VIOLENT DEATHS IN SA

The 2003 National Injury Mortality Surveillance System

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The latest data from the National Injury Mortality Surveillance System – the most detailed source on the 'who, what, when, where and how' of fatal injuries in South Africa – shows that homicide remains the most common cause of injury-related deaths. Homicide rates varied significantly between the four major urban centres covered, and firearms were a key contributor to the high homicide rates. Alcohol was confirmed as an important risk factor for murder, with the highest percentage of alcohol positive cases being recorded in Cape Town.

A study based on mortality data from 2000 estimated that there were more than 32,000 homicides in South Africa – a mortality rate of 72 per 100,000 population.[1] Although this study probably overestimated homicide by approximately 7%,[2] the data still imply a mortality rate due to violence that is nearly eight times the global rate of 8.8 deaths per 100,000 population.[3]

Although more recent data from the South African Police Service suggest that homicide rates may have decreased,[4] the 2003 National Injury Mortality Surveillance System (NIMSS) annual report indicates that homicide remains the most common cause of injury-related deaths.[5] This means that South Africa still has some way to go before our rates of violence begin to approach those experienced elsewhere in the world. This article describes selected findings and interpretations from the most recent NIMSS data pertaining to homicide.[6]

Background to the NIMSS

The NIMSS has provided information about the extent and scope of deaths due to non-natural causes in South Africa since 1999. It is the most detailed source of information on the *who, what, when, where* and *how* of fatal injuries in South Africa and has secured full coverage of five of the country's six metropolitan centres as well as several other major towns and cities.

Data are collected at state mortuaries by the police and forensic pathology departments. The cause of death is categorised according to the International Classification of Disease version 9 (ICD 9) to enable international comparisons. Spatial and temporal data are recorded as well as blood alcohol data from state forensic chemical laboratories.

Although studies have used the NIMSS data as a basis for extrapolation to national estimates, the data set is more reflective of urban rather than rural injury patterns in South Africa. In 2003, 36 mortuaries in seven of South Africa's nine provinces supplied data to the NIMSS (Table 1). This represents between 36–49% of all injury-related deaths that occur in South Africa.[7]

The aim is ultimately to establish a permanent system that will record all such deaths that occur annually in South Africa in order to provide information to:
- describe the incidence, causes and consequences of non-natural deaths;

- prioritise injury and violence prevention action directed at high-risk groups and socio-environmental risk factors;
- identify new injury trends and emerging problem areas;

Table 1: Participating mortuaries, 2003 (n = 24,600)			
Province	**City**	**Mortuary**	**Number of deaths recorded***
Eastern Cape	East London	Mdantsane	421
		Woodbrook	983
	Port Elizabeth	Gelvandale	549
		Mount Road	327
		New Brighton	727
Gauteng	Johannesburg	Diepkloof	1,663
		Germiston	2,489
		Johannesburg	2,470
		Roodepoort	1,338
	Pretoria/Tshwane	Bronkhorstspruit	173
		MEDUNSA	633
		Pretoria	1,838
KwaZulu-Natal	Durban	Chatsworth	838
		Gale Street	2,382
		Phoenix	1,403
Mpumalanga		Balfour	53
		Barberton	11
		Carolina	2
		Delmas	40
		Ermelo	133
		Groblersdal	41
		Hazyview	109
		Komatipoort	143
		Nelspruit	212
		Piet Retief	99
		Sabie	48
		Secunda	24
		Standerton	8
		Volksrust	71
Northern Cape	Kimberley	Kimberley	402
North West**	Klerksdorp	Klerksdorp	197
		Wolmaranstad	10
		Potchefstroom	136
Western Cape	Cape Town	Salt River	2,403
		Tygerberg	1,962
	Stellenbosch	Stellenbosch	262
TOTAL			**24,600**

The total includes undetermined deaths.
** Only five months' data for North West Province.*

- monitor seasonal and longitudinal changes in the non-natural fatality profile; and
- evaluate direct and indirect violence and injury prevention and control measures.

Distribution of homicide in 2003

In 2003 10,499 (47%) of the 22,248 non-natural deaths in the NIMSS where the apparent manner (or intention) of death was known, were homicides (Figure 1). Homicides accounted for a significantly higher percentage of non-natural deaths (p<0.01) in Cape Town (55%) and Durban (54%) than in Johannesburg (47%) and Pretoria/Tshwane (31%).

Figure 1: Overall apparent manner of death, 2003 (n = 22,248)
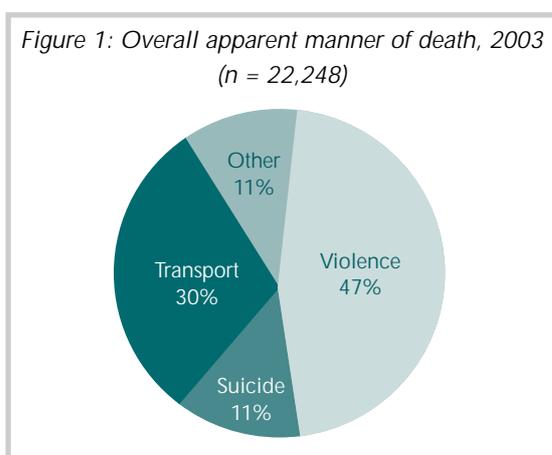
Among the major cities with full coverage, the highest mortality rate was recorded in Cape Town, where there were 66 homicides per 100,000 population, compared to 61 per 100,000 in Durban, 52 per 100,000 in Johannesburg and 24 per 100,000 in Pretoria/Tshwane (Figure 2).

Figure 2: Homicide rates in South Africa's four largest cities, 2003
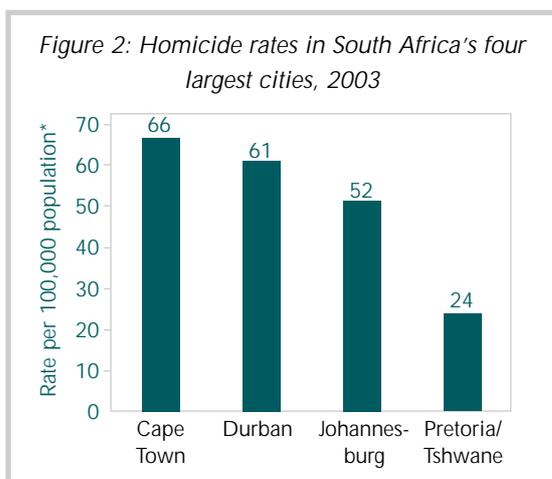
* Age adjusted to WHO world standard population distribution.

For the sample as a whole, the cause of death was unknown in only 70 of these homicides. Of the remaining deaths, the leading cause was gunshot injuries (Figure 3), which accounted for 52%, followed by sharp force injuries (31%), blunt force injuries (14%) and strangulation (2%).

Figure 3: Leading external causes of homicides, 2003 (n = 10,499)
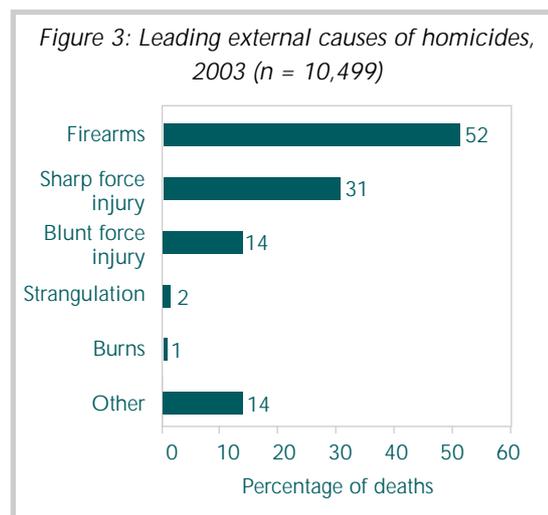
Among the major cities, the leading causes of death were firearms, followed by sharp force injuries (e.g. stabbing), blunt force injuries and strangulation. However, there were relatively more sharp force fatalities in Cape Town, compared to Durban and Johannesburg where the rates for firearm homicide were higher.

Firearms

Firearms were the leading external cause of homicides across all age groups from the age of five years. Of the 6,167 firearm deaths recorded by the NIMSS in 2003, 87% were violence-related and the rest were mainly suicide-related, except for 20 unintentional deaths (less than 1%). Gunshot injuries accounted for 53% of male and 41% of female homicides. The 46 recorded firearm deaths among children aged 0–14 years in Cape Town, Durban, Johannesburg and Pretoria/Tshwane were all violence-related except for one unintentional injury death in Johannesburg.

Male and female homicide

Males were disproportionately affected by fatal violence with 6.5 male homicides recorded for every female homicide. Although male homicides are more

Table 2: Mortality rates per 100,000 population in South Africa's four largest cities in 2003								
	Cape Town		Durban		Johannesburg		Pretoria/Tshwane	
	Population 2,951,842		Population 3,133,006		Population 3,337,138		Population 2,054,521	
	Total deaths	Deaths/ 100,000 pop.	Total deaths	Deaths/ 100,000 pop.	Total deaths	Deaths/ 100,000 pop.	Total deaths	Deaths/ 100,000 pop.
Crude homicide rate	2,166	73	2,071	66	2,024	61	548	27
Firearm homicide	933	32	1,193	38	1,384	41	319	16
Sharp force/stabbing	871	30	596	17	323	10	108	5
Blunt force	319	11	212	7	219	7	77	4
Male: female ratio	8.5:1		7.5:1		7.2:1		5.1:1	
Age standardised rate*	66		61		52		24	
* WHO world standard population distribution								

common than female homicides internationally, the ratio recorded by the NIMSS was approximately double that of the world average of 3.2 male homicides for every female homicide.[8]

The male to female ratio was highest in Cape Town (8.5:1), followed by Durban (7.5:1), Johannesburg (7.2:1) and Pretoria/Tshwane (5.1:1) (Table 2). Cape Town had the highest rate of fatal violence among females (7.7 per 100,000 population), followed by Johannesburg, Durban and Pretoria/Tshwane at 7.6, 7.3 and 4.5 per 100,000 of the population respectively.

Although men are at greater risk of being murdered, the majority of perpetrators for both male and female deaths are male. A recent MRC study found that in 2001, approximately half of all women murdered were killed by an intimate partner[9] and there are several allusions to this in the NIMSS data. Males outnumbered females for most causes of homicide in the NIMSS data set, with the exception of deaths due to strangulation. Furthermore, a far higher percentage of women were killed in private homes than men (42% versus 32%).

Age of victims
Analysis of homicide by age reveals that the number of homicides increased dramatically from the age of 15 to 44 years, with the highest number of homicides recorded in the 25–29 age group (Figure 4). In 2003,

homicide was the leading manner of non-natural death for all ages from 15 to 45 years and violence-related gunshot injuries are the single largest cause of injury death for all ages from 15 to 60 years.

Surprisingly, homicide rates among South African children were no higher than the world average in most age groups. The exception was among girls younger than four years where homicide rates were approximately 60% higher than the world average.[10]

Temporality of homicide
The most common days for homicide were Saturdays followed by Sundays in all four major cities, although the weekend peak was most noticeable in Cape Town, where nearly half of all homicides (49%) occurred on these two days. Overall, more violent deaths occurred between 20h00 and 23h00 (27%) than any other three-hour period, and again this evening peak was apparent in all four cities.

In the four major cities, homicide peaked in Cape Town between January and March; in Johannesburg between February and April, in Pretoria/Tshwane from October to December and in Durban between March and May (Figure 5).

Alcohol
More than half of homicide victims tested positive for alcohol, with the highest percentage of alcohol

Figure 4: Homicide by age in 2003 (n = 9,222)

Number of deaths / Age in years
Male / Female
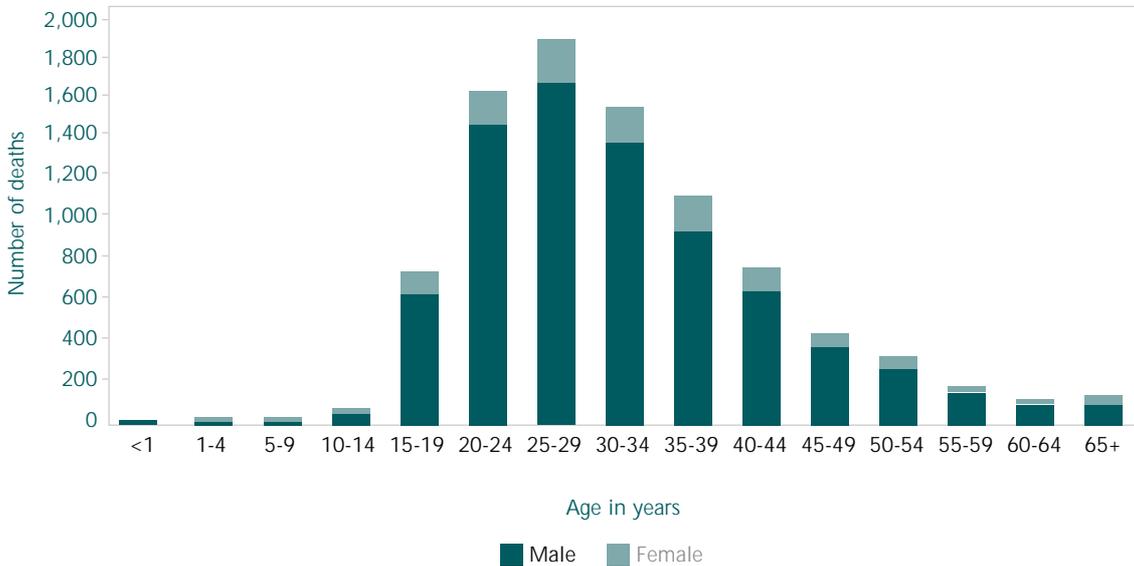
Figure 5: Homicide by month in 2003 (n = 6,678)

Percentage of deaths

Pretoria (n=544) Johannesburg (n=1,984)
Cape Town (n=2,126) ····Durban (n=2,024)
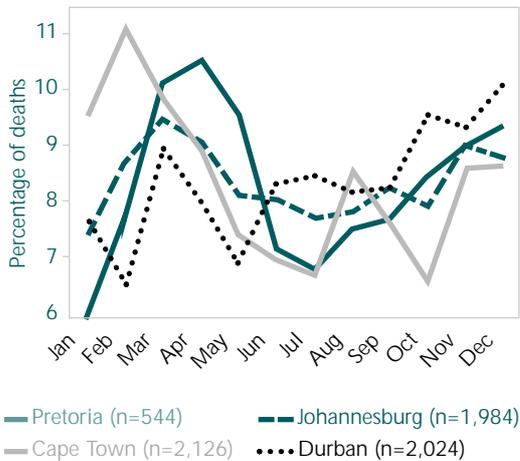
positive cases being recorded in Cape Town (53%), followed by Pretoria/Tshwane (49%), Johannesburg (46%) and Durban (44%). The levels of intoxication in Cape Town were also significantly higher than in Johannesburg (p<0.01) and Durban (p<0.01). Victims of sharp force homicide had the highest percentage of alcohol-positive cases (72%) as well as the highest mean blood alcohol concentration among the alcohol positive cases (0.19g/100ml).

In summary, the analysis of the NIMSS data indicated that homicide rates are much higher in South Africa than in the rest of the world and that there is also considerable variation in homicide rates between different urban centres. Firearms were a major contributor to the high homicide rates in all of the cities included in the NIMSS, and future analysis will provide pointers as to whether the new Firearms Control Act will have been successful in reducing firearm violence.

The data also clearly showed that males are at greater risk of being murdered than females, particularly those in the 15-44 year age group. The NIMSS results also confirmed that alcohol was an important risk factor, and it should be noted that other studies have shown a link between alcohol dependence and child abuse,[11] while excessive drinking by men is significantly associated with partner violence across different settings.[12] These factors, as well as the weekend and evening peaks have important implications for law enforcement and violence prevention.

Are rates of violence decreasing?
The 2003 NIMSS data established both the substantial prevalence and magnitude of homicide in South Africa's four largest metropolitan cities.

Table 3: Homicide in South Africa's four largest cities from 2001 to 2003					
	2001	2002		2003	
	No. of homicides	No. of homicides	% change	No. of homicides	% change
Cape Town total	2,420	2,421	0	2,166	-11
Firearm	1,113	1,192	+7	933	-22
Sharp force	932	870	-7	871	0
Blunt force	322	313	-3	319	+2
Durban total	2,100	2,175	+4	2,071	-5
Firearm	1,354	1,416	+5	1,340	-5
Sharp force	528	601	+14	608	+1
Blunt force	261	260	0	238	-8
Johannesburg total	2,274	2,285	0	1,932	-15
Firearm	1,643	1,577	-4	1,323	-12
Sharp force	347	398	+11	313	-19
Blunt force	219	247	+9	201	-11
Pretoria/Tshwane total	653	629	-4	548	-13
Firearm	398	384	-4	319	-17
Sharp force	120	111	-8	108	-3
Blunt force	86	98	+14	77	-21

These deaths imposed a significant social and economic burden, which threatens development strategies and also undermines South Africa's potential as a tourism destination. As the need to address these problems becomes increasingly urgent, it is important to understand whether rates of violence are increasing or decreasing. Because the NIMSS has maintained full coverage in all four cities since 2001, only very preliminary trend analysis is possible.

Comparisons with SAPS data are complicated by the use of different time periods (SAPS uses a financial year and NIMSS a calendar year), as well as different geographical boundaries. However, there does seem to be concurrence about a lower rate of homicide in 2003.

NIMSS data shows that in 2003 the number of homicides in all four major cities was lower than in 2001 and 2002 (Table 3), but these preliminary results should be treated with caution. The Cape Town, Durban and Johannesburg totals for 2002 were higher than any other year, and in Cape Town there has been a gradual increase in the number of

homicides since 1993.[13] The release of 2004 homicide data by SAPS in September 2005 provided further evidence of a decreasing trend.[14]

It is, however, worth questioning the utility of comparing the NIMSS data with that of the SAPS. Although the police's crime data potentially offers a richer pool of information, as there is not only a larger number of cases, but also the potential for more event-specific descriptive variables, these databases need to be underpinned by reliable reporting of non-natural deaths. South Africa's strict death registration system, which specifies that all non-natural deaths be subject to a post-mortem investigation, lends itself to a robust and accurate surveillance system. This is particularly true in urban areas, where it is more difficult for bodies to be disposed of outside the system.

Future options for the NIMSS
Further expansion of the NIMSS has temporarily been hampered by a lack of funding, as well as uncertainty about the pending transfer of state mortuaries from the Department of Safety and Security to the Department of Health. This is one

reason that the most recent annual report for 2003 data has focussed on mortality in South Africa's four largest cities, namely Johannesburg, Durban, Cape Town and Pretoria/Tshwane, where the NIMSS has full coverage. The other reason is that city level safety will become increasingly important as the 2010 Football World Cup draws nearer.

Cities provide ideal test beds for translating research into action for several reasons:
- they have streamlined and centralised information systems;
- city managers, local authorities and policy documentation are more easily accessible; and
- there are well defined population and geographical boundaries that allow for effective tracking and evaluation of intervention impacts and outcomes.

The utility of the information collected by the NIMSS lies in the pointers it provides for improving the prevention and control of injuries in South Africa, and in evaluating the impact of direct (e.g. gun law enforcement) and indirect (e.g. socio-economic development) interventions that are expected to reduce some of the major causes of fatal injury.

At the city level, the NIMSS and other sources of crime, violence and injury data can be used to inform violence and injury prevention initiatives through the various phases of formulation, implementation and evaluation. Utility may be enhanced by linking various systems such as death registration and SAPS crime analysis data, and inter-agency collaboration is one of the measures proposed by the Medical Research Council–UNISA Crime, Violence and Injury Lead Programme that will enable enhanced city safety between now and 2010. Others include systematic reviews of existing injury prevention strategies and the development of city-level policies for injury and violence prevention and safety promotion.

Acknowledgement

Endnotes

1 R Matzopoulos, R Norman, D Bradshaw, The burden of injury in South Africa: Fatal injury trends and international comparisons, in S Suffla, A Van Niekerk, N Duncan (eds), *Crime, Violence and Injury Prevention in South Africa: Developments and Challenges,* Tygerberg, MRC-UNISA Crime, Violence and Injury Lead Programme, March 2004.

2 The article makes use of estimates of injury deaths from D Bradshaw, O Groenewald, R Laubscher, N Nannan, B Nojilana, R Norman, D Pieterse, M Schneider, D Bourne, I Timæus, R Dorrington, L Johnson, Initial burden of disease estimates for South Africa 2000, *South African Medical Journal*, 93(9), 2003, pp 682–688. These estimates are based on the ASSA2000 model, but a later report by the same authors on the provincial mortality estimates, which uses the ASSA 2002 model suggests that injuries would have accounted for approximately 64,059 deaths as opposed to the 68,930 that were originally estimated.

3 WHO Global Burden of Disease study for 2000, Version 1, <http://www3.who.int/whosis/>

4 South African Police Service, Crime statistics per category: murder in the RSA for the financial years 1994/1995 to 2003/2004, <http://www.saps.gov.za/ statistics/reports/crimestats/2004/categories.htm> South African Police Service, 2004. Crime in the RSA for the period April to March 1994/1995 to 2003/2004, <http://www.saps.gov.za/statistics/reports/crimestats/ 2004/crime_stats.htm>

5 R Matzopoulos (ed), A profile of fatal injuries in South Africa, Fifth Annual Report of the National Injury Mortality Surveillance System 2003, Cape Town, Crime, Violence and Injury Lead Programme, Medical Research Council/University of South Africa, 2005.

6 We use the public health definition of homicide, where the death was due to an intentional act of violence, i.e. culpable homicides are excluded from the analysis, as are unintentional (or accidental) deaths and suicide.

7 Estimates for the total number of non-natural deaths range from between 49,846 Stats SA (2005) to the 68,930 non-natural deaths projected in the MRC's *Initial Estimates.*

8 World Health Organisation, *World report on violence and health,* Geneva, World Health Organisation, 2002.

9 S Matthews, N Abrahams, LJ Martin, L Van der Merwe, R Jewkes, *Every six hours a woman is killed by her intimate partner: a national study on female homicide in South Africa*, MRC Policy Brief, Medical Research Council, Tygerberg, 2004.

10 R Matzopoulos, R Norman, D Bradshaw, op cit.

11 JM Shultz and DP Rice, Quantifying the disease impact of alcohol with ARDI software, *Public Health Reports*, 106, 1991, pp 443–450. E Single, L Robson, X Xie, J Rehm, The economic costs of alcohol, tobacco and illicit drugs in Canada in 1992,

Addiction, 93, 1998, pp 983–98.

12 DR English, CDJ Holman, E Milne, G Hulse,
    MG Winter, *The quantification of drug caused
    morbidity and mortality in Australia, 1995 edition,*
    Canberra, Commonwealth Department of Human
    Services and Health, 1995.

13 Full coverage has been maintained by the NIMSS
    since its inception in 1999 and additional post mortem
    data were available through the surveillance work that
    preceded the NIMSS (1993 to 1995).

14 SAPS Annual report, <www.saps.gov.za/saps_profile/
    strategic_framework/annual_report/index.htm>