

**SENTINEL SURVEILLANCE OF SUBSTANCE
ABUSE AND TRAUMA
AT LIVINGSTONE & PROVINCIAL
HOSPITALS**

1999-2000

FINAL REPORT



November 2000

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Sr HE Siebbert, Sr-in-charge of Trauma

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Project Team:

Mzimkhulu Maziko
Nomhle Kawa
Nozulu Mtotywa
William Nose
Margie Peden (Project Leader)

Report Compiled by:

Margie Peden
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For further information please contact:

Maziko Mzimkhulu
Medical Research Council
PO Box 19070
Tygerberg
Ph (021) 938 0472
Email : maziko.mzimkhulu@mrc.ac.za

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1. INTRODUCTION

According to Tim Ryan (1999), the international doors opened in South Africa in 1994, bringing with this many opportunities for growth and prosperity but also the 'ugly face' of the illegal drugs trade. Consequently, in 1997 we began monitoring the incidence and prevalence of both alcohol and illicit drugs among trauma patients in order to assess and identify emerging trends which will drive prevention programmes (Peden & Sidzumo, 1997).

In 1997, a pilot study was conducted at Groote Schuur Hospital (GSH) to monitor substance abuse among trauma patients. The results confirmed that alcohol was still the most commonly misused substance among trauma patients but that almost one-third of the patients had smoked cannabis prior to their injury. Other street drugs such as cocaine and opiates did not appear to appear to be a problem among Cape Town trauma patients but a high incidence of 'white pipe' smoking was found, almost exclusively among victims of violence (Peden, Van der Spuy, Smith, et al., 2000).

After the pilot study in 1997, a trauma and drug study was conducted at Provincial and Livingstone Hospitals in 1999 with a view to conducting these studies annually. The results of the 1999 study indicated that almost 80% of the patients were alcohol-positive on breath analysis and nearly 40% of patients tested positive for at least one drug (Maziko & Peden, 1999). Furthermore, there were exceptionally high levels of problem drinking identified.

This report presents data from the follow up study conducted at the two hospitals in Port Elizabeth in 2000 and makes comparisons with the results obtained from the 1999 study. Annual studies such as these will provide trend data which will drive decision-making processes and assist with the development of prevention and training programmes. This study forms part of the National Violence and Injury Surveillance Initiative currently being undertaken by a consortium of research partners including the MRC, UNISA and the CSIR.

2. AIM OF THE STUDY

The aim of the project was to monitor substance abuse and establish trends among trauma patients by:

- assessing the proportion of patients with fresh trauma who were alcohol positive at the time of their injury;
- assessing the proportion of patients with fresh trauma who had used an illicit drug prior to their injury; and
- assessing, by means of the CAGE questionnaire, what proportion of trauma patients were chronic alcoholics.

Two of the major objectives of this study were:

- to monitor substance abuse and trauma trends in a number of cities in South Africa, viz. Cape Town, Port Elizabeth, Umtata and Durban; and
- to include the results in the South African Community Epidemiology Network on Alcohol, Tobacco and Other Drug Use study (SACENDU) which monitors substance abuse trends (in general) at sentinel sites in South Africa.

3. METHODS

3.1 Study Design

The study is essentially an annual cross-sectional, descriptive study of the incidence of alcohol (and alcohol dependence) and illicit substance abuse among patients presenting with fresh trauma to the Livingstone and Provincial Hospital trauma units.

3.2 Sampling

3.2.1 Study Population

Patients who attended the Livingstone and Provincial Hospital Trauma Units with fresh trauma.

3.2.2 Sampling Framework

The concept of an 'ideal week' was used at the trauma unit. Each day was divided into four six-hour shifts and one shift was randomly selected per day, i.e. over four weeks the 24-hour period for each day was covered. All patients with fresh trauma attending during these times were included provided they gave written consent.

3.2.3 Inclusion/Exclusion Criteria

The following inclusion and exclusion criteria applied to patients.

- Only patients with fresh physical trauma were included, i.e. reattenders were excluded.
- The injury-to-presentation time was set at a maximum of six hours.
- Referrals were included provided they did not obtain significant treatment at the first facility they attended and that their presentation to the study facility was within six hours.
- All patients had to give written, informed consent prior to inclusion in the study. Those patients who refused were excluded but the reason for their refusal was documented. For those less than 18 years of age, permission was requested from a parent or guardian.

- All types of poisoning and non-traumatic attempted suicide (e.g. drug overdoses) were excluded.

3.2.4 Sample Size

A total of 232 patients were included in the study for the period dates 19 August to 16 September 2000.

3.3 Instrumentation

- Each patient was interviewed by a field worker using a specially constructed interview sheet
- Alcohol usage was assessed using self-report, a breath alcohol test and the CAGE questionnaire. Self-report was conducted by either asking the patient whether he/she had consumed alcohol prior to their injury or by using clinical judgement in unconscious or uncooperative patients. Breath alcohol was assessed using the Lion Alcolmeter SD2 - the use of which has previously been validated in a study in Cape Town (Peden, 1997). The CAGE questionnaire was included to assess chronic alcohol usage (Ewing, 1984).
- Self-report was also used to assess drug usage among patients. A urine specimen was also taken from the patient, a portion of which was used to screen for five drugs namely amphetamine, cannabis (THC), morphine, cocaine and methamphetamine, using a Multidrug kit. Formal chemical analysis (to test for dagga and methaqualone [Mandrax]) was conducted on the rest of the urine specimen by the Department of Pharmacology, UCT.

3.4 Field Workers

The principal investigator (PI) was Margie Peden, Senior Specialist Scientist in Trauma Research at the Medical Research Council (MRC). She was assisted by a Chief and Senior Research Technologist from the MRC in Cape Town.

3.5 Ethics

- Ethical approval for the study was obtained from the University of Cape Town (UCT) Ethics Committee. Permission was also obtained from the Medical Superintendents of both Livingstone and Provincial Hospitals.
- The data was anonymous but linked to demographic/self report data. All data was kept in the strictest confidence by the primary researcher. No alcohol or drug results were documented in the patient's hospital folder. There was no way of cross-referencing research results to actual patient records.
- Informed, written consent was taken from the patients.

3.6 Analysis

The data was checked and coded by the research team and cleaned before entering into Epi Info version 6.02 (Shareware, Center for Disease Control, 1994) by a dedicated data puncher. Epi Info was used to do the basic statistical analysis presented in this report.

4. RESULTS FOR LIVINGSTONE & PROVINCIAL HOSPITALS

4.1 An Overview

During 2000, a total of 362 patients were seen at the two hospitals in Port Elizabeth. Of these 232 were included in the study - 118 from Livingstone and 114 from Provincial Hospital.

Number of patients seen over an idealised week
N = 362

Included (n=232)	Excluded (n=130)
Mean Age	
33.8 ± 13.6 years	31.7 ± 18.7 years
Gender	
70.3% males	73.8% males
Cause of Injury	
Violence = 65.9%	Violence = 44.6%
Traffic = 13.4%	Traffic = 23.1%
Non-traffic 'Accident' = 20.7%	Non-traffic 'Accident' = 32.3%
Reason for Exclusion	
	> 6 hours = 72.3%
	Repeat = 3.8%
	Refused = 10.0%
	Minor = 12.3%
	Missed = 0.8%
	Other = 0.8%

More than half of the patients who attended the two trauma units were injured violently in 2000. This was the case for both the included and excluded categories. There was no significant difference in mean age for both categories ($t=1.72$, $p=0.09$). The main reasons for excluding patients were that their injury had occurred more than six hours prior to their hospital presentation or because they were minors or refused consent.

4.2 Details of Injury

4.2.1 Overall cause of Injury

In 2000, violence out-numbered traffic as the leading cause of injury, accounting for nearly two-thirds of all injuries. Nearly one-third of the cases were due to non-traffic 'accidents' (which included falls, burns, sports and other mishaps) while traffic collisions contributed to a further one-eighth of the cases (Table I).

**Table I : Overall Cause of Injury
1999 versus 2000**

	1999 n (%)	2000 n (%)
Violence	166 (60.8)	153 (65.9)
Traffic	66 (24.2)	31 (13.4)
Non-traffic 'Accidents'	41 (15.1)	48 (29.7)

In comparison to the 1999 study, the 2000 study showed that:

- the proportion of patients injured violently or in traffic collisions had dropped slightly; and
- the proportion of patients with injuries due to non-traffic 'accidents' showed a dramatic increase of more than 14%.

4.2.1.1 Violence-related Injury

Of the 153 patients injured as a result of violence, more than half were due to sharp objects while firearms accounted for only 2%. Blunt (and blunt and sharp force combined) accounted for more than one-third of all violence-related incidents (Table II).

**Table II : Violence-related Injury
1999 versus 2000**

	1999 n (%)	2000 n (%)
Sharp Object	90 (54.2)	85 (55.6)
Firearm	8 (4.8)	3 (2.0)
Blunt & Sharp	44 (26.5)	7 (4.6)

Table II shows that there has been a slight decrease in firearm and blunt & sharp object-related injuries over the year and a concomitant increase in violence perpetrated with a blunt object.

4.2.1.2 Traffic-related Injury

In 2000, more than half of the traffic-related injuries involved passengers while nearly one quarter involved pedestrians. Nearly one-fifth of the traffic-related injuries involved drivers. Cars and minibus taxis were involved in more than 85% of the collisions.

**Table III: Traffic-related Injury
1999 versus 2000**

	1999 n (%)	2000 n (%)
Driver	14 (21.2)	6 (19.4)
Passenger	28 (42.4)	17 (54.8)

Table III shows that the proportion of driver- and pedestrian-related injuries decreased while passenger injuries increased by more than 12% over the year.

4.2.1.3 Non-traffic 'Accidents'

In 2000, falls accounted for more than half of this category while one-third of the cases were the result of non-specified 'accidents' (Table IV).

In comparison to the 1999 study, the 2000 study showed that:

- the proportion of fall-related injuries remained constant; and
- the proportion of injuries due to non-specified 'accidents' or mishaps increased by 7%.

**Table IV: Non-traffic 'Accidents'
1999 versus 2000**

	1999 n (%)	2000 n (%)
Fall	23 (56.1)	26 (56.1)
Sport	3 (7.3)	0
Non-specified 'accidents' or mishaps	14 (34.1)	20 (41.7)
Other	1 (2.4)	2 (4.2)

4.2.2 Demographics

4.2.2.1 Age

The mean age for patients seen during the 1999 and 2000 studies was similar ($t=0.74$, $p=0.46$). The largest proportion of injuries was seen in the 25-34 year age range. These injuries were mainly due to violence (Table V).

	Violence		Traffic		Non-traffic 'accidents'		Total	
	1999	2000	1999	2000	1999	2000	1999	2000
< 25	3 (2.5)	3 (2.8)	1 (2.1)	1 (4.5)	0	2 (6.3)	4	6
25 - 34	59 (49.2)	45 (41.7)	18 (38.3)	7 (31.8)	10 (32.3)	8 (25.0)	87	60
35 - 44	38 (31.7)	41 (38.0)	21 (44.7)	8 (38.4)	12 (38.7)	5 (15.6)	71	54
45 - 54	11 (9.2)	10 (9.3)	5 (10.6)	4 (18.2)	1 (3.2)	6 (16.5)	17	19
55+	8 (7.5)	9 (8.3)	1 (4.3)	2 (9.1)	8 (25.8)	12 (37.5)	19	23
Mean Age (±SD)	32.4 ±12.5	32.4 ±11.3	31.6 ±11.1	34.3 ±11.7	37.4 ±16.0	38.3 ±19.8	32.9± 12.9	33.8± 16.4

4.2.2.2 Gender

Of the cases studied at the two trauma units over the study period, three-quarters were male and one-quarter were female. There were no statistically significant differences in gender during the two study periods (ChiSq = 0.01, $p = 0.9$).

In comparison to the 1999 study, the 2000 study did show that the proportion of patients with violence and traffic-related injuries had dropped and that the proportion of non-traffic 'accidents' had increased in both genders (Table VI)

	Violence		Traffic		Non-traffic 'accidents'		Total	
	1999	2000	1999	2000	1999	2000	1999	2000
Female	49 (29.5)	43 (28.1)	16 (24.2)	9 (29.0)	15 (36.6)	17 (35.4)	80	69
Male	117 (70.5)	110 (71.9)	50 (75.8)	22 (71.0)	26 (63.4)	31 (64.6)	193	163

4.2.3 When and Where Injuries Occurred

4.2.3.1 Time of Injury

The proportion of injuries that occurred during office hours (from 08h00-16h59) and after hours (from 17h00 - 07h59) was similar over the study period (Figure 1).

In both 1999 and 2000 there were distinct peaks between 16h00 and 19h59.

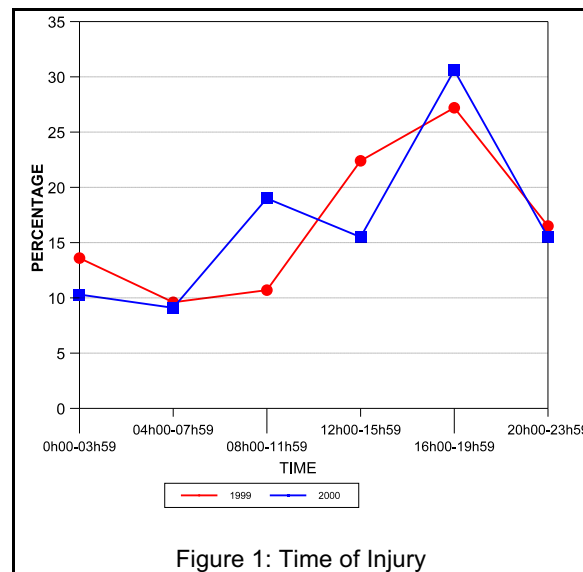


Figure 1: Time of Injury

4.2.3.2 Day of Injury

As expected, more than half of the patients presenting to the two trauma units had sustained their injury over the weekend, i.e. from Friday evening until Monday morning. This phenomenon was similar for both study years although there was a drop in injuries on a Sunday in 2000 (Figure 2).

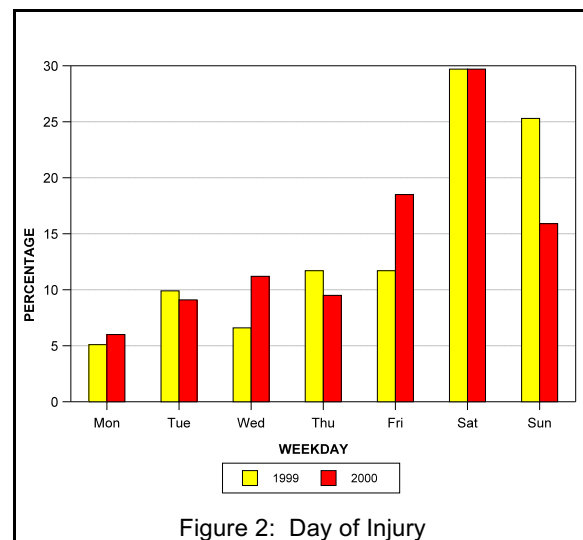


Figure 2: Day of Injury

4.2.3.3 Suburb of Injury

Over the two study periods, more than 80% of patients were injured in the four suburbs indicated in Table VII. In all four suburbs, homicide was the leading cause of injury.

Comparison between the study conducted in 1999 and this one shows that:

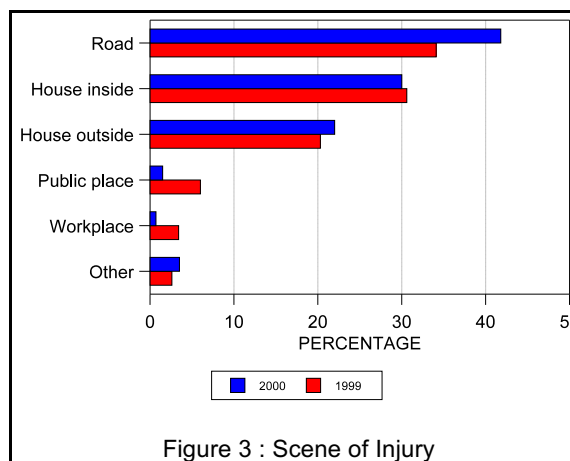
- violence-related injuries in all four suburbs increased; while
- traffic-related injuries decreased.

	Violence		Traffic		Non-traffic 'Accidents'		Total	
	1999	2000	1999	2000	1999	2000	1999	2000
PE Central	25 (39.1)	56(47.9)	21 (32.8)	18 (15.4)	18 (28.1)	43 (36.8)	64	117
Gelvandale	31 (54.4)	29(78.4)	17 (29.8)	4 (10.8)	9 (15.8)	4 (10.8)	57	37
Bloemendal	30 (62.5)	16 (69.6)	8 (16.7)	5 (21.7)	10 (20.8)	2 (8.7)	48	23
New Brighton	25 (55.6)	20(87.0)	6(13.3)	1 (4.3)	14(31.1)	2 (8.7)	45	23

The cells show the number of injuries followed by the percentages (in brackets) by suburb and cause of injury

4.2.3.4 Scene of Injury

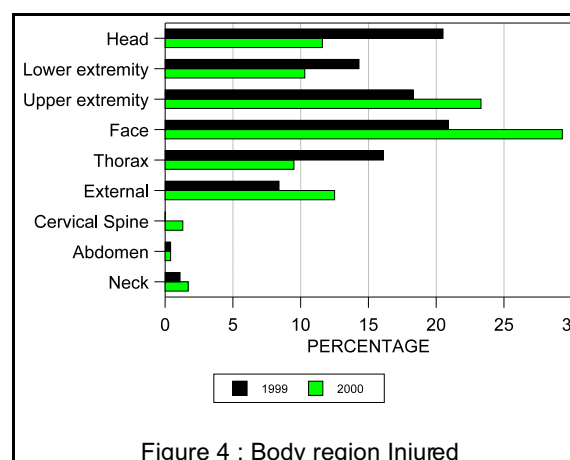
Over the two study periods, around 40% of all patients were injured on the road while over nearly 50% of incidences occurred in and around the home (Figure 3).



4.2.4 Location and Severity of Injury

4.2.4.1 Body Region Injured

Over the two study periods an increase in the proportion of injuries to the upper extremities, face, and exterior was noted while there was a concomitant decrease in injuries to the head, thorax and lower extremities (Figure 4).

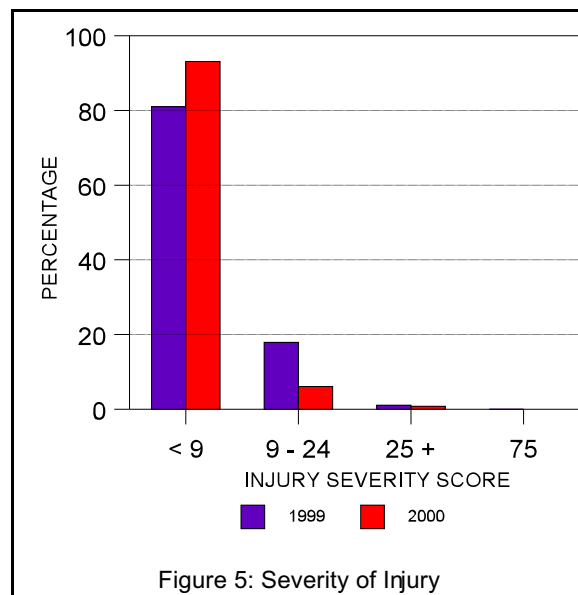


4.2.4.2 Injury Severity

Most of the patients sustained minor injuries (ISS < 9) while just over 10% had injury severity score of nine or more.

By comparison with the study conducted in 1999, the 2000 study showed that:

- the proportion of patients with mild injuries increased by 10%;
- the proportion of patients with moderate injuries decreased by approximately 5%;
- the proportion of patients with severe injuries remained the same.



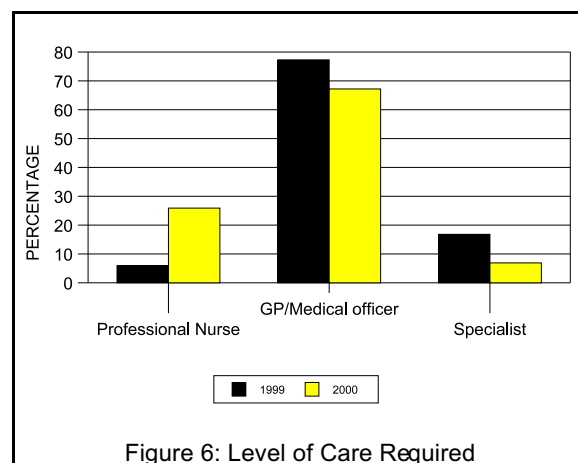
The median NISS for injuries sustained in both 1999 and 2000 was 4.

No patients had invariably fatal injuries (NISS = 75) during either the 1999 or 2000 sampling periods.

4.2.5 Care and Placement of Patients

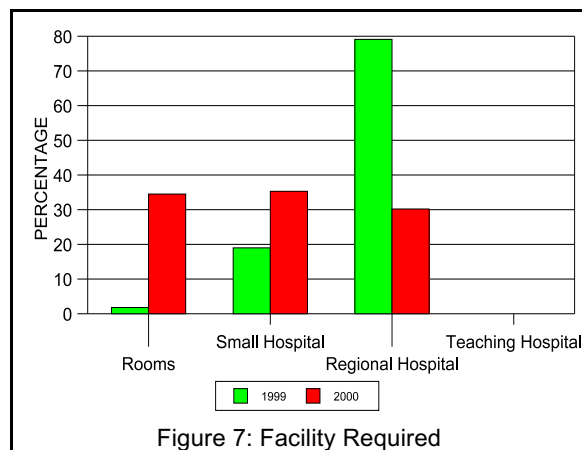
4.2.5.1 Level of Care Required

Since the majority of patients sustained minor injuries, it is not surprising to note that the research team judged that more than one-quarter of cases could have been adequately managed by a nursing sister. In 2000, about ten percent less patients required the services of a medical officer and another 10% less needed the services of a specialist doctor (Figure 6).



4.2.5.2 Facility Required

In 2000, the research team judged that more patients could have used smaller trauma services such as doctor's rooms, day hospitals or small hospitals. It was interesting to note that during no patients required a tertiary hospital during the time period (Figure 7).



4.2.5.3 Placement after Initial Assessment and Care

Over the two study periods approximately three-quarters of the patients who were seen in the trauma units were treated and discharged. However, in 2000, significantly less patients required admission to a hospital ward or directly to an Intensive Care Unit (ChiSq = 37.9, p<0.001). No patients died while being resuscitated in the trauma unit (Table VIII) during 2000.

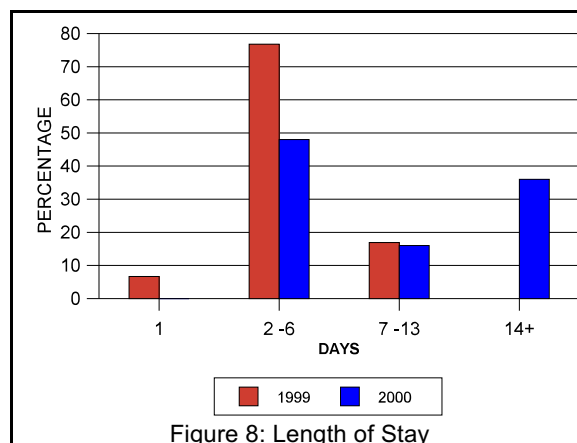
Table VIII: Placement after Initial Assessment and Placement 1999 versus 2000

	1999 n (%)	2000 n (%)
Discharged	191 (70.0)	203 (87.5)
Admit : Ward	74 (27.1)	16 (6.9)
ICU	3 (1.1)	0
Died	2 (0.7)	0
Transferred	3 (1.1)	9 (3.9)
Absconded	0	4 (1.7)

4.2.5.4 Length of Stay

As noted previously, significantly less patients required admission to hospital, yet more required 14 or more days in the ward (Figure 8).

On average patients required a median stay of 8 days (IQR 4 - 16) in hospital in 2000, compared with only 3 days (2 - 4) in 1999. This difference was statistically significantly



(Kruskall-Wallis = 15.8, $p < 0.0001$).

4.2.6 Estimated Disability of Patients

Estimated disability was assessed by the research team by judging what the impact of the injury would have on the patient's quality of life.

4.2.6.1 Severity of Disability

In 2000, more than 85% of patients were judged to have a mild disability while only 15% of them had more disabilities. No patients died as a result of their injuries (Table IX).

Table IX: Severity of Disability
1999 versus 2000

	1999 n (%)	2000 n (%)
None	1 (0.4)	1 (0.4)
Mild	177 (64.8)	194 (83.6)
Moderate	86 (31.5)	24 (10.3)
Serious	7 (2.6)	13 (5.6)
Total	0	0
Dead	2 (0.7)	0

4.2.6.2 Time Away from Work

In 2000, 40.1% of patients were employed, this is significantly less than the 49.1% in 1999 (ChiSq = 4.1, $p = 0.04$).

Of those employed, more than 75% required at least a week off work (compared with 60% in 1999). Nearly 20% of patients required more than one week off work (Figure 9). These differences were not statistically significant.

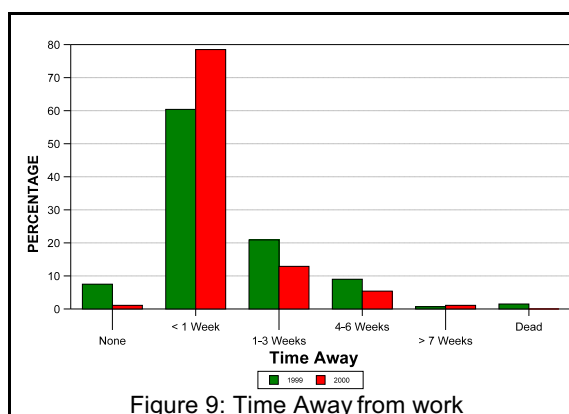
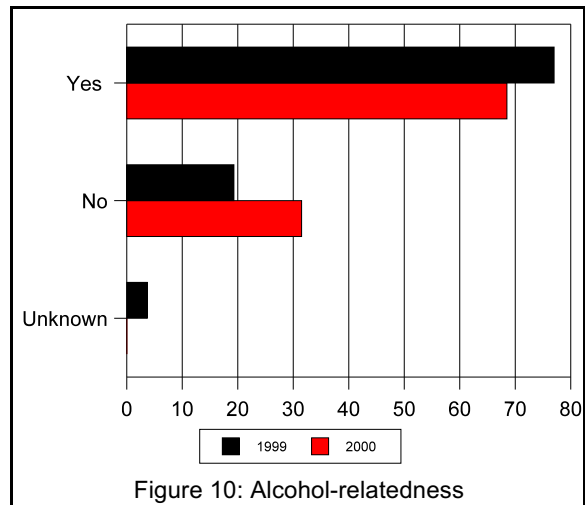


Figure 9: Time Away from work

4.3 Alcohol Usage

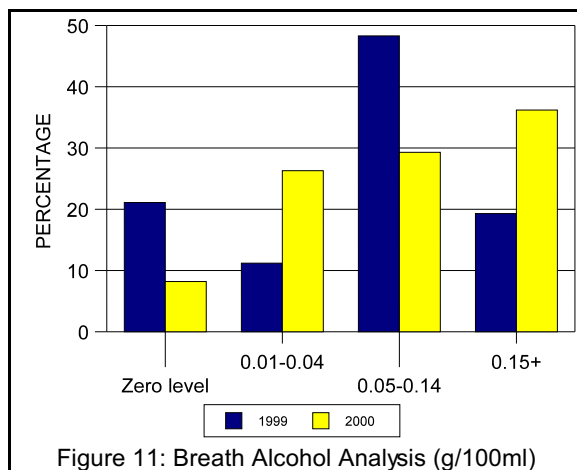
4.3.1 Alcohol-relatedness

This parameter was assessed by either asking the patient whether he/she had used alcohol prior to their injury or by using clinical judgement in unconscious or uncooperative patients. In 2000, nearly 10% more patients said that they had used alcohol prior to their injury (Figure 10). The differences were not statistically significant.



4.3.2 Breath Alcohol Analysis

Significantly more patients admitted to the trauma unit during the course of the study in 2000 were breath alcohol concentration (BrAC) positive compared to 1999 (ChiSq = 13.9, $p < 0.001$). However, the proportion of patients with BrACs at or above the legal driving limit (0.05 g/100ml), was similar although there were nearly 15% more patients with BrACs of 0.15 g/100ml or higher. The mean BrAC for those with positive alcohol levels in 2000 (0.14 ± 0.08 g/100ml) was significantly higher than that the 0.11 ± 0.07 g/100ml obtained in 1999 ($t=3.55$, $p < 0.001$).



Three-quarters of the patients that were injured violently had positive alcohol levels. Patients who were injured due to traffic and non-traffic 'accidents' had mean BrAC levels of approximately 0.12 g/100ml while those injured violently had slightly higher levels (Table X). There were six drivers injured: two were BrAC were negative and three (59%) had alcohol levels at or over 0.05 g/100ml.

Table X: Non-zero Breath Alcohol Levels 2000

	Positives	%	Mean BrAC (g/100ml)	± Std Dev
Violence	116	75.8	0.14	0.08
Traffic	17	54.8	0.12	0.10
Non-traffic 'Accidents'	15	31.3	0.13	0.09

In comparison with the study conducted in 1999, the 2000 study showed that:

- the proportion of patients who were injured violently and had positive BrAC levels increased by 5%; and
- the proportion of BrAC positive patients injured in motor vehicle collisions increased by 20%.

4.3.3 Chronic Alcohol Usage

In 2000, 15.1% of the patients could not be interviewed because of the severity of their injuries or because they were too intoxicated to answer the four CAGE questions.

Of the remaining 197 patients who could be interviewed, 26.9% had a total CAGE score of zero compared to 21.4% in 1999 (Figure 12). A staggering 63.5% of patients had a total CAGE score of two or more indicating problem drinking or possible alcohol dependence. This is, however, significantly lower than the 77.5% recorded in 1999 (ChiSq = 22.2, p<0.0001).

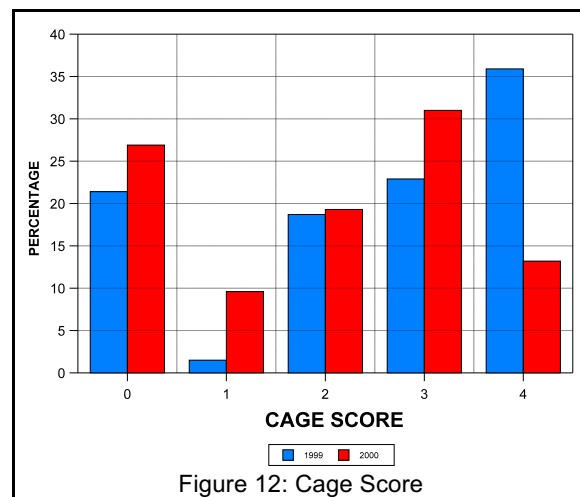


Figure 12: CAGE Score

4.4 Illicit Drug Usage

Drug usage was assessed by means of self-report, the Multidrug kit and conventional pharmacological methods.

4.4.1 Self-reported Drug Usage

About one in ten patients acknowledged using illicit drugs prior to their injury over the two study periods (Figure 13).

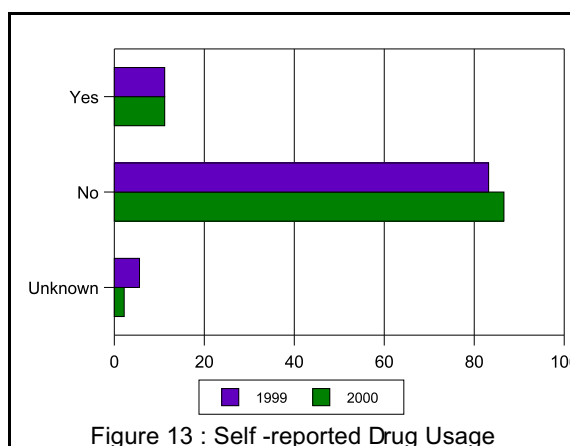


Figure 13 : Self -reported Drug Usage

4.4.2 Multidrug Screen Results

Drug screen results were obtained in 200 patients in 2000. The Multidrug kit screen for five drugs using a sample of urine. In 1999, 42.7% of patients were positive for at least one drug (some were positive for a combination of drugs). In 2000, 35.5% of patients were positive for at least one drug. This decrease was, however, not statistically significant (ChiSq = 2.36, p = 0.12). As can be seen by Table XI there is, however, an indication that patients are beginning to use 'harder' drugs.

**Table XI: Multidrug Screen Results
1999 versus 2000**

	1999 n (%)	2000 n (%)
Amphetamine	0 (0)	0 (0)
THC	100 (42.7)	40 (19.9)
Morphine	0 (0)	13 (6.5)
Cocaine	0 (0)	27 (13.4)
Methamphetamine	0 (0)	0 (0)

4.4.3 Pharmacological Analysis

Conventional wet analysis was undertaken on a sample of urine. As can be seen from Table XII, this analysis revealed that one-quarter of patients had used dagga, significantly less than in 1999 (ChiSq = 13.6, p<0.001). There were similar proportions of patients who had used Mandrax.

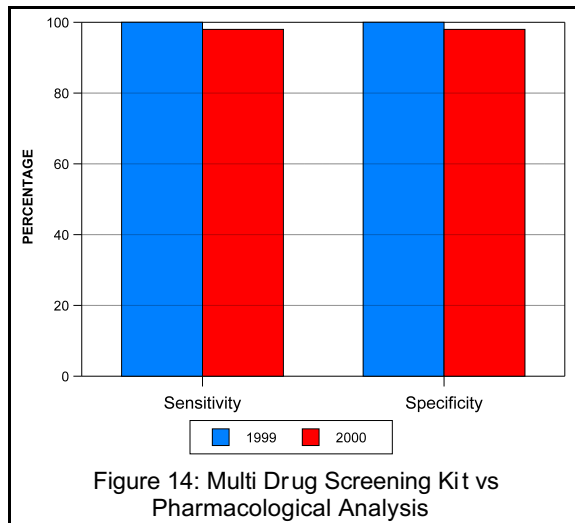
**Table XII: Pharmacological Analysis
1999 versus 2000**

	Positive Result	
	1999 n (%)	2000 n (%)
Dagga	100 (42.7)	51 (25.9)
Mandrax	31 (13.2)	22 (11.2)
White Pipe	31 (13.2)	20 (10.1)

4.4.4 Multidrug Screen Kit versus Pharmacological Analysis

The Multidrug screening kit was found to be valid and accurate.

Comparing the kit to the pharmacological 'gold standard' produced a sensitivity and specificity of more than 98% in 2000. In 1999, it yielded a 100% sensitivity and specificity. Consequently, this kit can reliably be used to assess cannabis in the urine of injured patients.



5. SUMMARY

The following summarises the trend data obtained by the Trauma and Drug Study in 1999 and 2000:

- patients were predominantly young males
- most injuries were due to violence
- most patients who were injured violently abused alcohol and/or drugs prior to their injury
- sharp and blunt objects were still a major cause of violence
- most of the patients who were involved in traffic collisions were pedestrians
- injuries most commonly occur after hours and on weekends
- there was a decrease in the frequency of injuries to the head and thorax
- two-thirds of the patients seen at these two regional hospitals could have been treated at less sophisticated medical facilities
- significantly less patients required admission to a hospital ward in 2000, but many of those who were admitted, spent more than a week in hospital
- most patients sustained injuries which were relatively minor and few were left with long-term disabilities
- significantly more patients were found to be alcohol positive in 2000
- alcohol positive patients also had significantly higher alcohol levels
- three-quarters of patients injured violently had positive alcohol levels
- a staggering two-thirds of patients could be classified as chronic alcoholics, but this was significantly lower than that recorded in 1999
- there were slightly less patients who were drug positive in 2000 but this was not significant
- there was a distinct increase in the proportion of 'hard' drugs being abused.

6. REFERENCES

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