victim particulars- name, education, Income, married / unmarried, no. of children, no. of dependents, known diseases suffering from, alcohol, drugs.

It would be also be interesting to get information on the following data after the patient is discharged from the hospital:

1. Date and time of discharge
2. Patient capability, ADL
3. Rehabilitation details
4. Change in occupation
5. Changes in family, financial status etc

2.6 Clinical issues relating to Road Traffic Injuries
Dr Mathew Varghese, SSH, Delhi

Dr Mathew Varghese addressed various issues on pre-hospital and hospital management of RTI victims. He presented evidence based studies on the management of various clinical conditions. Randomized clinical trials on the use of early or larger fluid resuscitation or of use of hypertonic crystalloid or isotonic crystalloid have not shown significant evidence for treatment of uncontrolled hemorrhage in pre-hospital care of a severely injured patient. There is still lack of evidence based data on choosing the right kind of intervention for

spinal immobilization from the ones adopted by the clinicians like back board or rigid and soft collars, sandbags tapes or straps, collar and back board combinations, holding the head in midline or log rolling the patient and mortality, neurological injury or degree of spinal stability. No randomized trials exist to study whether ambulance crew should be given advanced life support training or not. Dr Varghese felt that most of the pre-hospital data for injured was not evidence based and raised serious questions about its impact on morbidity and mortality. One of the reasons for the insufficient quality of research was due to lack of clear definitions, standard data elements and validated scoring systems. There is lack of reliable uniform data on emergency medical services and valid indicators of performance and effectiveness. Dr Varghese called for a consensus on data elements on time independent variables like age, body region, mechanism of injury and co-morbidities, abbreviated injury scale and time dependent variables like physiological parameters, level of consciousness, hematological/biochemical parameters and time variables like time of injury, time of first response, time of arrival at health care facility, injury-surgery interval, injury discharge/death time, injury –normalcy time. This type of data is essential to communicate between technocrats, politicians, legislate, media, NGOs and to mobilize public action.

2.7 Motor Vehicle Injuries: Key Issues Dr Bela Shah, ICMR

Injuries are emerging as a major public health problem and Road Traffic Injuries has occupied the primary position among deaths due to all types of injuries in South East Asia. In India it is projected that

Road Traffic Injuries would occupy the 5th rank in 2020 if the no action is taken to curb the situation. Road traffic accidents would be the third cause of disabilities in the next two decades. Road traffic fatalities have increased four times in the last two decades. The ICMR study on Cause of death by Verbal Autopsy has shown that in Chennai and Mumbai injuries rank the 2nd and the 3rd major cause of death as compared Rajasthan and Bihar. This emphasizes the association of urbanization with the emerging problem of injuries.

Dr Bela Shah described the pattern, type and nature of injuries in some of the hospital and community based epidemiological studies in India. In particular, the pattern of injuries over a period of five years in fatal cases in a hospital based study of the medico-legal autopsies in Assam has revealed that RTA constitutes 25.4% of all injury deaths. Persons aged 20-40 years were the most vulnerable Groups. Among the killed 30% were pedestrians. 20% pillion riders and 42% drivers were under the influence of alcohol. More than 50% of the deaths occurred in the hospital while 30% died at the accident spot. 49% died due to haemorrhage, shock and injury to vital organs and 38% died due to infection and gangrene.

Dr Bela emphasized the importance of understanding the type of data required to be collected by the surveillance unit. It is understood that 40-48% deaths occur on national highways which carry 40% of the total traffic and 75% of these deaths involve male pedestrians less than 45 years. Motorcycles constitute 64% of the total vehicular population of India that is of the order of 12% per annum. 40% of the accidents occur during night times. One–fifths of 2-wheeler and

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one-tenths of the pedestrian victims are under the influence of alcohol. Mobile phones, animals, children playing on the roads, bad roads, fallen trees, non-functioning road signals and absence of road signs are the risk factors. All this information led to the importance of data collection on the type of roads, type of vehicles and age-Group of the road accident victims, type of road users and the risk factors. In the light of the fact that hospital records have limitations and are unreported while the police records are incomplete Dr Bela felt that it is essential to have a central coordinator within the health setup that has access to police records. It is also essential to see how the reporting can be made complete.

Working Group Discussions

Group I: Intersectoral linking and use of information technology

Members: Dr Bela Shah, Dr R.S.Dhaliwal, Mr H.S Siddhu, Dr Rakhi Dandona, Dr Ashok Kumar, D Hariharan, Dr Mathew Varghese, Mrs Lakshmi, Mr Anantha Krishnan, Dr Chamaiparan Santikaran, Dr B.K. Jain, Dr Himanshu

The members of the Working Group pointed out that as of now India doesn't have any surveillance system on Road Traffic Injuries. They described the need to track data on both fatal and non-fatal accidents. The Group highlighted the barriers that prevent the collection of hospital and police data, inadequate standards, gross underreporting especially non-fatal cases, criminalisation, lack of interest in non-governmental organisations and lack of interoperable electronic system that permit linking of individual data, and a need for a National Agency to coordinate and collect the data. To achieve a method of coordinated data collection, the Group indicated new strategies to optimize existing systems. Adopting a format that is acceptable and useful for the different agencies was essential for ownership. If need be the medico-

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legal register, emergency form, the police form and the legal forms could all be put together in one single format. The Group also discussed the possibility of scientific exchange of available data from CRRI and police and ICMR leading to development of intervention and preventive policies. Using a web based system where all the agencies provided information could be useful.

The specific recommendations of the working Group were:

- C Standardise the definition of injuries
- C Develop an electronic and manual format for data collection
- C Involve all the stakeholders in preparation of the format
- C A unique identifier for similar records from the hospital and police may be developed
- C A Central Coordinating Committee (CCC) for data management, analysis and reporting may be formed
- C No legal implications should be attached with the CCC report
- C Use of the IT sector for interconnecting the sources of information must be explored
- C The use of existing health infrastructure at the primary, secondary and tertiary level may be encouraged
- C A pilot study on feasibility of road traffic surveillance may be initiated.

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Group II: Identification of surveillance unit and data capture format

Members: Dr G. Gururaj, Dr Ravi Saksena, Dr K. Anand, Dr Rajesh Malhotra, Dr J.S. Thakur, Dr Muralidhar Tambe, Dr Anoop Chawla, Dr Prashant Mathur, Dr Geetha Menon, Mr S.K. Jha, Mr P.K Swain

The Working Group discussed at length the logistics of the surveillance mechanism. It was felt that in order to get population based information it would be ideal to get the data at the district level. For this, the health infrastructure in the rural and urban areas must be tapped. The health care setup in rural areas starts at the subcenter, PHC, CHC and district Hospitals. While data on morbidities can be obtained from PHCs the subcenter would be able to provide data on deaths also. The importance of obtaining the data from police records was discussed. In the urban areas it was concluded that gathering information from private practitioners was difficult. Information could initially be gathered from the major government and private sector hospitals and Trauma centres along with the police records. The Sample Registration System data could be used for validation.

Regarding data points the Group felt that the data points for all the epidemiological aspects of what, where, when, how and why needs to be addressed. The individual's age, sex user category, location of the accident, nature and time of injury, pre-hospital care, source of referral and risk factors need to be addressed. The Group felt that information on road design and environment/condition was not an essential component for this kind of surveillance.

All the members of the Group felt that the RTI surveillance must not be seen only as a component for IDSP but may be given a wider scope. IDSP could be used as a vehicle for training and making it obligatory on hospitals to provide the required information.

The recommendations of the Group were:

- C   Injury surveillance could be a component of IDSP initially and may be expanded later
- C   Existing health infrastructure may be used
- C   Road Traffic mortality data may be collected from Police and the Sample Registration System
- C   Road Traffic injuries data may be collected from both govt and pvt hospitals
- C   The data format for the subcenter may be simple that give only the no. of cases.
- C   The database could be expanded at the CHC level which could give more detailed information
- C   The Minimum Data points that may be collected are the following
    - ➡   Information of the injured: - Age, sex, Place of stay (Rural/Urban), Road user type

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- ➡ Crash site: Highway/No highway, location, time and date of injury, nature of injuries
- ➡ Pre-hospital care:- Date and time of admission, mode of transport, First aid, nature of referral, status at arrival, outcome (alive/dead), injury severity grading
- ➡ Behaviour related information: inebriated under the influence of alcohol and other drugs, helmet and safety belt use

- ▪ Parallel population based studies may be initiated
- ▪ Encourage public/private partnership
- ▪ A feasibility study may be launched and coordinated by ICMR
- ▪ A dedicated project staff may be initially used followed by use of existing staff after proper training
- ▪ Data on road conditions may not be collected
- ▪ Need for awareness program in the community

Recommendations

The workshop participants emphasized the need for a National Surveillance System for Road Traffic Injuries. They underlined the importance of:

- C Developing a simple recording system in the tertiary hospitals, medical colleges, trauma centres, and district hospitals
- C Record linkages from the grass root level to a sustainable reporting system, that incorporates capacity building, manpower training and infrastructure building
- C Formation of Coordination Committee involving safety professionals, enforcement, engineering and emergency medical services, health professionals and economists that will be responsible for ensuring complete, accurate and timely traffic safety data

The Group called attention to the fact that state and local based surveillance system needs to be in place for local level planning purposes. They called for initiating multi-centric epidemiological surveys that would serve to validate the data collected and generate methodological in-depth studies to understand the phenomenon of road traffic crashes.

The workshop participants also recommended the need for a feasibility study at two or more centres that looks into the core data points and an optimum mechanism of data collection in the hospital. This will ensure providing a data format and mechanism to the ministry's IDSP

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programme on the one hand. It will also provide a framework for a more coordinated hospital surveillance program for RTI as a long term measure.

The workshop ended with the following recommendations:

1. Road Traffic Injuries is a major cause of public health concern and needs to be given a high priority.

2. A National Coordinating Committee comprising of stakeholders from public health, police, emergency medicine, road transport, urban planning, enforcement and service, emergency care, insurance and legal services needs to be in place.

3. The ICMR should initiate a feasibility study to develop and test a mechanism for data capture of Road Traffic Injuries by hospital surveillance.

4. Multicentric Task Force Projects for understanding the phenomenon of road traffic crashes must be initiated.

Agenda

9.00 - 9.30 am	Registration of participants
9.30 – 10.30 am	Inaugural session
10.30 - 11.00 am	TEA BREAK
11.00-1.00 pm	SESSION I- EXISTING SYSTEMS FOR ROAD TRAFFIC INJURY DATA COLLECTION AND REPORTING (Presentation from different agencies)
11.00-11.15 am	Accident Data Recording – Delhi Police Experience Mr G.S.Awana
11.15-11.30 am	Role of CRRI in preventing Road Traffic Accident Dr P.K. Nanda
11.30-11.45 am	Feasibility module on road traffic injury surveillance. Mr H.S. Sidhu
11.45-12.00 noon	Data on Road Vehicle Traffic Accidental Deaths through Medical Certification of Cause of Death-Mr. S.K.Jha
12.00-12.15 pm	Road safety- Mrs. G.S. Lakshmi
12.15-12.30 pm	Centralized Accidents and Trauma Services- Mr. Wahi
12.30-1.00 pm	Discussions

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1.00 pm-2.00 pm	LUNCH BREAK
2.00- 3.15 pm	SESSION II- EXPERIENCES IN ROAD TRAFFIC INJURIES NATIONAL AND INTERNATIONAL STUDIES
2.00-2.30 pm	Country experience in Injury Surveillance A case study: Thailand-Dr. Chamaiparan Santikarn
2.30- 2.45 pm	Lessons learnt from Injury Surveillance in:Delhi, India & Asian Countries " Current realities and challenges" Dr. Ravi Saxena
2.45-3.00 pm	Road Safety Information Systems in India, Road safety studies-Bangalore Experiences - Dr G. Gururaj
3.00 3.15 pm	Road Traffic Injury studies -Experience in Hyderabad. Dr. Rakhi Dandona
3.15-3.45 pm	TEA BREAK
3.45-4.00 pm	Core Data requirement for Road Traffic Surveillance- Dr. Geetha R. Menon
4.00 -4.30 pm	Discussions

Day 2- 12th July 2006

9.30-9.45 am	Clinical Issues relating to road accidents- Dr M. Varghese
9.45-10.00 am	Motor Vehicle Injuries-Key issues -Dr Bela Shah
10.00-10.15am	Road Traffic injuries as integral component in IDSP Mr Virender Singh
10.15 -10.45 am	TEA BREAK

10.45am -12.30 pm	ISSUES RELATED TO DESIGNING AN OPTIMUM SYSTEM OF DATA COLLECTION
	Working Group I – Intersectoral linking and use of information technology
	Working Group II- Identification of surveillance unit and data capture format
12.30-1.00 pm	Recommendations
1.00-2.00 pm	LUNCH BREAK
2.00 -3.30 pm	An interactive session on designing a draft protocol and data collection proforma (small Group-Dr Gururaj, Dr Murlidhar Tambe, Dr Ravi Saksena, Dr Rajesh Malhotra, Dr Rakhi Dandona)
3.30 pm-4.00 pm	Finalization and conclusions

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