A PROFILE OF FATAL INJURIES IN GAUTENG 2009

Annual Report for Gauteng based on the National Injury Mortality Surveillance System (NIMSS)

Forensic Pathology Services

MRC-UNISA (SAPPRU)

Forensic Chemistry Laboratories

Editor:
Hilton Donson

MRC-UNISA Safety and Peace Promotion Research Unit
(SAPPRU)

November 2010

SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

MRC

UNISA university of south africa

MRC-UNISA Safety & Peace Promotion Research Unit

(SAPPRU)

CONTACT DETAILS
JOHANNESBURG

Director:	Professor Mohamed Seedat
Address:	UNISA ISHS PO Box 1087 Lenasia 1820
Telephone: Fax:	(011) 857 1142 (011) 857 1770
For more information:	Lyndsey Lourie lourilc@unisa.ac.za

CAPE TOWN

Co-Director: Programme Manager:	Professor Kopano Ratele Anesh Sukhai
Address:	Medical Research Council PO Box 19070 Tygerberg 7505
Telephone: Fax:	(021) 938 0216 (021) 938 0381
For more information:	Annelise Krige annelise.krige@mrc.ac.za
Websites:	http://www.sahealthinfo.org http://www.mrc.ac.za/ http://www.unisa.ac.za/dept/ishs/index.html
Editor:	Hilton Donson
Project Team:	Sherianne Kramer, Annelise Krige, Hawabibi Laher, Royal Lekoba, Lyndsey Lourie, Sarah MacKenzie, Babsy Mathebula, Jeminah Mtshali, Keith Ross, Bronwyn Sheriff, Mariette Smith, Lu-Anne Swart
Cover design, design and layout:	Hilton Donson

© Medical Research Council, November 2010.
ISBN: 978-1-920014-73-5

Table of Contents

Acknowledgements iii

Glossary iv

Executive Summary vi

Chapter 1 1
Introduction: The National Injury Mortality Surveillance System (NIMSS) 1
- 1.1. Goals of the NIMSS 1
- 1.2. Aims of the NIMSS 2
- 1.3. NIMSS methodology 2

Chapter 2 3
Participating Facilities and Data Representivity 3

Chapter 3 4
Injury Mortality Profile for Gauteng 4
3.1. Overall manner of death 4
- 3.1.1. Manner of death by age 4
- 3.1.2. Manner of death by sex 5

3.2. Scene of injury 5
3.3. Time of death 5
3.4. Day of death 6
3.5. Monthly variation 6
3.6. External cause of death 6
- 3.6.1. External cause of violence by age 7
- 3.6.2. External cause of suicide by age 8
- 3.6.3. External cause of transport by age 9
- 3.6.4. External cause of other unintentional injury deaths by age 10

3.7. Monthly caseload 11
3.8. Blood alcohol levels 11
- 3.8.1. Blood alcohol level by apparent manner of death 11
- 3.8.2. Blood alcohol level by transport user 11

Chapter 4 12
Estimated mortality rates for Gauteng 12

Chapter 5 14
Conclusion 14

References 15

Appendix I: Injury Mortality Data Collection Form 16

Acknowledgements

We would like to acknowledge the support of the following individuals of the participating Forensic Medicine Departments and participating Gauteng Forensic Pathology Services Medico-legal Laboratories (MLLs) namely:

Dr. K.K. Hlaise (Acting Head: Clinical Department of Forensic Medicine, University of Limpopo, MEDUNSA Campus and Forensic Pathology Services: Ga-Rankuwa), Prof. J. Vellema (Head: Clinical Department of Forensic Medicine, University of Witwatersrand, Johannesburg and Forensic Pathology Services: Gauteng Southern Cluster), Dr. J. Steenekamp (Head: Clinical Unit, Forensic Pathology Services: Germiston Cluster), Dr. J.B. Mwesigwa (Head: Clinical Unit, Forensic Pathology Services: Diepkloof Cluster) and all the Forensic Pathology Service Doctors who contribute to the completion of the NIMSS data forms.

Bronkhorstspruit: W. Fouche
Diepkloof: L. Malatse, L. Motsewabone and T. Dladla
Ga-Rankuwa: M. Wilken, D. Du Plessis and A. Sekhaolelo
Germiston: Y. Minnie
Heidelberg: A. Botha
Johannesburg: I. Botes, E.A. Uys and R. Chabalala
Roodepoort: J. Koekemoer
Sebokeng: P. Denner, J. Masupe and J.F. Stroebel
Springs: P. Cox

We would like to acknowledge the ongoing support of the National Department of Health, the Provincial Department of Health and Social Development of Gauteng and Mr K. Xaba, Head of the Forensic Chemistry Laboratory, Johannesburg.

We also acknowledge the appointed staff members at the Medical Research Council (MRC) and the University of South Africa (UNISA) who assisted in the data collection, analysis, compilation and layout of the NIMSS 2009 Annual Report.

And finally, thank you to the many users of the National Injury Mortality Surveillance System (NIMSS) data. We hope that this report plays some part in assisting you in your prevention, advocacy and policy work.

Glossary

The following terminology is used in this report and is briefly explained and contextualised below:

APPARENT MANNER of death describes the intention prior to the injury that resulted in the death. The apparent manner of death is divided into five different categories: violence/homicide, suicide, transport death, unintentional injury death and undetermined death. *Note that this is the apparent manner of death according to the forensic pathologists who perform the autopsies, and the final manner of death is only determined after court proceedings, which can take between 2 and 5 years to complete.*

The EXTERNAL CAUSE of death refers to the mechanism, circumstance or event that preceded the death. Examples of the external cause of death include deaths resulting from injuries due to firearms, stabbing, motor vehicle collisions, drowning, burns and poisonings, all of which may result in injury and eventually death.

An INJURY can be defined as damage to a person caused by an acute transfer of energy (mechanical/kinetic, thermal, chemical, electrical, radiation) or by a sudden absence of heat (hypothermia) or oxygen (asphyxiation, drowning) (Berger, L.H. & Mohan, D. 1996).

NON-NATURAL deaths include all deaths that were not due to, or may not have been due to natural causes and that in terms of the Inquest Act, 1959 (Act No. 58 of 1959) are subject to medico-legal investigation. The National Health Act, 2003 (Act No. 61 of 2003) "*Regulations Regarding the Rendering of Forensic Pathology Service*" define *"unnatural death"* as follows: for the purposes of the medico-legal investigation of death, the following shall be deemed to be deaths due to unnatural causes:

- Any death due to physical or chemical influence, direct or indirect, or related complications;
- Any death, including those deaths which would normally be considered to be a death due to natural causes, which in the opinion of a medical practitioner, has been the result of an act of commission or omission which may be criminal in nature; or
- Where the death is sudden and unexpected, or unexplained or where the cause of death is not apparent.

We have grouped these non-natural deaths by external cause of death and apparent manner of death.

This report uses SEX rather than GENDER to distinguish between male and female deaths. In general, the term sex is used to describe distinctive physiological features related to being male or female. In contrast, the term gender comprises different occupational, social and psychological attributes that are variously attributed to being male or female. The latter concept depends on societal norms and is not internationally comparative.

SUICIDE refers to fatal self-inflicted *intentional* injuries.

SURVEILLANCE is a process that involves the ongoing and systematic collection, analysis and interpretation of data relating to the occurrence of a health event and the timely dissemination of this information to those who need to know and those who need to apply it. In the NIMSS the health events that are described are attributable to injuries and are described as non-natural deaths.

TRANSPORT deaths are normally also *unintentional* injury deaths, but may include deaths due to culpable homicide. Since the NIMSS data are geared towards prevention initiatives, all transport deaths have been grouped together to facilitate international comparison, and the development and evaluation of prevention programmes.

UNDETERMINED deaths are those where the medical examiner is unable to determine whether the manner of death was due to violence, suicide, transport or unintentional injuries, or due to natural causes.

UNINTENTIONAL INJURY deaths include all other *unintentional* non-transport injuries such as those due to burns, falls, poisoning and drowning.

The NIMSS definition of VIOLENCE refers to intentional injuries inflicted by another person (perpetrator). This definition excludes deaths due to culpable homicide ("the unlawful negligent/unintentional killing of a human being") since the NIMSS data are geared towards prevention initiatives, and intentional and unintentional injuries require different types of intervention.

Executive Summary

This 2009 Annual Report for Gauteng[1], based on the National Injury Mortality Surveillance System (NIMSS), presents a profile of fatal injuries in the province for the period from 1 January 2009 to 31 December 2009. The analysis focuses on the 11329 non-natural deaths (cases due to natural causes were excluded) registered at nine (out of the ten) medico-legal laboratories in Gauteng.

Manner of death. Violence was the leading manner of death, accounting for just under one-third (32.4%, n= 3671) of the 11329 non-natural deaths recorded in Gauteng, followed by transport (28.7%, n=3248), suicide (11.3%, n=1278), and other unintentional injury unintentional injuries (8.3%, n=937). For the remaining 2195 (19.4%) cases, the manner of death was undetermined.

External causes of death. The leading external cause of death was firearm-related (15.5%, n=1630) followed by pedestrian injury (12.7%, n=1334), sharp objects (10.4%%, n=1091), and blunt force (10.1%, n=1064). The external cause of death was unknown in 7.0% of the 11329 cases. For children aged 0-4 years, abortions were the leading causes of death, while for older children (5-14 years) it was pedestrian injuries. Among the youth aged 15-29 years, adults aged 30-44 years and older adults aged 45-59 years, a firearm was the leading cause of death. For adults 60 years and older, pedestrian injuries were the leading external cause of death.

Violence. Over 37% (n=1374) were inflicted by firearms, followed by sharp instruments (29.3%, n=1074) and blunt force (26.5%, n=971). The external cause of violence-related deaths was unknown in seven of the 3671 cases. The number of deaths due to violence rose sharply from the age of 20 years and peaked in the 25-29 year age group and remained high until 39 years. There were nearly seven male violent deaths for every female.

Suicide. Hangings accounted for the vast majority (52.9%, n=676) of the 1278 suicides, followed by poisonings (19.5%, n=249) and firearms (17.2%, n=219). The external cause of suicide-related deaths was unknown in one of the 1278 cases. Over one-third of suicides occurred among youth aged 15-29 years (34.8%, n=439) with a higher incidence among adults aged 30-44 (38.1%, n=481). There were just over five male suicides for every female suicide. The major external causes of suicide among males was hanging (56.4%, n=606) and firearms (18.5%, n=99), while among females it was poisoning (44.3%, n=89) and hanging (34.3%, n=69).

Transport-related deaths. Of the 3248 transport-related deaths, pedestrian-related deaths accounted for 41.0% (n=1333), drivers 16.7% (n=542), passengers 16.1% (n=522), railway-related deaths 5.0% (n=162) and (motor) cyclists 4.7% (n=151). A further 16.4% (n=533) of transport-related deaths were due to motor vehicle collisions of which the user category was unknown. Transport-related injuries were a leading external cause of death across all age groups. Over 60% of all transport-related deaths were among victims aged between 20-44 years. There were four male transport-related deaths per female transport-related death.

[1] Data from nine participating medico legal laboratories (MLLs) in Gauteng were available at the time of the report being finalised.

Other unintentional injury deaths. Burns (36.3%, n=336) followed by drowning (14.5%, n=134) were the leading causes of the 927 other unintentional injury deaths. The external cause of violence-related deaths was unknown in ten of the 937 cases. In one-quarter of cases injury deaths occurred among the 0-9 year olds. Nearly half (45.7%) of these injury deaths occurred among 20-44 year olds. There were about three male other unintentional injury deaths for every female death.

Manner of death undetermined. For 2195 cases, the manner of death was undetermined. The external cause was unknown in 35.2% (n=773) of the undetermined deaths. For the remaining 1422 deaths, abortions accounted for 23.1% (n=329), poisoning for 19.9% (n=283) and burns for 17.9% (n=252) of the undetermined deaths. Most of these deaths (51.8%) were clustered among adults between 20-54 years.

Chapter 1

Introduction: The National Injury Mortality Surveillance System (NIMSS)

Injury is one of the major causes of death in South Africa. External causes of death are vital for monitoring demographic, seasonal and socio-economically related trends in these major causes of death and disability. Since 1991 and Act No. 52 of 1992 which precluded entry of the external cause of death in the death register for injury cases, such information has been missing from the national vital statistics on causes of death. Police data systems only record information for violence, and the national transport information system records information for an uncertain subgroup of motor vehicle collision deaths. Death due to suicide and other unintentional causes, where the manner of death is undetermined, are not tracked by any agency.

The National Injury Mortality Surveillance System (NIMSS) was established in 1999 to fill this gap by providing more comprehensive information about deaths due to external causes. The information is collated from existing investigative procedures at medico legal laboratories and state forensic chemistry laboratories. All deaths due to external causes are included, allowing an overview of how the different categories of external cause (e.g. gunshots, drowning) contribute to the profile of non-natural mortality in men, women, and children.

The ultimate goal of the NIMSS is to establish a permanent system that will register all such deaths that occur annually in South Africa, and develop partnerships to inform initiatives for the prevention of non-natural fatality.

1.1. Goals of the NIMSS

The goals of NIMSS are:

- To provide ongoing and systematic information about the incidence, causes and consequences of all non-natural deaths at local, regional and national levels;
- To enable the early identification of new injury trends and emerging problem areas so that adequate interventions can be timeously established;
- To determine priorities for injury and violence prevention action for high-risk groups and for socio-environmental risk factors;
- To help evaluate direct and indirect violence and injury prevention and control measures; and
- To monitor seasonal and longitudinal changes in the non-natural death profile.

The utility of the information collected by 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. Although limited in coverage, these reports provide a baseline profile for future monitoring and an information platform to reinforce the ongoing extension and improvement of the system. In achieving its goals, the NIMSS is intended to meet the information requirements of three main stakeholder groups, namely, the forensic medico-legal services; the National Crime Prevention Strategy; and violence and injury prevention agencies at local, provincial and national level.

For forensic medico-legal services, NIMSS is able to provide important information for the allocation of resources, auditing of costs and rationalisation of services. The current absence of information prevents proper assessment of costs, inhibits evaluation and impedes proper planning.

For the National Crime Prevention Strategy, NIMSS is able to provide crucial baseline data for all deaths due to violence and other injuries, including information on the covariance between violence and unintentional injury deaths, demographic and geographic variations in the magnitude and patterning of violent deaths,

and information on particularly sensitive indicators such as the use of firearms, alcohol and other substance involvement.

Injury prevention agencies include national and local government, the South African Police Services, non-governmental organisations, business and parastatals. For the agencies, NIMSS is able to provide descriptive information needed for the design and implementation of preventive interventions at municipal, metropolitan, provincial and national levels.

1.2. Aims of the NIMSS

NIMSS uses existing medico-forensic investigative procedures. It collates onto a single data form and into a single computer database items spread between four points in the investigative procedure, namely, post-mortem reports, SAP 180 forms, chemical pathology laboratory results, and criminal justice system reports.

At its inception in 1999, NIMSS was piloted with funding from the then Department of Arts, Culture, Science and Technology's Innovation Fund on Crime Prevention. For 2000, 15 MLLs in five provinces contributed data to the NIMSS. For 2009, 29 MLLs in 2 provinces contributed their data, with comprehensive provincial coverage for Gauteng (with exception for Pretoria) and Mpumalanga, the latter providing the NIMSS with rural representivity. Extension to other provinces and cities will continue as long as resources permit.

1.3. NIMSS methodology

NIMSS records 21 items of information for every deceased that enters the forensic medico- legal system in the participating facilities. In order to meet the system's goals and enable international comparisons, NIMSS classifies the primary medical cause of death using the International Classification of Disease version 9 (ICD 9) and assigns a probable manner of death code to each case. Spatial and temporal data are recorded, as is the presence of alcohol in the deceased through information from forensic laboratory reports. The final manner of death is only available after court findings, which are often only available up to 4 years after the death. The data are collected by the police and forensic pathologists at each site, and captured into a computerised database by administrative and secretarial staff at the MLLs. The data are then sent to the SAPPRU offices in Cape Town, where they are combined with other MLLs' data and data from the forensic chemistry laboratories, cleaned, and finally analysed by researchers. Annual and caseload reports are produced for forensic pathologists at each facility. The findings generated by the NIMSS contributes broadly to the Injury Prevention and Safety Promotion agenda in the country including as a lab management tool and for capacity development, dissemination, interventions and policy.

Perhaps most importantly, it is emphasised that the annual report provides an overview of the data only, and does not fully reflect the rich amount of information in the surveillance database. This additional information includes, in particular, suburb-level indicators of where injuries occurred and, of course, many cross-tabular analyses that could not be accommodated in this summary report.

Chapter 2

Participating Facilities and Data Representivity

Table I shows the nine (out of ten) participating medico-legal laboratories (MLLs) in Gauteng and the number of deaths recorded at each facility for 2009, including those from natural causes.

Table I: Participating MLLs

Province	City	MLL	Total
Gauteng	Bronkhorstspruit	Bronkhorstspruit	317
Gauteng	Ekurhuleni	Springs	1235
Gauteng	Heidelberg	Heidelberg	291
Gauteng	Johannesburg	Diepkloof	1738
Gauteng	Ekurhuleni	Germiston	2678
Gauteng	Johannesburg	Johannesburg	2531
Gauteng	Johannesburg	Roodepoort	1409
Gauteng	Johannesburg	Sebokeng	1376
Gauteng	Tshwane	Ga-rankuwa	1155
Total			12 730

Not all cases had information for every item, and therefore totals in the subsequent graphs and tables may vary. Additionally, descriptive findings in this report (including charts and tables) are the result of an automated report generating process and hence, patterns emerging from some of the graphs with few cases should be interpreted with caution. Owing to the relatively few cases where date and time of injury were available, date and time of death have been reported instead. While death would have occurred at the time of injury for a majority of cases, some victims will have died hours or days after the injury itself, and this bias must be kept in mind when reading the relevant tables and charts.

Chapter 3

Injury Mortality Profile for Gauteng

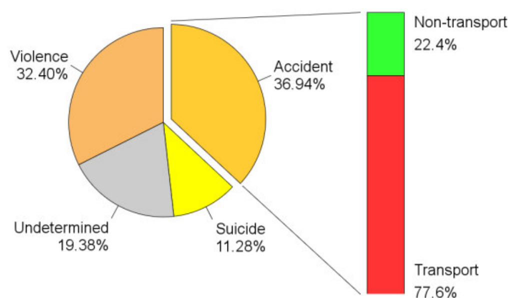
Results

A total of 12730 cases were recorded in Gauteng for January 2009 to December 2009, including 1401 (11.0%) cases that were due to natural causes. The rest of the analysis is restricted to the 11329 non-natural deaths that occurred in the catchment area. However, the section that deals with the pathology service (section 3.7) includes the natural deaths in order to provide an accurate assessment of facility caseload.

3.1. Overall manner of death

Violence was the leading manner of death, accounting for just under one-third (32.4%, n= 3671) of the 11329 non-natural deaths recorded in Gauteng, followed by transport (28.7%, n=3248), suicide (11.3%, n=1 278), and other unintentional injury unintentional injuries (8.3%, n=937). For the remaining 2195 (19.4%) cases, the manner of death was undetermined.

Figure 1 : Overall manner of death (N=11329)



3.1.1. Manner of death by age

The average age of the victims was 33.3 (± 17.2 years). The leading manner(s) of death amongst the;

- **0-14** age group was undetermined (46.9%);
- **15-24** age group was violence (41.5%);
- **25-34** age group was violence (41.7%);
- **35-44** age group was violence (34.9%)
- **45-54** age group was transport (32.2%)
- **55-64** age group was transport (32.4%); and
- **65+** age group was transport (27.9%).

Figure 2.1. Violence by age (n = 3547)

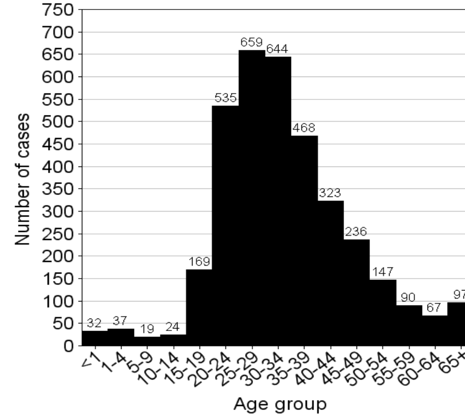


Figure 2.2. Suicide by age (n = 1261)

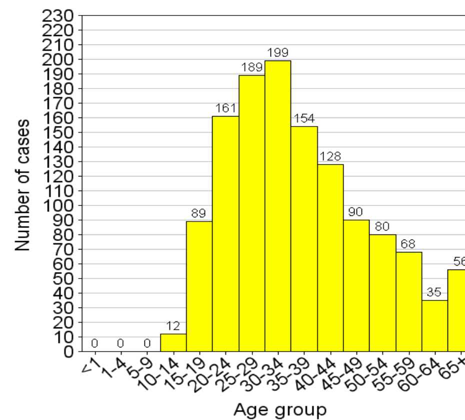


Figure 2.3. Transport deaths by age (n = 3123)

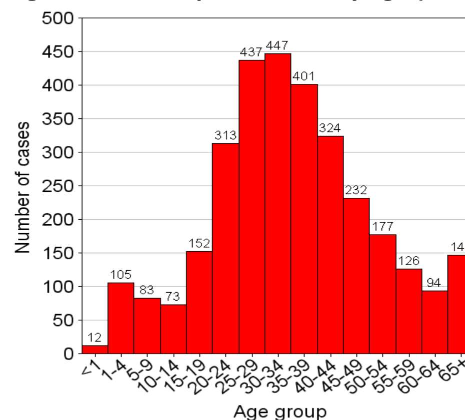


Figure 2.4. Other unintentional deaths by age (n = 909)

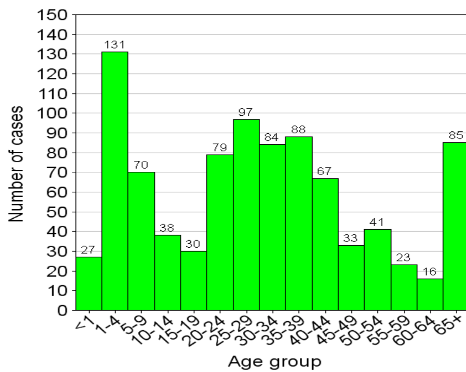
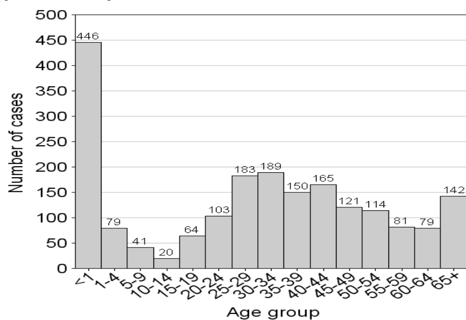


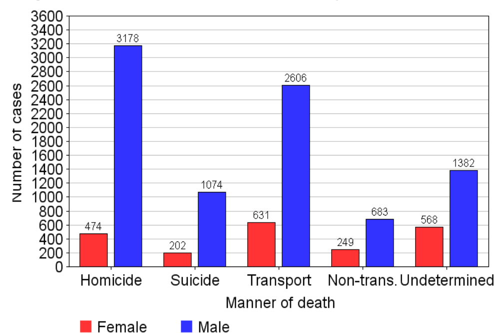
Figure 2.5. Undetermined deaths by age (n = 1977)



3.1.2. Manner of death by sex

Of the cases recorded for Gauteng, 8923 (80.8%) were male and 2124 (19.2%) were female. The leading manner of death amongst males was violence (35.6%). The leading manner of death amongst females was transport (29.7%), followed by undetermined (26.7%), and followed by violence (22.3%).

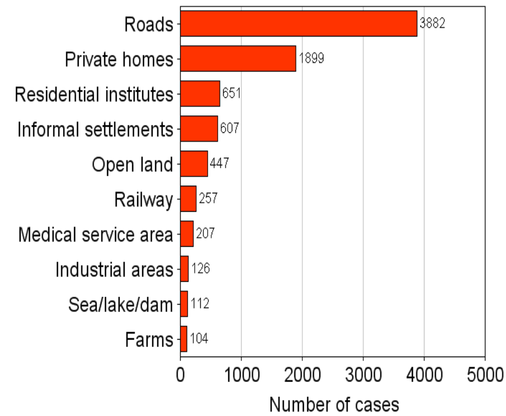
Figure 3. Manner of death by sex (n = 11047)



3.2. Scene of injury

The scene of injury was known in 8662 (76.5%) cases. The scene that accounted for the majority of deaths was roads (44.8%).

Figure 4. Top 10 scenes of injury (n = 8292)

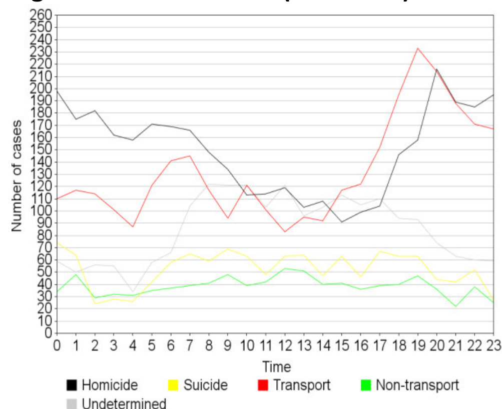


3.3. Time of death

The peak period(s) of death for:

- **violence** was 20h00 - 01h00 (27.2%), 01h00-03h00 (10.6%);
- **suicide** was 17h00 - 20h00 (15.3%), 00h00 - 02h00 (11%), 09h00 - 11h00 (10.5%), 12h00 - 14h00 (10.1%), 07h00 - 08h00 (5.2%), 15h00 - 16h00 (5%);
- **transport** related deaths was 18h00 - 00h00 (36.5%); and
- **other unintentional injury** related deaths was 12h00 - 14h00 (11.2%), 01h00 - 02h00 (5.2%), 09h00 - 10h00 (5.2%), 19h00 - 20h00 (5.1%).

Figure 5. Time of death (n = 11025)



3.4. Day of death

The peak days of death for:

- **violence** were Saturdays (22.7%), Sundays(20.9%), and Fridays (13.1%);
- **suicide** were Sundays(16.4%), Mondays (15.6%), and Wednesday (15.4%);
- **transport** related deaths were Saturdays (20.5%), Sundays (19.6%), and Fridays (14.9%); and
- **other unintentional injury** were Sundays (16.1%), Wednesdays (14.9%), and Tuesdays(14.5%).

Figure 6. Day of death (n = 11223)

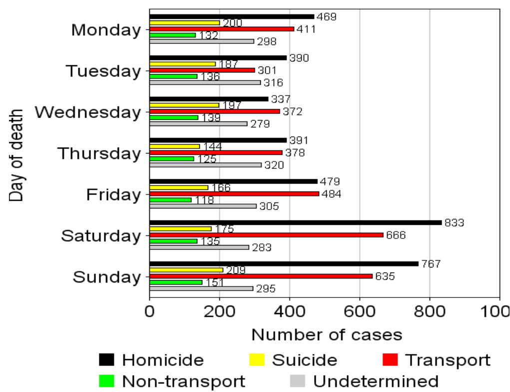


Figure 7. Day of violence deaths by sex (n = 3648)

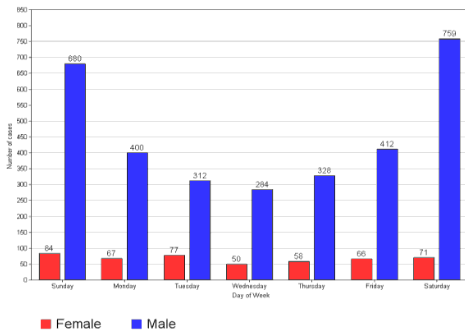


Figure 8. Day of suicide deaths by sex (n = 1276)

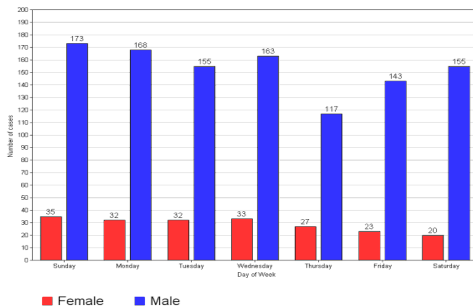
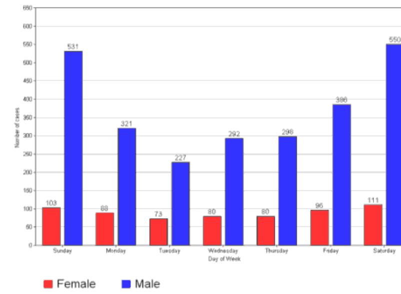


Figure 9. Day of transport deaths by sex (n = 3236)

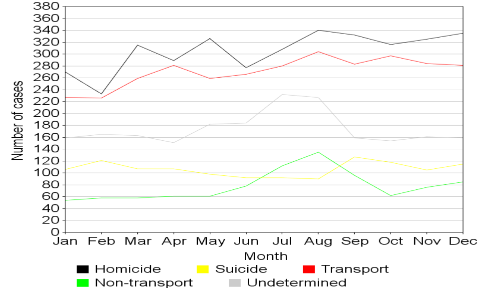


3.5.Monthly variation

The peak month for:

- **violence** was August (9.3%), December and September (9.1% each);
- **suicide** was September (9.9%), February (9.5%), and October (9.2%);
- **transport** related deaths was August (9.4%), October (9.1%), and November (8.7%); and
- **other unintentional injury** related deaths was August (14.4%), July (12.0%), and September (10.3%).

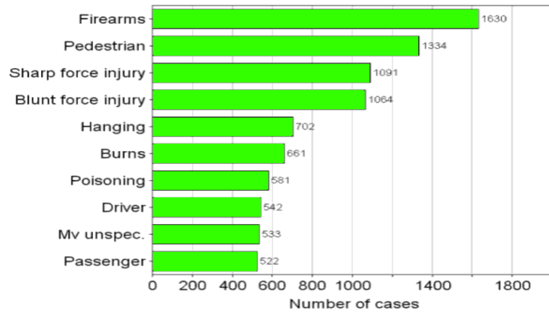
Figure 10. Monthly variation (n = 11223)



3.6. External cause of death

The external cause of death was unknown in 7.0% of the 11329 cases. For the remaining 10538 cases, the leading external cause of death was firearm-related (15.5%, n=1630) followed by pedestrian injury (12.7%, n=1334), sharp objects (10.4%%, n=1 091), and blunt force (10.1%, n=1064). For children aged 0-4 years, abortions were the leading causes of death, while for older children (5-14 years) it was pedestrian injuries. Among the youth aged 15-29 years, adults aged 30-44 years and older adults aged 45-59 years, firearms was the leading causes of death. For adults 60 years and older, pedestrian injuries were the leading external cause of death.

Figure 11. Top 10 external causes of death (n = 8660)



3.6.1. External cause of violence by age

The external cause of violence-related deaths was unknown in seven of the 3671 cases. For the remaining 3664 cases, just over 37% (n=1374) were inflicted by firearms, followed by sharp instruments (29.3%, n =1074) and blunt force (26.5%, n =9). The number of deaths due to violence rose sharply from the age of 20 years and peaked in the 25-29 year age group and remained high until 39 years. There were nearly seven male violent deaths for every female. Age was unknown in 124 of the 3671 cases. Of the remaining cases, the average age of the victims was 33 (± 13.2 yrs). The leading external cause of death for violence in the:

- **0-14** age group was blunt force injury (22.3%);
- **15-24** age group was sharp force injury (37.2%) followed by firearms (30.7%);
- **25-34** age group was firearms (41.4%) followed by sharp force injury (31.9%);
- **35-44** age group was firearms (39.9%);
- **45-54** age group was firearms (41.8%) followed by blunt force injury (30%);
- **55-64** age group was firearms (47.1%); and
- **65+** age group was blunt force injury (43.3%).

Figure 12.1. Firearm violence by age (n = 1347)

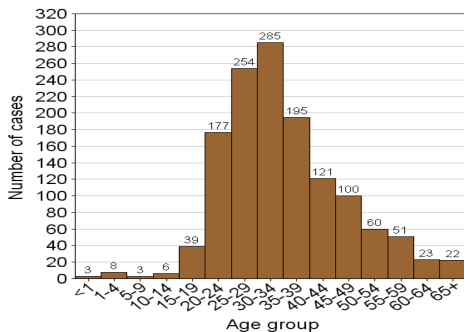


Figure 12.2. Sharp force violence by age (n = 1040)

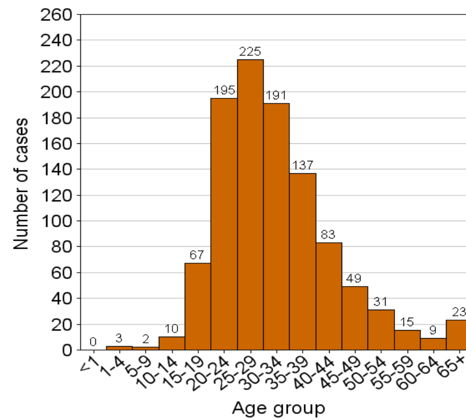


Figure 12.3. Blunt force violence by age (n = 922)

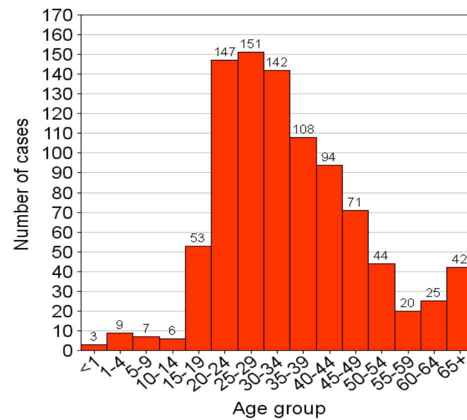
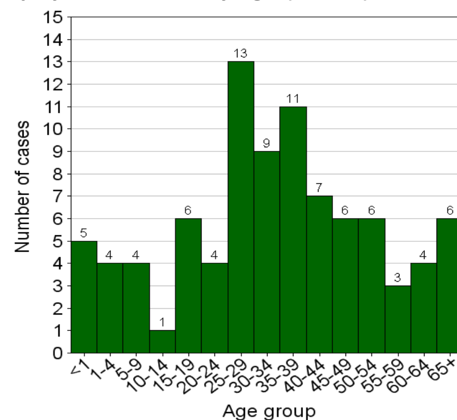


Figure 12.4. Strangulation, suffocation or asphyxia violence by age (n = 89)



3.6.2. External cause of suicide by age

The external cause of suicide-related deaths was unknown in one of the 1278 cases. For the remaining 1277 cases, hangings accounted for the vast majority (52.9%, n=676) of the 1278 suicides, followed by poisonings (19.5%, n=249) and firearms (17.2%, n=219). Over one-third of suicides occurred among youth aged 15-29 years (34.8%, n=439) with a higher incidence among adults aged 30-44 (38.1%, n=481). There were just over five male suicides for every female suicide. The major external causes of suicide among males was hanging (56.4%, n=606) and firearms (18.5%, n=99), while among females it was poisoning (44.3%, n=89) and hanging (34.3%, n=69). Age was unknown in 17 of the 1278 cases. Of the remaining cases, the average age of the victims was 36 (± 14.1 yrs). The leading external cause of death for suicide in the:

- **0-14** age group was hanging (75%);
- **15-24** age group was hanging (61.6%);
- **25-34** age group was hanging (61.3%);
- **35-44** age group was hanging (49.3%);
- **45-54** age group was hanging (42.4%);
- **55-64** age group was firearms (34%) followed by hanging (33%); and
- **65+** age group was hanging (33.9%) followed by firearms (33.9%).

Figure 13.1. Hanging suicide by age (n = 665)

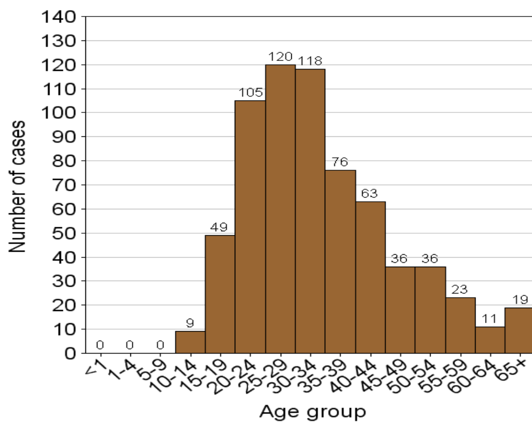


Figure 13.2. Poisoning suicide by age (n = 248)

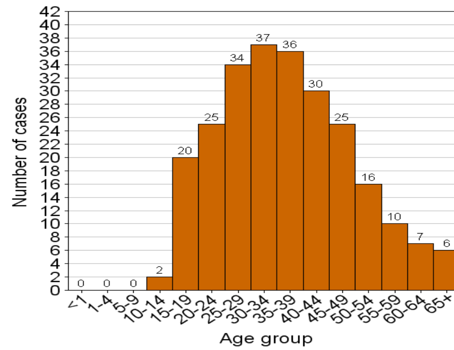


Figure 13.3. Firearm suicide by age (n = 218)

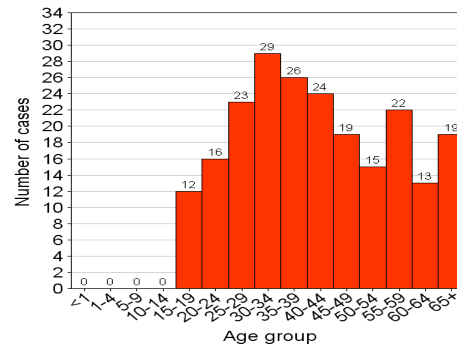


Figure 13.4. Gassing suicide by age (n = 61)

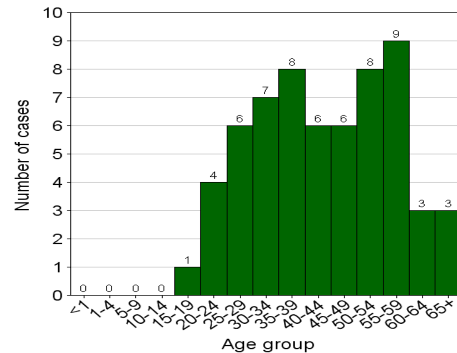
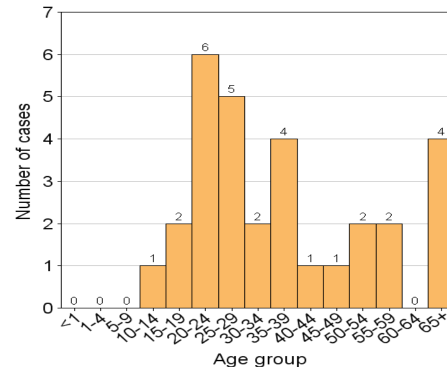


Figure 13.5. Jump from height suicide by age (n = 30)



3.6.3. External cause of transport by age

Of the 3248 transport-related deaths, pedestrian-related deaths accounted for 41.0% (n=1333), drivers 16.7% (n=542), passengers 16.1% (n=522), railway-related deaths 5.0% (n=162) and (motor) cyclists 4.7% (n=151). A further 16.4% (n=533) of transport-related deaths were due to motor vehicle collisions of which the user category was unknown. Transport-related injuries were a leading external cause of death across all age groups. Over 60% of all transport-related deaths were among victims aged between 20-44 years. There were four male transport-related deaths per female transport-related death. Age was unknown in 125 of the 3248 cases. Of the remaining cases, the average age of the victims was 34 (± 16.1 yrs). The leading external cause of death for transport in the:

- **0-14** age group was pedestrian (67%);
- **15-24** age group was pedestrian (32.5%);
- **25-34** age group was pedestrian (36.3%);
- **35-44** age group was pedestrian (40.4%);
- **45-54** age group was pedestrian (36.9%);
- **55-64** age group was pedestrian (41.8%); and
- **65+** age group was pedestrian (45.6%).

Figure 14.1. Pedestrian deaths by age (n = 1258)

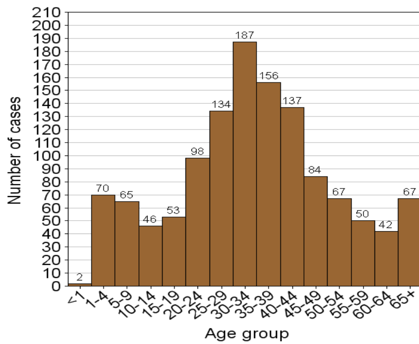


Figure 14.2. Driver deaths by age (n = 536)

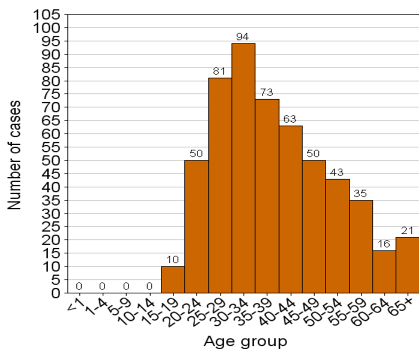


Figure 14.3. MVA Unspecified deaths by age (n = 521)

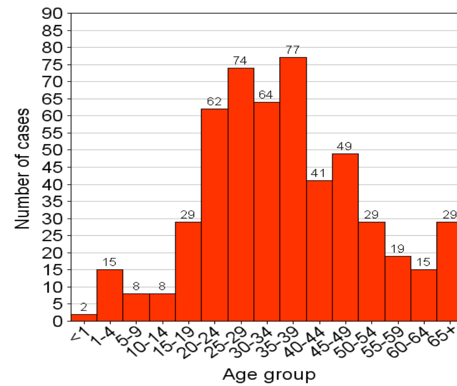


Figure 14.4. Passenger deaths by age (n = 511)

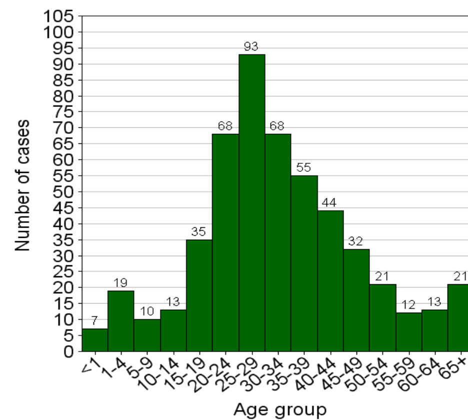
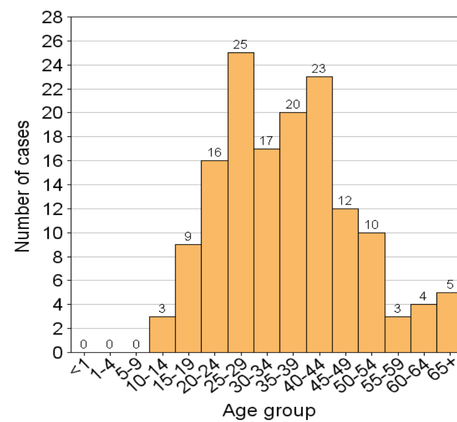


Figure 14.5. Cyclist deaths by age (n = 147)



3.6.4. External cause of other unintentional injury deaths by age

The external cause of violence-related deaths was unknown in ten of the 937 cases. For the remaining 927 cases, burns (36.3%, n=336) followed by drowning (14.5%, n=134) were the leading causes of the 927 other unintentional injury deaths. In one-quarter of cases injury deaths occurred among the 0-9 year olds. Nearly half (45.7%) of these injury deaths occurred among 20-44 year olds. There were about three male other unintentional injury deaths for every female death. Age was unknown in 28 of the 937 cases. Of the remaining cases, the average age of the victims was 29 (± 22.1 yrs). The leading cause for other unintentional injury related deaths in the:

- **0-14** age group was burns (35.7%);
- **15-24** age group was burns (39.4%);
- **25-34** age group was burns (43.6%);
- **35-44** age group was burns (40.1%);
- **45-54** age group was burns (36.5%);
- **55-64** age group was burns (38.5%); and
- **65+** age group was burns (31.8%).

Figure 15.1. Burn deaths by age (n = 330)

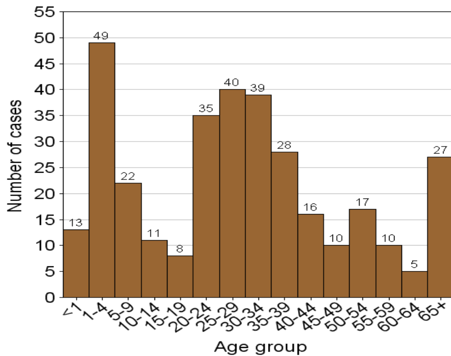


Figure 15.2. Drowning deaths by age (n = 127)

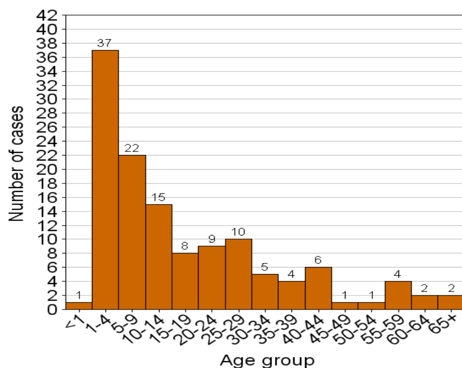


Figure 15.3. Fall from height deaths by age (n = 91)

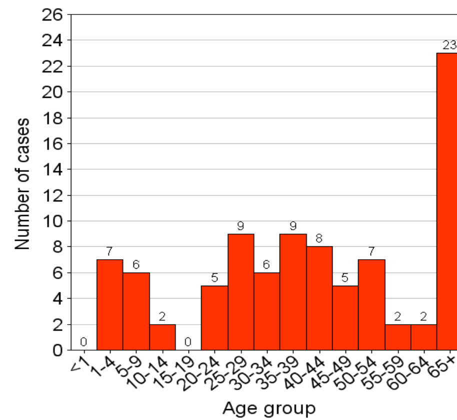


Figure 15.4. Blunt force injury deaths by age (n = 58)

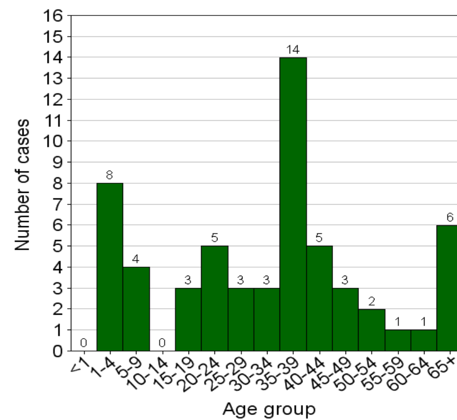
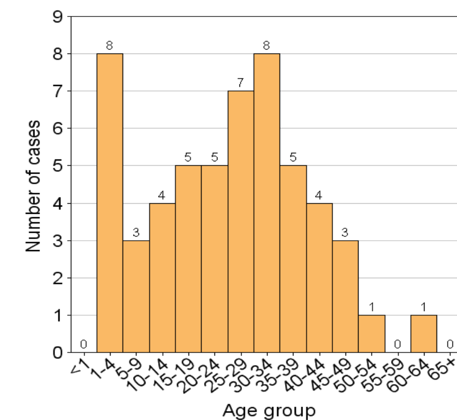


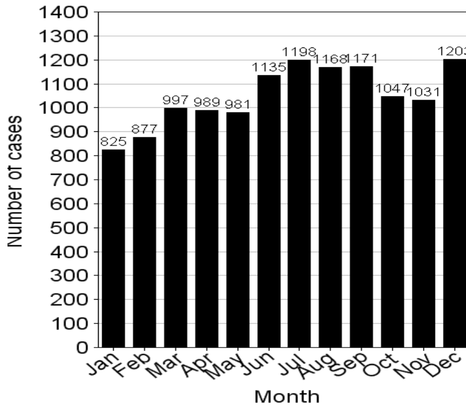
Figure 15.5. Electrocution deaths by age (n = 54)



3.7. Monthly caseload

The monthly caseload was highest in December (9.5%), followed by July (9.5%), followed by September (9.3%). The monthly caseload was lowest in January (6.5%).

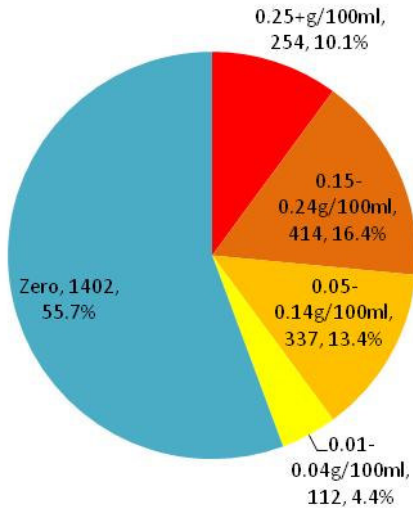
Figure 16. Monthly caseload (N = 12622)



3.8. Blood alcohol levels

Blood alcohol concentration (BAC) levels were obtained in 2519 of the 11329 cases. The average BAC for those who tested positive was 0.17 ± 0.10 g/100ml

Figure 17. Blood Alcohol Levels (n = 2519)



3.8.1. Blood alcohol level by apparent manner of death

Of the 11329 injury-related deaths, blood alcohol concentrations were available for 2519 (22.2%) cases.

Table II: Blood alcohol findings by apparent manner of death

Apparent manner	BAC's done n (%)	BAC positive n (%)	Mean BAC	Std. Dev.
Violence (3671)	953 (26.0)	463 (48.6)	0.16	0.09
Suicide (1278)	394 (30.8)	134 (34.1)	0.16	0.11
Transport (3248)	833 (25.7)	407 (48.9)	0.19	0.1
Other unintentional (937)	95 (10.1)	29 (30.5)	0.16	0.08
Undetermined (2195)	244 (11.1)	84 (34.4)	0.15	0.11
Total	2519	1117	0.16	0.1

3.8.2. Blood alcohol level by transport user

Of the 3248 transport-related deaths, blood alcohol concentration were available in 833 (25.6%) of the cases.

Table III: Blood alcohol findings by transport user

Transport user	BAC's done n (%)	BAC positive n (%)	Mean BAC	Std. Dev.
Driver (542)	178 (32.8)	103 (57.9)	0.17	0.09
Passenger (522)	148 (28.4)	64 (43.2)	0.17	0.09
Pedestrian (1333)	290 (21.8)	153 (52.8)	0.23	0.11
Railway case (162)	38 (23.5)	10 (26.3)	0.12	0.08
Cyclist (151)	46 (30.5)	15 (32.6)	0.15	0.07
Unspecified (533)	132 (24.8)	62 (47.0)	0.16	0.09
Aviation (5)	1(20.0%)	0	0	0
Total	833	407	0.2	0.11

Chapter 4

Estimated mortality rates for Gauteng

Age standardised injury mortality rates were calculated for Gauteng using population data from the 2001 Census. In the absence of data for Tshwane MLL, the Gauteng population data was adjusted by removing the population count for the Tshwane geographical area.

Provincial annual exponential growth rates between 2008 and 2009 derived from the ASSA2003 (ASSA, 2003), were then applied to the adjusted 2001 census data for Gauteng.

Table VI: Age-adjusted mortality rates for the Gauteng province for 2008 and 2009

Year	**2008**		**2009**	
Population[#]	*7627922*		*7659017*	
	Total deaths	*Rate/ 100,000 pop.*	*Total deaths*	*Rate/ 100,000 pop.*
Violence	**4223**	**51.7**	**3671**	**45.1**
- firearm	1700	20.6	1374	16.4
- sharp force	1239	15.1	1074	13.1
- blunt force	1068	13.3	971	12.4
Suicide	**1350**	**17.4**	**1278**	**16.5**
- firearm	240	3.3	219	3.0
- hanging	738	9.2	676	8.5
- poisoning	233	3.0	249	3.1
Transport	**3578**	**46.3**	**3248**	**41.6**
- road traffic	3405	44.2	3081	39.5
- *pedestrian*	1441	18.9	1333	17.2
driver	592	7.5	542	6.8
passenger	649	8.5	522	6.6
- railway	147	1.9	162	2.1
Unintentional	**1222**	**16.2**	**937**	**12.6**
- burns	338	4.2	336	4.4
- drowning	207	2.6	134	1.7
- falls	112	1.7	94	1.5
ALL INJURIES	11565	147.1	11329	144.4

Table VI shows the number and mortality rates for the main external causes in Gauteng for 2008 and 2009. The overall injury fatality rates for Gauteng are not too dissimilar to the national estimate of 158 per 100 000 population (Matzopoulos, Norman and Bradshaw, 2004; Norman, Matzopoulos, Groenewald and Bradshaw D, 2007), which is considerably higher in relation to the global rate of 83.7 per 10000 and the African continental death rate of 117.7 per 100000 reported by Peden, McGee & Sharma (2002).

There has been a decrease in the mortality rates for all manners of death between 2008 and 2009.

Violence-related death rates are markedly higher than the 38.6 per 100000 & 37.3 per 100000 reported by the SAPS crime statistics for South Africa for the two years (SAPS, 2009).

The 2009 firearm-related violent death rates in South Africa were higher than that reported for the United States in 1998 (Krug, Powell & Dahlberg, 1998). Suicide rates remain high compared to the rate of 15.4 per 100000 as reported by the NIMSS in 2006 (Burrows et al., 2006). Road traffic death rates were also higher than the global rate of 20.8 per 100000 and continental rate of 26.3 per 100000 reported by Peden, McGee & Sharma (2002).

-

Chapter 5

Conclusion

This 2009 NIMSS Annual Report for Gauteng has shown violence and transport-related deaths to be major public health concerns. Violence (largely due to firearms) was the leading manner of death among males while among females it was transport (in particular due to pedestrian-related injuries).

The leading manner of death among children aged 5-14 years and adults 45 year and older were transport-related and in particular, pedestrian injury. Violence was the leading manner of death among youth aged 15-29 years and adults aged 30-44 years. Of note is that 60% of deaths among 0-4 year olds were classified as undetermined.

An abortion was the leading external cause of death among 0-4 years while a pedestrian injury was the leading external cause of death among children aged 5-14 years and for the 60+ age groups. Violence was the leading cause of death for the remaining age groups. In general, the majority of the injury deaths occurred among males in the economically active age range of 15-44 years. While the single leading scene of injury was the road, the leading scene of injury for violence, suicides and unintentional deaths was in and around the home.

About half the violence and transport-related cases tested positive for alcohol. Levels of consumption among pedestrians were particularly high at more than four times the legal limit for driving of 0.05g/100ml, used as a proxy level for intoxication.

The NIMSS data provides a useful source of information to inform policy and intervention initiatives. The data can assist in the identification of potential victim groups, hazardous locations, times and instruments, and selected high-risk behaviours such as alcohol consumption. However, we also hope that these findings will stimulate further research on the underlying causes and risk factors that drive the patterns of fatal injuries among the different –vulnerable groups identified in this report.

The Safety and Peace Promotion Research Unit (SAPPRU) (formerly known as Crime, Violence and Injury Lead Programme), which is co-directed by the MRC and UNISA, is committed to facilitating the use of NIMSS data by a wide range of stakeholder groups, but especially the forensic medico-legal services and violence and injury prevention agencies at local, provincial and national level.

The NIMSS could provide additional information, including for example suburb-level indicators of where injuries occurred and, of course, many cross-tabular analyses that could not be accommodated in this report.

References

Berger, L.H. & Mohan, D. 1996. *Injury Control: A global view.* Delhi: Oxford University Press.

ASSA (2003). Actuarial Society of South Africa. Downloaded on 30 June 2009 at http://www.actuarialsociety.org.za/Models-274.aspx

Matzopoulos R, Norman R, Bradshaw D. (2004). *The burden of injury in South Africa: fatal injury trends and international comparisons.* In: Suffla S, Van Niekerk A, Duncan N, eds. Crime violence and injury prevention in South Africa: developments and challenges. Tygerberg: MRC-UNISA Crime, Violence and Injury Lead Programme: 9–21.

Krug, E., Powell, K. and Dahlberg, L. (1998). "Firearm-related deaths in the United States and 35 other high- and upper-middle-income countries." *International Journal of Epidemiology* 1998.

Peden M, McGee K, Sharma G. (2002).*The injury chart book: a graphical overview of the global burden of injuries*. Geneva, World Health Organization.

South African Police Service. (2007). *Annual Report 2008/2009: Crime situation in South Africa*.Pretoria

Stephanie; Lucie Laflamme (2006). "Suicide Mortality in South Africa". *Social Psychiatry and Psychiatric Epidemiology*. http://www.springerlink.com/content/px7v1186u51k738w/.Retrieved 2009-07-05

Appendix I: Injury Mortality Data Collection Form

Injury Mortality Data Collection Form

SECTION 1 (for completion by Officer Collecting Body) **Police MAS/CAS no** ______ **Closest Police Station** ______

Province of injury (may differ to province of death)

1 Gauteng
2 Western Cape
3 KwaZulu Natal
4 Eastern Cape
5 Northern Cape
6 Free State
7 Mpumalanga
8 Limpopo
9 North West
10 Unknown
11 Other ______ specify

Scene where incident occurred

1 Private house & yard (inc. pool)
2 Residential institute
3 Bar, shebeen, nightclub
4 Amusement park,sports area
5 Road/street/highway
6 Railway track, station
7 Shop, bank, retail area
8 School, educational area
9 Medical service area
10 Industrial & construction area, mine
11 Farm, primary production area
12 Sea, lake, river, dam
13 Open land, beach
14 Countryside
15 In custody, prison
16 Place unknown
18 Informal settlement/ squatter camp
19 Site and Service area
17 Other ______ specify

Suburb ______
Town ______
GPS co-ordinates ______ optional

Date & Time of injury ☐☐/☐☐/☐☐☐☐ ☐☐h☐☐
Date & Time of Death ☐☐/☐☐/☐☐☐☐ ☐☐h☐☐

SECTION 2 (for completion by Forensic Officer)

Mortuary Name ______ **Was body identified by name prior to PM?** Y N U

DR No ______ PM Date d d / m m / 2 0 y y BI1663 A O ☐☐☐☐☐☐☐☐

SECTION 3 (for completion by Forensic Pathologist/ District Surgeon/ Forensic Officer)

Was an autopsy carried out? Y N If no, was the body 1 Stored 2 Viewed

Surname

Age ☐☐☐ Years ☐☐ Months (if < 1 year) Race A B C W U Sex M F U

Medical treatment of injury prior to death? 1 None 2 Emergency care at scene 3 Hospital care 4 Both Hospital (final) ______ Name of hospital

Cause of Death 1 Natural 2 Non-natural 3 Undetermined

Apparent Manner of Death (i.e "Intentionality" if death is non-natural) 1 Homicide 2 Suicide 3 Unintentional 5 Undetermined

Circumstances of Injury

1 Firearm Discharge
2 Sharp Object
3 Blunt object
4 Asphyxia (hanging, strangulation, suffocation, choking, aspiration)
6 Poisoning, ingestion
7 Poisoning, gassing
8 Fire burn/other burn
9 Fall/push/jump from height
11 Crushing
13 Drowning, immersion
14 Lightning
25 Electrocution
26 Explosive blast
33 Non-natural disaster
34 Natural disaster
15 Motor vehicle Pedestrian
16 Motor vehicle Passenger
17 Motor vehicle Driver
18 Motor vehicle Unspecified
30 Aviation casualty
31 Motor-cycle
32 Bicycle
35 Railway pedestrian
36 Railway passenger
21 Medical Procedure
22 Sudden Infant Death
23 Abortion/non-viable foetus
24 Abandoned baby
28 Unknown
29 Other ______ specify

Special categories

1 Sex-related crime
2 Susp. child abuse
3 Susp. elder abuse
4 Domestic Violence
5 Death in Custody
6 Legal intervention
7 Youth/gang violence
8 Maternal death
9 Mining death
10 Work-related injury
11 Mob violence

ICD 10 code ______ Optional

Special investigations

1 Samples for alcohol
2 Samples for toxicology
3 Sample for histology incl. organ retention
4 Samples for suspected rape
5 Samples to identify victim
6 Photography
7 Projectiles

SECTION 4 (for completion by surveillance staff)

Blood Alcohol Level 0 . ☐☐ g/100ml Eye Fluid Alcohol ☐☐☐☐