provided computers for four mortuaries in the surveillance system but if the system is to be expanded, more computers will be necessary. The hardware and software costs of providing computers for these and other sites are small compared to the overall forensic medical services budget, suggesting the low value placed on information and information management in these contexts.

The NMSS can help to reverse the information vacuum and begin to build a new information culture for the benefit of administration, budgeting, management and safety promotion. To do this effectively, the NMSS would need to be integrated with other health and crime information systems.

The NMSS has been designed to meet the information requirements of three main stakeholder groups. For *forensic medical services* the NMSS provides information for the allocation of resources, auditing of costs and rationalisation of services. For the *National Crime Prevention Strategy* the NMSS provides crucial baseline data for all deaths due to intentional violence, including information on particularly sensitive indicators such as gunshots, alcohol and other substance involvement, the co-variance between violent and unintentional injury deaths, and geographical variations in the magnitude and patterning of homicides and suicides. The third stakeholder group consists of *injury prevention agencies* including national and local government, the South African Police Services, non-governmental organisations, businesses and para-statals such as Metro Rail. The NMSS will provide these with the descriptive information needed for the design and implementation of preventive interventions at municipal, metropolitan, provincial and national levels.

## Non-fatal injury surveillance

This component of the surveillance system is still in its early stages of development. The primary objective to be reached by December 2000 is to develop and pilot a methodology for the ongoing surveillance of non-fatal injuries. The methodology will include a description of the human and technological resources required and a budget for start-up, running costs and evaluation.

Since it is not feasible to monitor all injuries seen in the health sector, a sampling-based surveillance system is required. The challenges in setting up a non-fatal injury surveillance system are numerous. Little is known about the patient population presenting with non-fatal injuries, and the few studies which have been done in the area are dated. Firstly, the exact number of non-fatal injuries per year in South Africa is unknown. One can only extrapolate from the ratios to the number of deaths per year. Secondly, there are variances in injury patterns across different locations. Thirdly, there are different levels of severity of injury which necessitate different types of facilities. A surveillance system needs to take all of the above into consideration when selecting a representative sample of health facilities or health districts.

A number of pilot sites will be set up where the surveillance system will be developed and tested. The sites selected will include tertiary, district and private hospitals so that the system and the cost involved can be evaluated in each. Also, the feasibility of sampling a health district, with all its facilities, as opposed to sentinel sites will be investigated so as to establish the most appropriate method.

## Sentinel substance abuse surveillance

Longitudinal information on both alcohol misuse and drug use is required to identify changes in the nature and extent of the use of these substances and their co-variance with patterns of violence and injury. Unfortunately the ongoing surveillance of these substances among all trauma patients (fatal and non-fatal) is not financially possible.

All fatally injured cases undergoing medico-legal post-mortems who are over the age of 16 and who have not died of the late effect of their injury should have their blood tested for alcohol levels in terms of the Inquest Act. Unfortunately, due to a lack of resources, personnel and access to chemical pathology laboratories, this is not practised equally throughout the country.

Very few hospitals have the facilities or staff to assess alcohol and substance abuse among non-fatally injured patients. Consequently, sentinel sites have been chosen for the assessment of these substances and will be monitored annually in order to identify changes in the nature and extent of the use of these substances and their negative consequences as well as the effect of national and regional interventions aimed at reducing substance abuse and violence in society.

# Prevention and interventions

## Intentional Injuries

Within South Africa primary prevention initiatives (i.e. those addressing the root causes of violence in order to dry up the supply of new victims and perpetrators) continue to find significantly lower levels of financial and policy support than police and security-oriented strategies aimed at protection through more efficient policing, swifter criminal justice processing and target hardening. Added to this imbalance is the combined weight of the burgeoning private security and insurance industries, both of which are heavily invested in protection ahead of prevention. Such protection strategies do not address the socio-economic inequalities that underlie the high crime and violence rates, and, by reinforcing and even expanding social and class divisions, may make the situation worse, not better.

Victims of domestic violence are among the most vulnerable members of society and all currently available remedies have proved to be ineffective. The Domestic Violence Act 116 of 1998 was passed by government in late 1998. This Act recognises that there is a high incidence of domestic violence in South Africa and that it is a serious social evil which can take on many forms and, more importantly, be perpetrated in a wide range of domestic relationships. The purpose of this Act is therefore to afford the victims of domestic violence the maximum protection that the law can provide. In passing this legislation, the South African government has succeeded in fulfilling its international commitments towards ending violence against women. Although on paper, the Act looks as though it will afford relief to victims of domestic violence, unless it is vigorously implemented and strictly adhered to by both the police and prosecutors "this legislation is bound to remain one of theory".[9]

About 31 people die of firearm wounds every day in South Africa. Over the years, there has been much debate surrounding the efficacy of stringent gun ownership laws as an injury prevention measure. In mid-1998 a draft Firearms and Ammunition Control Bill was released which will replace the current Arms and Ammunition Act. This Bill, which suggests making firearm licensing more expensive, limiting the number of firearms which a license holder may possess as well as addressing the issues of policing and prosecution of the illegal possession of guns, has generated much debate and will probably require amendment before being accepted by Parliament and enacted.

Over the last year a number of injury prevention lobby groups have been formed. Medics against Crime, a Gauteng-based group of medical doctors, are advocating for the notification of gunshot injuries while a Cape Town group of concerned doctors have formed a group called Cape Doctors against Violence and Rape. The latter group publish educational injury prevention articles and injury mortality statistics in a local newspaper monthly.

Over the last year there has been an increase in violent incidents at schools across the country. A number of initiatives have been developed to address this crisis including, among others, a Ministerial Commission, promotion of the safe schools concept, injury surveillance at schools, conflict management and the inclusion of an injury prevention module in the Life Skills programme of the 2005 school curriculum.

## Unintentional injuries

The Arrive Alive Road Safety Campaign was launched in 1997 as a short-term initiative to reduce the carnage on South Africa's roads. Its main objectives were:

- ❖ to reduce the number of road traffic accidents in general, and fatalities in particular, by 5% when compared to the same period for the previous year
- ❖ to improve road user compliance with traffic laws
- ❖ to forge improved working relationships between traffic authorities at the various levels of government.

To date three Arrive Alive campaigns have been held focusing on speed, alcohol and pedestrian collisions.

Extensive use has been made in the media in of slogans such as "speed kills" as well as educational reports and shock tactic advertisements. Speed law enforcement equipment was purchased by the Department of Transport and traffic officials have used this equipment on various roads and highways around the country. This has been combined with visible law enforcement and the prosecution of offenders.

Furthermore, the Traffic Act was amended to include new blood alcohol and breath alcohol levels for general and professional drivers, bringing our law into line with most of those in developed countries (Box 1). Since the Breathalyser test results have been accepted by the Attorneys General as admissible evidence in court it is now much easier for traffic officers to check drivers and take intoxicated drivers off the road immediately. The names of drivers caught drinking and driving are also now published in local newspapers.

**Box 1: Drinking and driving and the law**

Under the new National Traffic Act No 93 of 1996 the levels for *any driver* other than a professional driver will be:

Blood alcohol : 0.05g/100ml of blood
Breath alcohol : 0.24mg/1 000 ml of breath

While for *professional drivers* (of goods exceeding a mass of 3.5 tonne and drivers of vehicles carrying passengers for reward) the levels will be:

Blood alcohol : 0.02g/100ml blood
Breath alcohol : 0.10mg/1 000 ml of breath

Perhaps the most successful element of the Arrive Alive programme has been the emphasis on pedestrian safety. A combination of street theatre, graffiti walls, taxi rank promotions, community workshops and lectures to community organisations have been used to get the message of pedestrian safety across to road users. These together with television advertisements and engineering measures appear to have gone

a long way to reduce our high pedestrian fatality rate. Since the early 1990s there has been a steady decrease in the proportion of pedestrians killed on our roads as was indicated in Figure 5.

Since its inception the Arrive Alive road safety campaign had exceeded its target of a 5% reduction in fatalities during its three campaigns. Since 1996 there has been a 7.52% reduction in fatal collisions and a 1.76% decrease in all types of crashes (including damage-only crashes) resulting in significant economic savings. Unfortunately the number of deaths on South African roads is still unacceptably high. What is needed is an effective and integrated system of road traffic management in place 24 hours a day, seven days a week, 365 days a year. Unfortunately due to financial restraints the Arrive Alive campaign can only be conducted in phases and expanded according to the ability to raise funds.[10]

While most unintentional injuries are readily preventable, there is little focus on other non-traffic "accidents" other than the work done by two non-governmental organisations, viz. the Child Accident Prevention Foundation of South Africa and the Paraffin Safety Association of South Africa. In addition, there are a number of smaller local prevention efforts which focus on problem areas such as the "Stop Burns" campaign launched by the Chris Hani Baragwanath Hospital. Such efforts need to be assessed and expanded to other areas where burns are a problem, thus pooling the limited expertise and resources in South Africa. The prevention of unintentional injuries can produce many gratifying results as has been seen in first world countries with the investment of consumer organisations and large businesses. This area requires urgent development in South Africa.

## Trauma care and rehabilitation

Many of the people injured as a result of gunshots, motor vehicle collisions and landmine blasts in Africa are also those with the least access to formal emergency medical services. Consequently, pre-hospital care for this group of patients is often rendered by those community members closest to the scene of the injury. These individuals, known as *first responders*, are thus a crucial link in the injury prevention chain. In 1998 an Emergency Life Support course for trainers of *first responders* was held in Johannesburg. Sponsored by the World Health Organisation, this course trained 20 individuals from South Africa and nine other African countries. Participants were taught the principles and practice of emergency medical care through first response and how to identify and train non-professional first responders at a local level.

Advances have been made in the Emergency Medical Services (EMS) in some areas like the Northern Province which inherited homeland emergency services with poor infrastructure and very few trained personnel. This service is now training many personnel and has been given Advanced Cardiac Life Support accreditation. EMS in other areas like KwaZulu-Natal and Gauteng are in crisis due to the lack of trained personnel and vehicles, and the inequity of resources in rural areas is now very obvious. However, the rescue subdivision of the EMS and other mountain rescue services, particularly in KwaZulu-Natal and the Western Cape, although they do not deal with large numbers of patients, play a significant role since their work is very important in the eyes of tourists and ecotourism opportunities in South Africa. Communication in the EMS has been partially addressed by the implementation of a national 10177 emergency number.

The Advanced Trauma Life Support (ATLS) programme, developed by the American College of Surgeons, was started in South Africa in 1992. It is a 2+ day course aimed at doctors, nurses and emergency medical staff who may be confronted with major trauma involving life-threatening injuries. The programme emphasises the significance of the "golden hour" in the initial assessment and primary management of the patient but also goes on to teach life saving interventions, re-evaluation, stabilisation, and when needed, transfer to a facility in which the patient can received specialised care. Since 1992, a total of 235 courses have been run at six approved centres in South Africa and more than 3 000 health care workers have been successfully trained.

The clinical trauma services at primary, secondary and tertiary levels in South Africa are overloaded with cases and under-staffed. Few of the health care workers working in these areas are trauma trained. Due to financial cuts and the rationalisation process, many nursing colleges in South Africa have been forced to stop training critical care and trauma nurses. Furthermore, there is no official recognition for trauma surgeons in South Africa although this aspect is currently being addressed by the Trauma Society of South Africa who are exploring the possibility of starting a two-year registerable trauma course in the near future. Furthermore, at present there is work on the categorisation of hospital casualties and trauma units so that patients are correctly prioritised and transferred. This will promote equity by redistributing exiting resources.

Non-governmental organisations such as St John's Ambulance and Red Cross continue to do sterling work in the area of first aid training.

# Conclusions and Recommendations

The state-supported initiation of an injury surveillance system represents a major advance on the previous situation where the size and shape of the injury problem was unknown. The major challenge now is to establish an adequate preventive response, in the absence of which surveillance is a futile and resource-wasting exercise.

In response to the problem of violence, two major gaps are evident. The first concerns interpersonal violence including homicide, assault and rape. While occurring in all social sectors, local and international studies unequivocally demonstrate that elevated incidence rates for interpersonal violence are driven by structural determinants. Of these, relative deprivation appears particularly important, high homicide and assault rates clustering in the most disadvantaged sectors of populations with large rich-poor differentials.[11,12] This suggests that interventions which selectively target alcohol and firearm availability address only the symptoms of structural deficit, and therefore that they must be complemented by an equivalent focus on reducing inequality if sustained violence prevention is to be achieved.[13] The second gap in relation to violence concerns the problem of suicide, and the lack of any vigorous prevention programmes targeted against suicide. As shown in the NMSS data for fatal injuries, suicide is a leading cause of violent death in the white middle- and upper-income sectors. While enhanced gun-control measures can potentially impact on both homicide and suicides, the risk factors unique to suicide and non-fatal forms of self-directed violence demand their own prevention strategies.

Concerning traffic, the Arrive Alive programme which was launched by the Department of Transport in 1997 has reduced the number of collisions on our roads over holiday periods (Easter and Christmas) thereby slightly reducing the overall number of annual collisions. Unfortunately, sporadic efforts such as these will not have a long term impact on our catastrophic traffic problem. This will only be attained by continuous, visible law enforcement so that the perceived risk of being caught speeding or driving drunk outweighs that of not being apprehended thereby effectively reducing the number of offenders on our roads.

For accidental injuries, the elevated incidence of burns, falls and other unintentional causes seen in informal and low-income settlements is clearly related to environmental risks. Of these risks, dependence on fossil fuels and the inadequacy of child recreational areas are among the more prominent, suggesting that electrification coupled with the provision of formal housing and child-safe recreational and caretaking facilities will yield immediate prevention gains.