

# **PREVENTION AND CONTROL OF ROAD TRAFFIC INJURIES: A SOUTH AFRICAN RURAL EXPERIENCE**

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## **INTRODUCTION**

Road traffic collisions and their related trauma present a complex problem particularly for developing countries, including South Africa (SA). In general and legislative terms it is a transport problem. However, it impacts heavily on the health services and the fiscus. Preventive programmes have traditionally focused on reducing fatalities. However, fatalities tell only part of the story. For each person who dies in a motor-vehicle related collision, there are more than ten hospitalisations and more than hundred visits to the emergency department. Clearly, the medical burden cannot be over emphasised. Fatalities thus provide an inaccurate and incomplete analysis of the total injuries picture.

Thus it is essential that communities be empowered with ways of circumventing or at least minimising the problem of injuries. An integrated injury control system needs to be established at community level, because that is where action is. This necessitates the need for communities to form partnerships with key role players, e.g. the private sector, health sector, health insurance companies and other relevant stakeholders. A safety audit (Moeketsi & van Niekerk, 1999) of the Phokeng community, a rural community in the North West province, which forms the basis for this paper, was conducted with a view to developing ways to empower the community to circumvent the problem of injuries.

## **INJURIES: AN OVERVIEW**

### **Scope of the injury problem: world-wide**

Concern about the escalating road safety problems is growing within the international community and the problem is increasingly being recognised as one that requires urgent attention. While road deaths and injuries are declining in developed countries, the opposite is true for the developing world.

Studies carried out have demonstrated that road traffic collisions in developing countries are:

- a serious problem in terms of fatality and injury rates;
- a significant cause of death and injury for the age group 15 – 44;
- not treated in a holistic manner, and
- a considerable waste of scarce resources

Recent studies into the Global Burden of Disease undertaken by Harvard University for the World Health Organisation (WHO) and World Bank indicated that by the year 2000, road accidents will be the third most important health problem world wide, exceeded only by heart disease and unipolar depression (Dhliwayo, 1997; 1999; World Disaster Report, 1998). It is, however, expected that in

developing countries such as SA, this problem might be ranked somewhat lower, given other health priorities like AIDS/HIV and violence.

### **South Africa**

It is argued that traffic is the second leading cause of injury in South Africa. The country's death rate of 11,7 per 100 million kilometres travelled is more than ten times that of the USA (Butchart and Peden, 1997). Road traffic injuries are arguably one of South Africa's most preventable and controllable public health problems. They cost the country approximately R12billion per annum. Therefore, the challenges that face the country are enormous. Some of these challenges relate to decreasing funding levels for road safety programmes and competing messages on critical issues such as HIV/AIDS and violence. A deeper and more fundamental understanding of road safety problems is required.

### **Phokeng**

The Phokeng village is one of the rural villages of the Bafokeng situated in the North West province. The striking feature of this community is the presence of both rural and peri-urban characteristics.

The director of road safety in the Northern West province raised a concern of high traffic road collisions in the area. Hence, a safety audit of the Phokeng and surrounding villages was undertaken in late 1999 (Moeketsi & van Niekerk). A number of critical factors in the prevention and control of injuries were identified and these are discussed in the section below.

## **A PUBLIC HEALTH APPROACH TO INJURY PREVENTION AND CONTROL**

Countries such as the United States have over the years employed a scientific, data-based approach to address the traffic and motor-vehicle safety problem. The approach employed is similar to the public health approach in:

- using data to identify the magnitude of the problem;
- identifying the causes of the problem (what are the risk factors?);
- developing and testing interventions/countermeasures to reduce the problem, and
- implementing the interventions/countermeasures, monitoring and measuring their effectiveness in addressing the problem (Centre for Disease Control, 1994).

The belief that injuries are "accidents" is a fallacy. In fact, injuries are predictable and preventable. Injury is a disease process, and as in other disease processes, the host or human comes in contact with an agent in the environment. For an example, when a person develops tuberculosis - the host is the person, the agent is the bacteria and the environment is something that allows the person to become infected, such as a small enclosed room. In an injury, the host is a human, the agent is energy, and the environment allows the two to come together.

Unlike diseases, however, injuries tend to occur without warning: one minute a person is healthy, the next minute he/she is injured.

Host factors such as attitude, judgement, impairment, vision, training and physical strength can predispose a person to injury. Tissue tolerance, for an example, can determine whether an injury occurs. The very young and the very old may not be able to absorb an injury well. In a side-impact

crash the driver or passenger is particularly vulnerable because there is too little crush space. In this case, the age and physical well being of the occupants can determine the degree and severity of injury.

Environmental factors such as poor road design, lack of barriers and lighting, and adverse weather can also contribute to injury. For example it is difficult to have a head-on collision on a freeway because there is significant separation between opposing lanes of traffic. However, head-on crashes are more common on two lane roads, rural roads with no lane separations and little or no lighting.

From the Phokeng safety audit the following host/human and environmental factors were identified:

#### Host/Human factors

- unskilled drivers;
- taxi drivers load and off load passengers anywhere along the street;
- high proportion of children and youth in the population;
- roads used for stalls, playing and walking as well as driving vehicles;
- pedestrians unfamiliar with traffic behaviour - children and rural people from the villages;
- existing traffic regulations disobeyed;
- alcohol and drug abuse, and
- people and vehicles not separated.

#### Vehicle factors

- speeding and overloading of vehicles;
- unroadworthy vehicles, including public transport modes;
- absence of standard safety features in vehicles or failure to use them, e.g., safety belts; and
- heavy vehicles go through the village.

#### Road Environment

- roads not paved and poorly maintained;
- absence of markings;
- poor or absent road lighting;
- inappropriate town planning - children crossing a main road on their way to school, and
- schools built next to busy roads.

#### Other factors

- stray animals;
- few or no traffic officers for enforcement of laws;
- built shacks have no fencing;
- sprawl of sheebens in the communities which makes alcohol more accessible, and
- drug syndicates at schools, taxi ranks and in the community

### **Prevention of injuries**

William Haddon, the first administrator of the National Highway Traffic Safety Administration (NHTSA), created a conceptual framework to reduce injury by addressing the triangle of the human, the vehicle, and the environment for three phases of an accident.

- Pre-event: factors that increase or decrease the likelihood that a crash will occur, for example use of alcohol, excessive speed or visibility. This is the primary focus of traffic and motor vehicle safety - preventing the crash from occurring in the first place.

- Event: factors that make it more or less likely an injury will result once a crash occurs. Seat belts, bicycle helmets, child safety seats all protect during a crash to lessen the severity of injury
- Post-event: factors that lessen injury severity and complications after the crash has occurred. First responders and Emergency Medical services personnel getting victims to treatment as quickly as possible are important in the post crash phase.

Injury patterns vary for different age groups, genders and cultural groups. There are also seasonal and geographical patterns. Understanding the demographics, culture, and circumstances associated with injury is necessary to appropriately target prevention efforts to populations and situations at risk for injury. Injury prevention efforts should fall under the Four E's of prevention, viz. Education, Enforcement, Engineering and Economic incentives. The decision to use any of one or a combination of these efforts should be determined by their economic efficiency and effectiveness.

The above mentioned factors identified in Phokeng will be useful in developing and implementing effective and efficient road safety programmes. For example, seat belt campaigns are likely to have little impact in Phokeng and surrounding villages because of a low rate of vehicle ownership. A large proportion of the population, including school children, rely on walking as a mode of transport. Over the weekends the possibility of a drunken pedestrian being knocked over by a car increases. Therefore, pedestrian safety programme should receive priority above a safety seat belt campaign.

### **Integrated injury control**

While injuries are preventable, it is unrealistic to view all injuries as totally preventable. It is also important to note that persons who are injured by motor vehicles typically do not have a single injury; rather, they have multiple injuries and often have long hospitalisation periods. As the majority of the victims are young, their disability tends to be long-term. Some of them may never become fully productive and may need disability payments for many years. Consequently, one needs a system to control the effects of injuries once they occur and lessen their severity. Thus injury control is a systematic approach to reduce the number and consequences of injuries.

Four components should be considered in injury control: prevention, acute care, in-hospital care and rehabilitation.

**Prevention** programmes seek to avert the occurrence of an injury. More often than not this function is perceived to be the primary responsibility of road safety officials. The involvement of the medical care personnel is minimal or absent. For example, primary health care personnel are better positioned to educate pregnant mothers on the dangers of drugs and alcohol during their routine check-ups. The programme can be extended to include infants and toddlers. For instance, the importance of seat belts, use of appropriate child safety seat during different stages of development, the importance of putting fences around *shacks* or houses, etc. During interviews, the medical personnel in some of the clinics in Phokeng indicated that it has never occurred to them that there is a role for them in terms of road safety. There is therefore a need to develop relevant programmes for health care personnel.

**Acute care** systems provide access, assessment and treatment of injured patients and referral to appropriate care facilities. The First Responder has a crucial role to play in this regard. The lapsed time between the occurrence of a serious motor vehicle collision and access to medical care is a determining factor in terms of mortality and morbidity. The management of the injured at the scene of accident will be determined by the availability of trained personnel and technological and economic resources at hand. For example, in Phokeng there is a dire shortage of ambulances. The

clinics are ill-equipped to deal with serious injuries and most of them are closed after hours.

The need for **in-hospital care** depends on the severity of an injury and the rate of recuperation depends on the level of care that a patient receives. High-tech hospitals with skilled personnel will have shorter periods of recovery than ill-equipped hospitals. For example, a person with severe head injuries is unlikely to fully recover if circumstances are not conducive for his/her health. Other than the mine hospitals, there are no public hospitals in Phokeng and injured patients have to be transferred to nearby hospitals. It is important to note that this translates to extra costs to be incurred by relatives who have to visit their injured.

**Rehabilitation** is the process by which biologic, psychologic and social functions are restored or developed to permit the injured person to be integrated back into society and lead a productive and independent life. In South Africa there is a dire shortage of such facilities, especially in the developing communities, such as Phokeng. Most victims of traffic vehicle collisions have to rely on their families for the rehabilitation process. In some cases this proves to be very strenuous and costly for both the victims and their families. And, because of poverty, not many are fully rehabilitated.

These components represent the phases a patient goes through from injury occurrence to recovery. Given the bridge that exists between traffic safety and health these components currently operate as independent systems. The opportunity of the cost effectiveness of an integrated injury control system is lost.

One critical element for the development of an integrated injury control system is the availability of data and this is discussed in the section below.

## **DATA USE IN INJURY PREVENTION AND CONTROL**

According to Berger and Mohan (1996) reliable sources of data on injuries are one of the crucial elements required to:

- assess the nature and extent of injuries in a population;
- identify groups that are most at risk for specific injuries;
- establish priorities for intervention;
- allocate appropriate resources for injury control programs;
- design counter measures, evaluate the effectiveness of laws, technological changes; environmental modifications, and educational campaigns in reducing injuries, and
- convince the public and policy makers of the importance of certain injuries and the need for appropriate action.

Data on injuries within countries are usually quite numerous. The following are sources of motor vehicle injury data and their limitations:

- **Death registers**  
Death registers are often the most accurate source of information on serious injuries. Their accuracy will depend on the level of training of the individual who completes the forms.
- **Police records**  
Police records are important and data regarding victim's age and sex, location and time of injury are often accurate and therefore useful for designing countermeasures. And also, only the police

may record deaths that occur outside of a hospital. However, these records have a number of limitations. Many injuries are not reported to the police for one reason or the other. The assessment of injury severity by police is unreliable. The assignment of cause is heavily influenced by legal concerns.

- **Medical records**  
Medical records are important in determining causes of non-fatal injuries. Also, medical records give a detailed information about the nature, severity and costs of injuries. However, they cannot be used as a representative sample of the communities they serve.
- **Special surveillance studies**  
Surveillance is an on-going, systematic programme of data collection and analysis (Berger and Mohan, 1996). Although these are more accurate and representative of the population, they require enormous investments of time, money and personnel.
- **Insurance companies**  
Insurance companies collect data for the settlement of claims. Their data system can be utilised and compared to other available data.
- **Industries and businesses**  
Data in industries and business is captured as an ‘occupational-related’ injury or death. In industries where the system is non-existent, valuable information is lost.
- **Criminal justice system**
- **Research institutions**

One major problem is that these data systems are not linked and result in a number of organisation recording the same injury. For example, should a truck driver be involved in a serious motor vehicle while driving through Phokeng. The following might happen to him:

If the injuries are severe he will immediately be transferred to one of the major hospital in the surrounding towns. The police, hospital and his place of employment will have a record of the same injury. But the hospital record will not show the location where the collision took place. This might be problematic for designing effective and efficient locally based strategies. However, should the driver die at the scene of the crash, the hospital will not have his record, and if there are no insurance claims to be settled, the insurance industry will also not have his record. The link to integrate these systems cannot be over-emphasized.

## **LOCALLY-BASED INTEGRATED INJURY CONTROL SYSTEMS**

Following from the discussions above it is clear that an integrated injury control system has to be established at the community level, because that is where the action is. Communities have experience in developing and implementing a variety of programmes to address specific problems. However many sectors can provide leadership to help make integrated injury control a reality.

In the past few years, the Council for Scientific and Industrial Research (CSIR) adapted the NHTSA and (WHO) models to produces a CSIR Safe Communities Model to suit developing countries, such as South Africa. The main characteristics of the model are (Vermaak, 1999):

- Injury data analysis: Communities identify and link data sources that will provide information on the magnitude of the injury problem, the costs associated with injuries, who is at risk for injury, and what are the common risk factors across the spectrum of injuries.
- Establishing partnerships: To make progress in injury control, communities need to form partnerships that include business, provincial and local government, health care providers and any other relevant stakeholders.
- Community-driven process: Communities need to move away from top-down to bottom-up approaches in prioritizing community injury problems, identifying solutions, and implementing programmes.
- Integrated and comprehensive injury control system: Communities, need to incorporate prevention, acute care and rehabilitation programmes in solving community injury problems.

## CONCLUSION

This paper has described a model for comprehensive injury control and illustrated arguments that support active participation of partners from business, health, transport and other relevant stakeholders. The economic burden of motor vehicle collision is enormous and it is, therefore, imperative that resources be pulled together in addressing injury problems. It is through such partnerships that the health, personal and financial toll of motor vehicle injuries will be reduced. Communities such as Phokeng stand to benefit from such an approach.

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