

**Inaugural Report of the
Western Australian Trauma Registry 2003
RR164**

**INJURY RESEARCH CENTRE
School of Population Health
The University of Western Australia**

**35 Stirling Highway
Crawley WA 6009**



**THE UNIVERSITY OF
WESTERN AUSTRALIA**



Heather A. Williams, L. Rina Cercarelli & Sarah A. Dye

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Inaugural Report of the Western Australian Trauma Registry 2003

Author(s)

Williams HA, Cercarelli LR & Dye SA

Performing Organisation

Injury Research Centre
School of Population Health
The University of Western Australia
35 Stirling Highway
CRAWLEY WA 6009

Tel: (08) 6488 1302
Fax: (08) 6488 1199
www.irc.uwa.edu.au

Sponsor

Department of Health
189 Royal Street
EAST PERTH WA 6004

Abstract

The Western Australian Trauma Registry was developed using pre-existing trauma registry data from four metropolitan tertiary hospitals in Western Australia; Royal Perth Hospital, Princess Margaret Hospital for Children, Fremantle Hospital and Sir Charles Gairdner Hospital. The purpose of this report is to present findings from the Western Australian Trauma Registry for 2003. The report describes characteristics of major trauma including demographic information about patients with major injuries as well as the distribution, causes and outcome of injuries as recorded by the participating trauma registries.

Keywords

Trauma registry, data collection, hospital, injury

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EXECUTIVE SUMMARY

The Western Australian Trauma Registry (WATR) has been an ongoing project devised by the Western Australian Trauma Services Advisory Group (WATSAG). The aim of the WATR is to combine the data from the four existing trauma registries in Western Australia, and to develop a state-wide trauma registry. The four participating hospitals are Royal Perth Hospital, Sir Charles Gairdner Hospital, Fremantle Hospital and Princess Margaret Hospital for Children.

This inaugural report of the WATR was developed in conjunction with the trauma registry nurses at the four participating hospitals and describes combined data for 2003. The report details the characteristics of major trauma (ISS>15) including demographic information about injured patients as well as the distribution, causes and outcomes of injuries as recorded by the participating trauma registries.

The newly established WATR shows that in 2003, 622 major trauma incidents were managed by the four hospitals. The most significant features of major injury characteristics for 2003, were:

- Males accounted for 73% of all major trauma admissions; young males (aged 15 to 24 years) had more major trauma admissions than any other group.
- Motor vehicle accidents were the leading cause of major trauma admissions (30%); falls were the second most common cause (23%).
- Nine percent of major trauma admissions were the result of a personal assault.
- Thirty five percent of road trauma patients were drivers.
- Sixty three percent of major trauma patients required an operation.
- Forty three percent of major trauma patients were admitted to an Intensive Care Unit where they spent, on average, 7.5 days.
- Forty nine percent of major trauma patients were discharged to their residential homes after their hospital treatment.

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Lynn Ashton	Co-ordinator Trauma Services, Sir Charles Gairdner Hospital

The information provided in this report is directly evolved from data supplied by these hospital staff and would not be possible without the high quality data collection and maintenance they perform.

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Arem Gavin	Research Assistant, Injury Research Centre, UWA
Matthew Legge	Research Officer, Injury Research Centre, UWA

1. INTRODUCTION

Trauma registries are an important tool for maintaining and improving the quality of care and outcomes for trauma patients. They assist in developing best practice indicators for trauma care, planning and managing trauma services, describing the size and nature of severe injury, and evaluating trauma prevention and treatment programs (McClure, Neale & Kassulke, 2001).

In Western Australia (WA), at present, there are four separate metropolitan trauma registries: the Royal Perth Hospital Trauma Registry, the Sir Charles Gairdner Hospital Trauma Registry, the Fremantle Hospital Trauma Registry and the Princess Margaret Hospital for Children Trauma Registry. The data held in these trauma registries are regarded as the 'backbone of the whole trauma management process' and are used to audit all trauma-related deaths, to devise and revise clinical protocols, and to contribute to the body of knowledge on trauma care through publications and presentations (Rao, 2003).

Recently, several other Australian states (eg. Victoria, Queensland and South Australia) have moved to a model in which individual hospital trauma registries are combined in a state registry and managed by a centralised group, such as a university medical faculty (eg. McClure, Neale & Kassulke, 2001). Centralising the data and its management ensures consistency among individual data collections, facilitates the timely use of data and provides a sufficient volume of data for studies of injury epidemiology.

The purpose of this document is to report on findings of the newly established Western Australian Trauma Registry (WATR). This is a quantitative descriptive report on the 2003 major trauma data (ISS>15). A Data Definitions Description Report for the WATR is available which specifically defines the variables included in this report (Williams, Cercarelli & Dye, 2005).

2. METHODS

The Western Australian Trauma Registry project was devised by the Western Australian Trauma Services Advisory Group (WATSAG), previously the State Trauma Advisory Committee (STAC). Collaboration between the four teaching hospitals in WA was required for the development of the state wide trauma registry. These hospitals are:

Royal Perth Hospital (RPH);
Sir Charles Gairdner Hospital (SCGH);
Fremantle Hospital (FH & HS); and
Princess Margaret Hospital for Children (PMH)

Upon consulting with the trauma registry nurses at each participating hospital, fields for inclusion in the state trauma registry were agreed on, and variable definitions were checked for consistency across hospitals.

Aggregate and non-aggregate trauma data for the year 2003 was collected via password-protected files. For this report, the aggregate data from each hospital was checked and cleaned, and the four individual datasets were merged to generate total numbers. The combined findings from this descriptive data are presented in this report.

The non-aggregate data was not used as a direct source of information, but was referred to if clarification of the aggregate data was required. In the non-aggregate data each individual is represented by a study number, a unit medical record number (UMRN) and an account number. The study number eliminates the need to use identified data but can identify the hospital, the UMRN can identify individuals and their event history, and the account number is the number given to a particular episode of care. The study number, UMRN and account number were used to identify discrepancies in the data then deleted from the database. No named data were viewed by Injury Research Centre researchers. Gender was used for descriptive comparisons. Race identified aboriginality but was not reported on.

Ethics for this project were approved by the University of Western Australia Human Research Ethics Committee, and the following hospital ethics committees;

Royal Perth Hospital Ethics Committee

Sir Charles Gairdner Hospital Human Research Ethics Committee
Fremantle Hospital Human Research Ethics Committee, and
Princess Margaret Hospital Ethics Committee.

3. DEFINITIONS

3.1 Trauma

Trauma is defined as “an injury or wound resulting from an external force” (Miller and Keane, 1983).

3.2 Injury Severity Score (ISS)

The Injury Severity Score (ISS) is a method used to describe patients with multiple injuries and is applied retrospectively when diagnosis is complete. It is calculated by the sum of the squares of the highest Abbreviated Injury Severity (AIS) code in three of the following locations: Head or neck;

Face;

Chest;

Abdominal or pelvic contents;

Extremities or pelvic girdle; and

External (lacerations, burns).

For example, the face, chest and external might score 4, 3, and 2 respectively. Thus giving an ISS of $4^2 + 3^2 + 2^2 = 29$. The ISS is then grouped by severity into the following categories:

Minor (1 to 15);

Moderate (16 to 24);

Severe (25 to 40); and

Critical (41 to 75).

The registry population is divided into major and minor trauma admissions based on the ISS.

3.2.1 Major Trauma

Defined as trauma patients with an ISS greater than 15. This includes the categories: moderate, severe and critical trauma.

3.2.2 Minor Trauma

Defined as trauma patients with an ISS of less than 16. Minor trauma is not included as this data is not collected by one of the four registry hospitals in WA.

3.3 Population included in the WATR

The WATR population is defined as individuals who:

- Had an ISS greater than 15;
- Presented to one of the four participating hospitals within 7 days of the date of their injury;
- Were admitted for a minimum of 24 hours; or
- Died within 24 hours of presentation to a Trauma Registry Hospital.

Excluded were cases that did not fall within the formal definition of trauma, that is, individuals who suffered the effects of drowning, hypoxia, poisoning, inhalation and drug overdose. Hanging was included if there was an injury present, eg. a cervical spine fracture, ligamentous injury or carotid vessel trauma. Also excluded were patients discharged following treatment in the Trauma Registry Hospital within 24 hours of admission.

4. DATA WITHIN THE REGISTRY

Further information on the data included in this report can be found in the Western Australian Trauma Registries Definitions for Data Collection and Entry (State Trauma Advisory Committee, 2002).

4.1 Trauma description

The WATR contains many variables for describing the trauma. These include the day and time of the trauma incident, type of trauma (blunt or penetrating), cause, intent and site of the trauma incident. The condition of the trauma patient, including the patient's documented consumption of alcohol or illicit drugs in the previous 12 hours (this data relies mostly on self or third party reporting and therefore may not be reliable) is also documented.

4.2 Pre-Registry Hospital Care Providers

The pre-registry hospital phase contains information on clinical services provided to the trauma patient before attending the definitive hospital. These services include the method of transport, medical interventions, and the time each provider started and finished caring for the patient.

4.3 Definitive Hospital Care

The definitive hospital phase contains information on clinical services provided to the trauma patient at the definitive hospital. This care is further divided into Emergency Department and Post Emergency care. Clinical services include resuscitation measures, investigations, administered medications and operations for each phase of the patient's hospitalisation.

4.3.1 *Emergency Department Care*

The Emergency Department records information such as when the patient was first attended to by a medical practitioner, initial investigations and procedures, and any medications administered.

4.3.2 *Post Emergency Care*

The provision of clinical services once the patient has left the Emergency Department (recorded for the first 24 hours since arrival to the Emergency Department). Further investigations, operations and any subsequent complications are noted. Discharge details include the date of discharge and type of discharge, and whether patients had been treated in a specialist acute area such as an Intensive Care Unit, High Dependency Unit or Burns Unit, or received specialised care such as ventilation or renal dialysis.

4.3.3 *Death information*

The date, time and location of death are recorded for the deceased major trauma patient. Information on the cause of death is also included if available.

5. METHOD OF DATA COLLECTION AT THE DEFINITIVE HOSPITAL

The Fremantle Hospital, Princess Margaret Hospital for Children, Royal Perth Hospital and Sir Charles Gairdner Hospital trauma registries record all hospital trauma admissions that meet the criteria for inclusion in the Trauma Registry. Data is collected using the 'Major Trauma Data Collection Summary Sheet' and entered onto a Microsoft Access database. A computerised version of the *Abbreviated Injury Scale 1990 Revision* is used to classify injuries and to calculate an ISS for each patient, which is later recorded on the database.

To establish the WATR, a dataset containing at least 90 de-identified items were collected from each of the participating trauma registries. These include:

- location and site of trauma
- mechanism of injury
- arrival mode to hospital
- admission type
- overall length of stay in hospital
- ICU admission and length of stay
- injury day of the week and time of the day
- surgical procedures
- injuries sustained
- injury outcome

The four participating hospitals maintain their own databases and data have been aggregated directly from these registries. It is important to note that the WATR records details of those major trauma patients who present to the four participating hospitals. There will be major trauma patients who present to non-participating hospitals and, therefore, are not captured on the database. This report is limited to major trauma (ISS > 15) data collected on patients at four WA Tertiary Hospitals in 2003.

6. DEMOGRAPHIC DATA

6.1 Major trauma admissions

A combined total of 622 major trauma patients presented to the four tertiary hospitals in WA between January and December 2003. On average there were 52 admissions per month, with a range from 38 to 63 admissions (Table 6.1).

Table 6.1 Major trauma admissions in the WATR (2003)

Admissions	2003
Total trauma admissions	622
Average monthly admissions	52
Range	38 - 63

More major trauma admissions occurred in the month of August (n=63), followed closely by May (n=61) (Figure 6.1). September (n=38), February (n=41) and June (n=43) had the least number of trauma admissions.

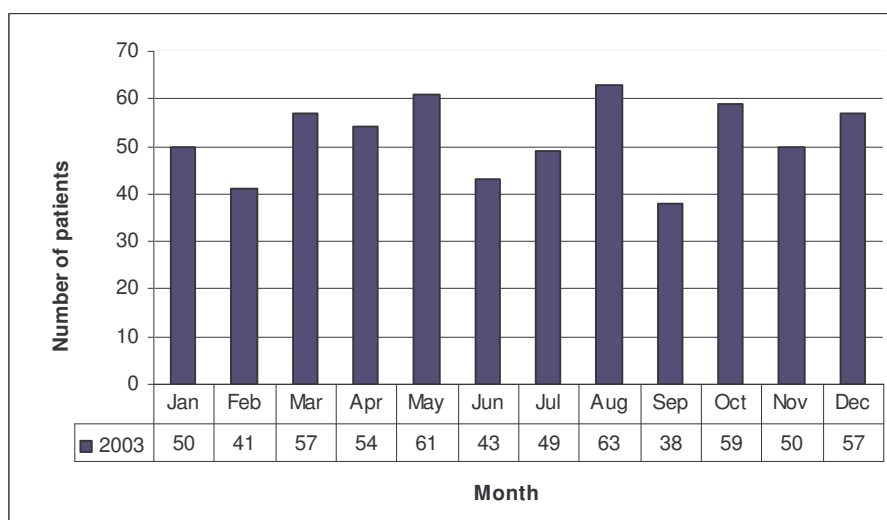


Figure 6.1 Major trauma admissions in the WATR by month (2003)

6.2 Age and sex distribution

Almost three-quarters (73%) of all major trauma admissions were male (Table 6.2). Males aged 15 to 24 years were admitted to hospital with a major trauma more frequently than any other group (Figure 6.2). Females aged 55 to 64 years had the least number of major trauma admissions.

Table 6.2 Sex distribution of major trauma admissions in the WATR (2003)

Trauma admissions		
Gender	Number	Percentage
Male	453	72.8
Female	169	27.2

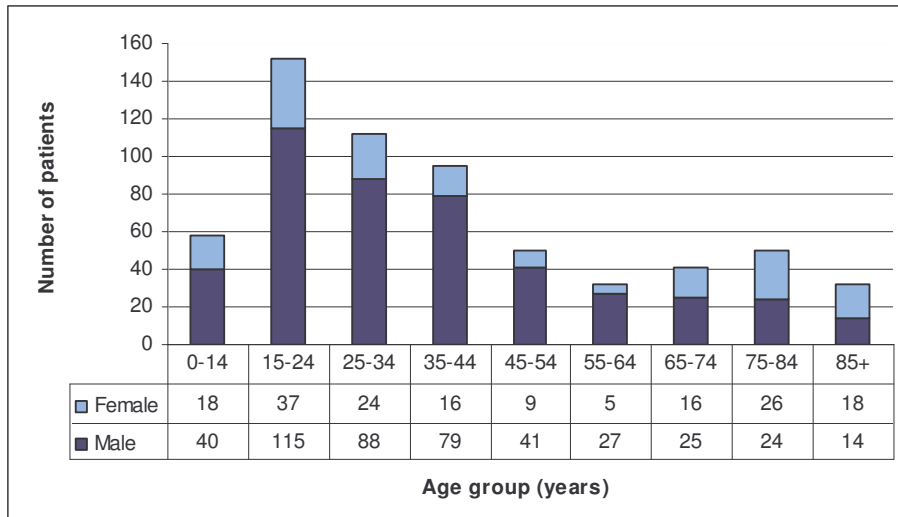


Figure 6.2 Age and sex distribution of major trauma admissions in the WATR (2003)

6.3 Previous illness

More than one-quarter of patients admitted with a major trauma had suffered a previous trauma injury (Figure 6.3). A history of psychiatric illness was also common among trauma patients. More than one previous illness can be recorded for each patient.

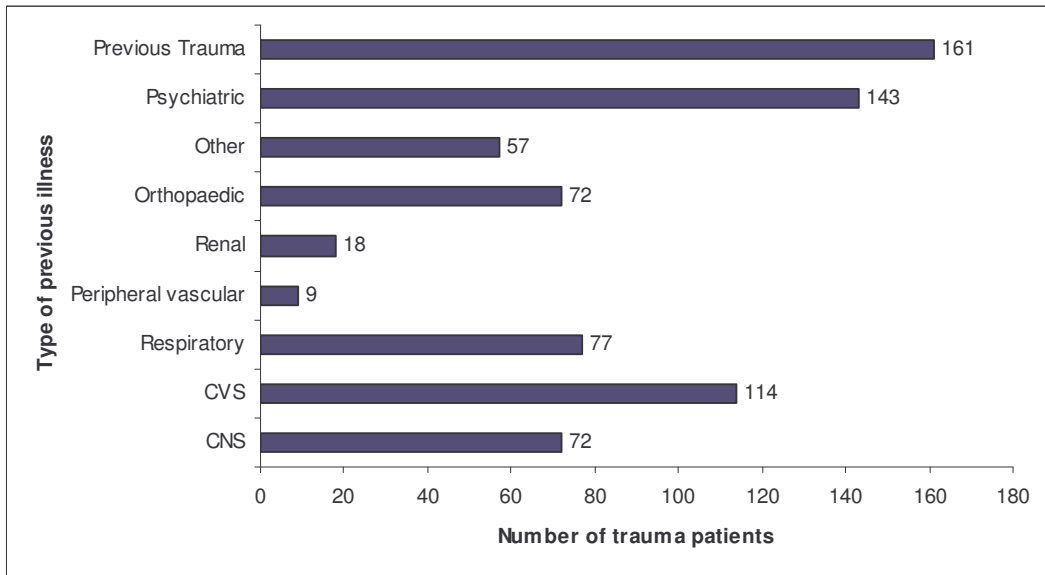


Figure 6.3 Previous illness of major trauma patients in the WATR (2003)

7. TRAUMA DETAILS

7.1 Trauma incident day and time

The most common day for a major trauma incident was Saturday and the most common time was between 12:00pm and 4:00pm (Figures 7.1 and 7.2). Major trauma patients more frequently sustained their injury during the late afternoon/early evening than the early morning. One-third (n=206) of patients did not have a time of trauma event recorded in the WATR database.

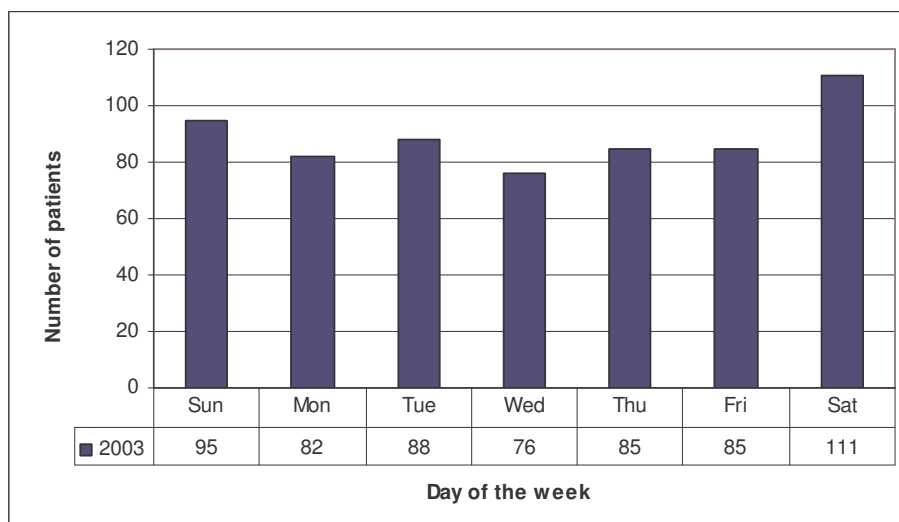


Figure 7.1 Day of trauma incident in the WATR (2003)

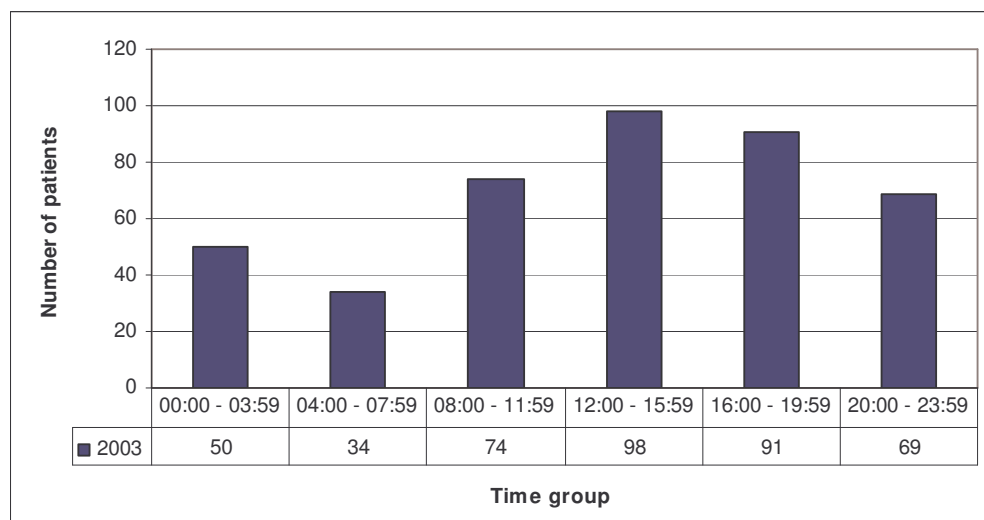


Figure 7.2 Time of trauma incident in the WATR (2003)

7.2 Major trauma incidents by holiday code

There were more major trauma admissions on a public holiday that occurred during school holidays (Figure 7.3).

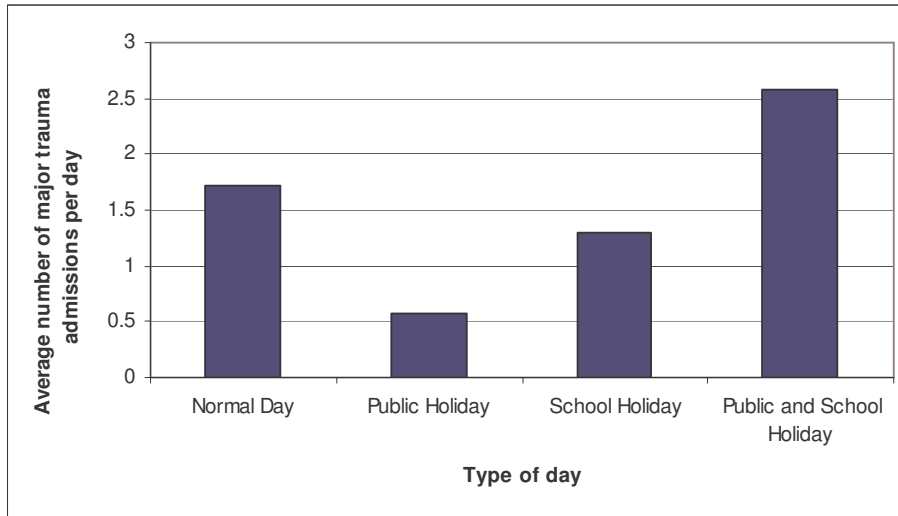


Figure 7.3 Major trauma admissions in the WATR by holiday code (2003)

7.3 Intent of trauma

The majority of major traumas were unintentional (85%), while 9% were the result of a personal assault, and 3% were self-inflicted (Figure 7.4).

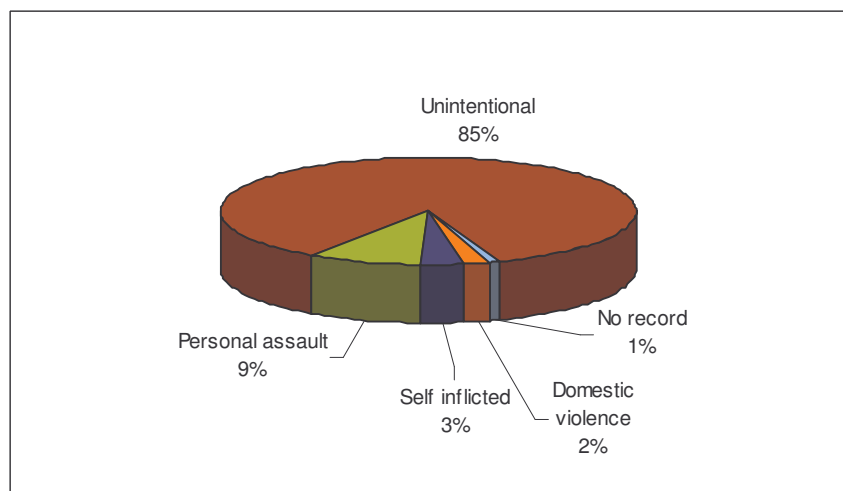


Figure 7.4 Intent of major trauma in the WATR (2003)

7.4 Cause of trauma

The main causes of major trauma that presented at WA Registry Hospitals were motor vehicle accidents and falls (Figure 7.5). Other common causes include, motor bike accidents, pedestrians and pedal cyclists involved in road accidents and those who struck or were struck by an object.

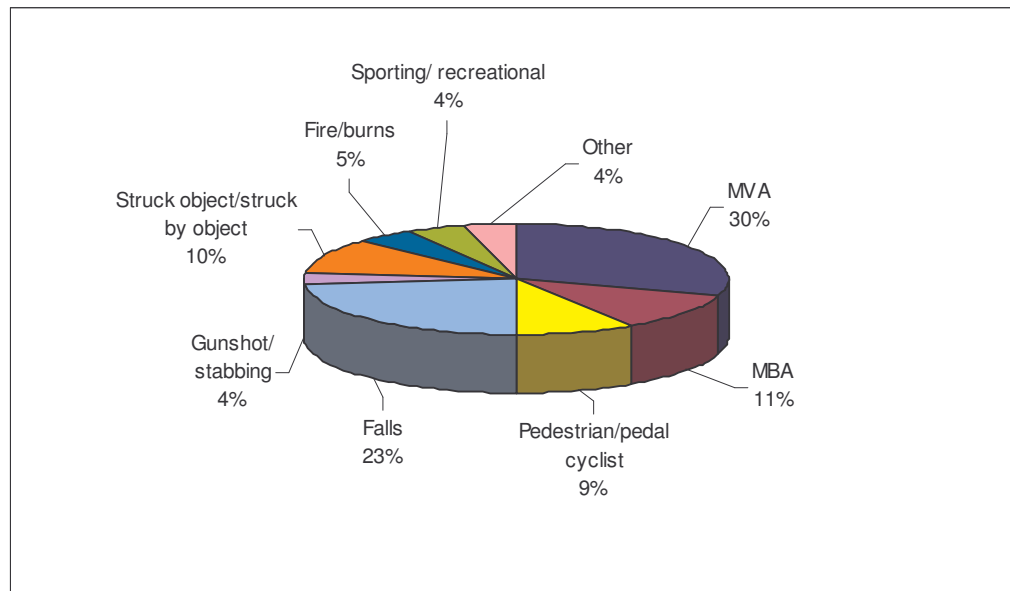


Figure 7.5 Cause of major trauma in the WATR (2003)

7.5 Site of trauma incident

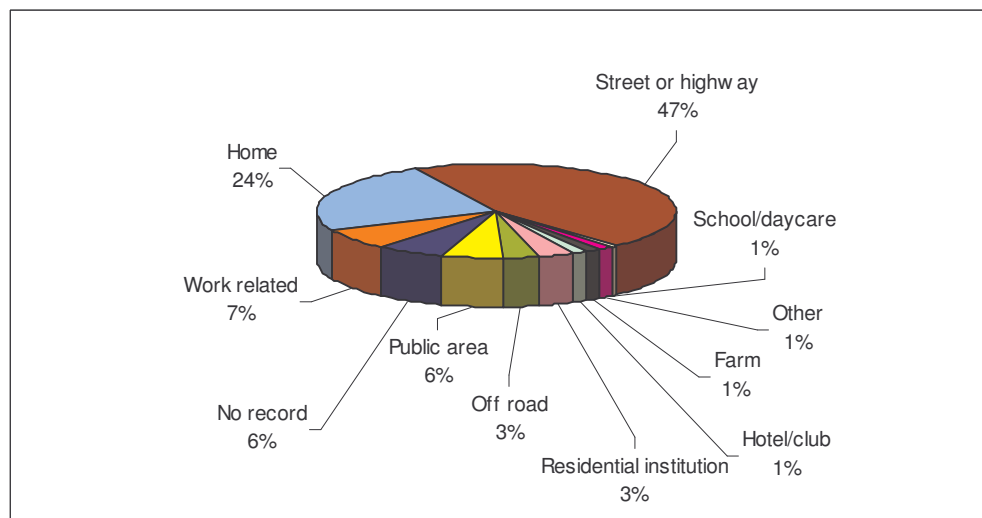


Figure 7.6 Site of major trauma incident in the WATR (2003)

Almost one-half of major trauma incidents occurred on a street or highway (47%), while one-quarter occurred in the home (24%) (Figure 7.6).

7.6 Location of trauma incident

Sixty nine percent of the total major trauma admitted were from the metropolitan area (Table 7.1). Non-metropolitan trauma incidents accounted for 30% of all major trauma presentations.

Table 7.1 Location of major trauma incident in the WATR (2003)

Location	Trauma admissions	
	Number	Percentage
Metropolitan	429	69.0
Non-metropolitan	189	30.4
Interstate and international	4	0.6

7.7 Patient condition at scene

The condition of the patient at the trauma scene was followed up by trauma registry nurses for the hospital registries but was not collected for all patients. Airway obstruction and hypotension were the most common conditions at the scene of the trauma incident (Table 7.2). Please refer to the Western Australian Trauma Registries Definitions for Data Collection and Entry (State Trauma Advisory Committee, 2002) for further information about patient condition at scene.

Table 7.2 Major trauma patient condition at scene in the WATR (2003)

Condition	Number of patients
External bleeding (> 500mLs)	19
Hypotension	37
Airway obstruction	45
Condition unknown	10

7.8 Documented alcohol and illicit substance

Twenty one percent of trauma patients had documented evidence of consuming alcohol in the 12 hours leading to their admission (Table 7.3). Nine percent of trauma patients had documented evidence that they had used an illicit substance in the previous 12 hours. These numbers are based on patient self-reporting or third party reporting and may not be complete or reliable.

Table 7.3 Documented alcohol and/or illicit substance use in past 12 hours as recorded in the WATR (2003)

Substance	Trauma admissions	
	Number	Percentage
Alcohol	130	20.9
Illicit substance	55	8.8

8. ROAD TRAUMA

Road trauma is any vehicular trauma occurring on a public highway or street. A public highway or street is the entire width between boundary lines of land open to the public for purposes of moving persons or property from one place to another (ICD-10-AM).

8.1 Road trauma admissions

In 2003 there were 265 admissions as a result of road trauma. The five suburbs that recorded the highest number of road trauma are shown in Table 8.1.

Table 8.1 Suburbs with the highest numbers of road trauma in the WATR (2003)

Postcode	Number of road traumas	Locations
6107	12	Beckenham, Cannington, Cannington East, Kenwick, Queens Park, Wattle Grove, Wilson
6062	9	Embleton, Morley, Noranda
6210	9	Barragup, Bouvard, Clifton, Coodanup, Dawesville, Dudley Park, Erskine, Falcon, Furnissdale, Greenfields, Halls Head, Herron, Lakelands, Madora Bay, Mandurah, Mandurah East, Mandurah North, Meadow Springs, Parklands, San Remo, Silver Sands, Stake Hill, Wannanup
6018	8	Innaloo, Churchlands, Doubleview, Gwelup, Karrinyup, Woodlands
6061	7	Balga, Mirrabooka, Nollamara, Westminster

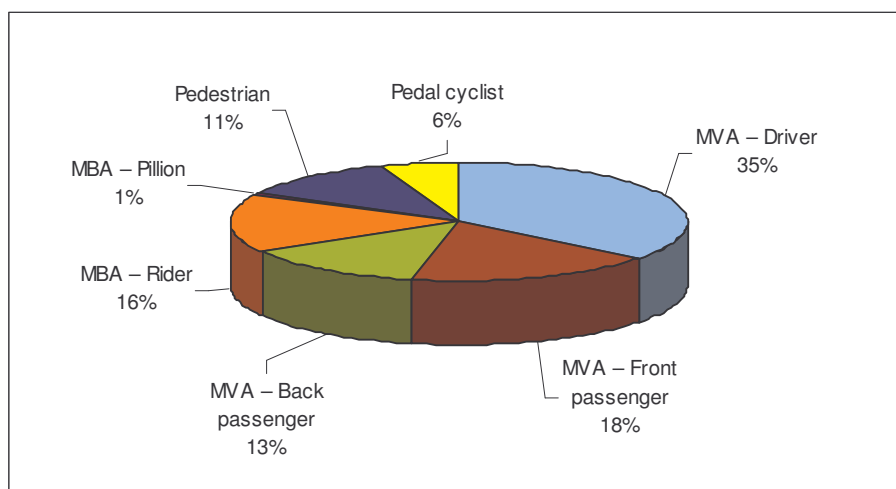


Figure 8.1 Road trauma admissions by category of patient in the WATR (2003)

Road trauma patients were more frequently a driver (35%) or front passenger (18%) of a motor vehicle (Figure 8.1). Pedestrians accounted for 11% of road trauma and pedal cyclists accounted for 6%.

8.2 Road trauma details

Twenty percent of road trauma patients were involved in a roll-over, and 10% were ejected from the vehicle (Table 8.2). Most road trauma accidents involved a single vehicle (58%) and speeds over 60 km/hr (Table 8.2).

Table 8.2 Road trauma details in the WATR (2003)

Road trauma details	Level	Number
Roll-over		53
Thrown from vehicle		27
Death in the same accident		21
Extrication		57
Speed (km/hr)	< 60	38
	60-100	77
	> 100	60
	Not recorded	90
Number of vehicles	1	154
	2	95
	> 2	3
	Not recorded/nil	13
Combined Speed*	< 60	5
	60-100	23
	> 100	21
	Not recorded	49
Impact**	Front	54
	Back	2
	Passenger side	17
	Driver side	24
	Not recorded	79

Total number of road traumas = 265

*Applies to road traumas where >1 vehicle involved (n=98)

**Applies to MVAs only (n=176)

8.3 Road trauma safety devices

Based on the information that was recorded, more than one-half (61%) of drivers and front passengers (57%) involved in a motor vehicle accident were wearing a seatbelt (Table 8.3). The number of rear passengers wearing a seatbelt was lower (37%). Fifty-six percent of motor bike riders were not wearing a helmet at the time of their road accident (Table 8.4). The numbers were small and should be interpreted with caution. Please refer to the Western Australian Trauma Registry's Definitions for Data Collection and Entry (State Trauma Advisory Committee, 2002) for further information about safety devices.

Table 8.3 Road trauma safety devices for MVA in the WATR (2003)

	Seatbelt/restraint	Seatbelt & airbag	Nil	Not recorded
MVA Driver (n=94)	57 (61%)	7 (7%)	10 (11%)	20 (21%)
MVA Front Passenger (n=47)	27 (57%)	1 (2%)	8 (17%)	11 (23%)
MVA Rear Passenger (n=35)	13 (37%)	0	19 (54%)	3 (9%)

Table 8.4 Road trauma safety devices for MBA and pedal cyclist in the WATR (2003)

	Helmet	Nil	Not recorded
MBA Rider (n=42)	15 (35%)	24 (56%)	3 (9%)
MBA Pillion (n=2)	0	1 (50%)	1 (50%)
Pedal Cyclist (n=15)	7 (47%)	4 (27%)	4 (27%)

9. NON-ROAD TRAUMA

Non-road trauma is a vehicular accident that occurs entirely in any place other than a public highway or street (ICD-10-AM). For example, accidents occurring on private property such as home driveways, factory locations and private paddocks and accidents occurring on dirt tracks and in car parks.

9.1 Non-road trauma admissions

In 2003 there were 44 major trauma admissions as a result of non-road trauma. Motor bike riders accounted for one-half of these admissions (Figure 9.1).

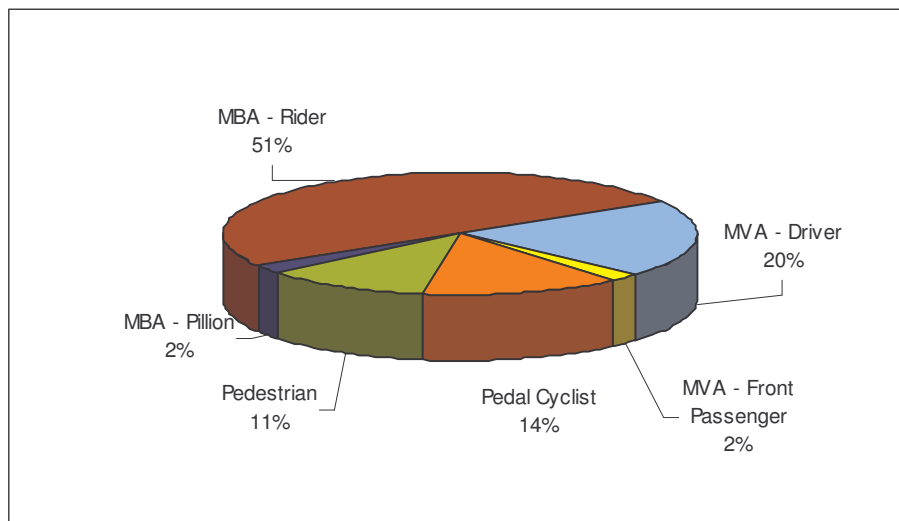


Figure 9.1 Non-road trauma admission by category of patient in the WATR (2003)

9.2 Non-road trauma details

The majority of non-road accidents involved a single vehicle (Table 9.1).

Table 9.1 Non-road trauma details in the WATR (2003)

Road trauma details	Level	Number
Roll-over		3
Thrown from vehicle		2
Death in the same accident		2
Extrication		4
Speed (km/hr)	< 60	10
	60-100	11
	> 100	0
	Not recorded	16
Number of vehicles	1	28
	2	6
	> 2	0
	Not recorded/nil	3
Combined Speed*	< 60	0
	60-100	1
	> 100	1
	Not recorded	4
Impact**	Front	4
	Back	0
	Passenger side	0
	Driver side	0
	Not recorded	6

Total number of non-road traumas = 44

Note: PMH does not collect details on non-road traumas so PMH data not included

*Applies to road traumas where >1 vehicle involved (n=6)

**Applies to MVAs only (n=10)

9.3 Non-road trauma safety devices

The use of safety devices were difficult to determine for non-road trauma patients due to very small numbers (Tables 9.2 and 9.3). Helmet compliance among motor bike riders appeared to be high (73%), although the numbers are small.

Table 9.2 Non-road trauma safety devices for MVA in the WATR (2003)

	Seatbelt/restraint	Seatbelt & airbag	Nil	Not recorded
MVA Driver (n=9)	3 (33%)	0	3 (33%)	3 (33%)
MVA Front Passenger (n=1)	0	0	1 (100%)	0
MVA Rear Passenger (n=0)	0	0	0	0

Table 9.3 Non-road trauma safety devices for MBA and pedal cyclist in the WATR (2003)

	Helmet	Nil	Not recorded
MBA Rider (n=22)	16 (73%)	5 (23%)	1 (4%)
MBA Pillion (n=1)	0	1 (100%)	0
Pedal Cyclist (n=6)	2 (33%)	3 (50%)	1 (17%)

10. WESTERN AUSTRALIAN REGISTRY HOSPITAL EMERGENCY DEPARTMENT CARE

10.1 Time of admission

The most common time for admission to a Registry Hospital was between 4:00pm and 8:00pm (Figure 10.1).

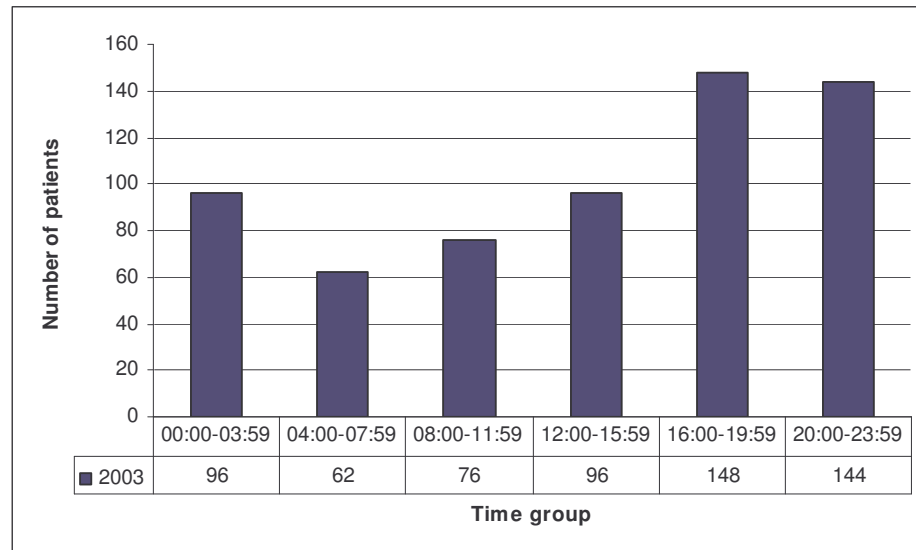


Figure 10.1 Trauma admission time in the WATR (2003)

10.2 Mode of arrival

Sixty nine percent of major trauma admissions arrived at the hospital via ambulance (Figure 10.2). Twenty six percent arrived by air, either on a Royal Flying Doctor Service flight (24%), helicopter flight (1%) or a commercial flight (1%), while 5% came via private or other transport.

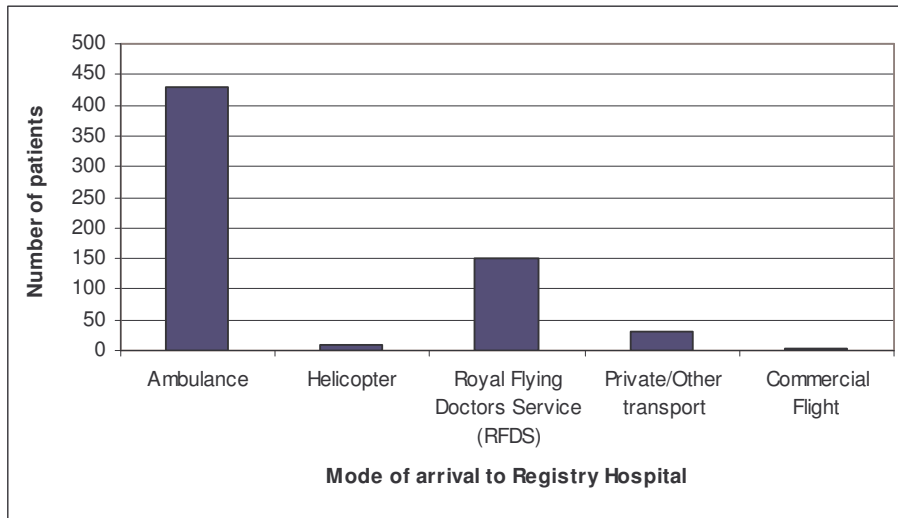


Figure 10.2 Mode of arrival to Registry Hospital in the WATR (2003)

Five percent of trauma patients had no escort to the hospital; 26% had either a doctor or nurse, or a combination of the two; 68% of escorts involved an ambulance officer (Figure 10.3).

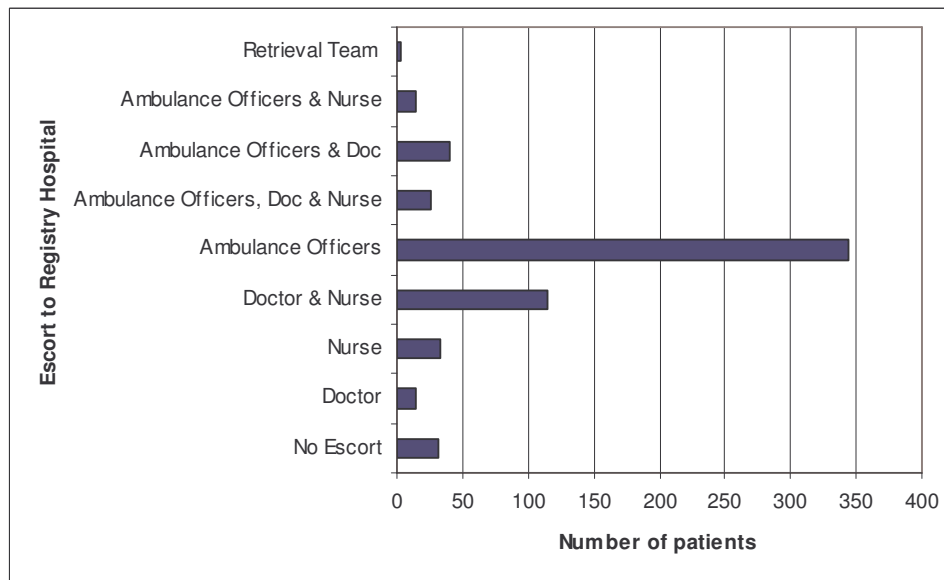


Figure 10.3 Escort to Registry Hospital in the WATR (2003)

10.3 Triage

On arrival at the hospital patients were allocated a triage priority according to the Australasian Triage Scale (ACEM, 2005). For 44% of major trauma admissions, triage code was recorded as resuscitative, while 45% were allocated a triage priority of emergency or urgent (Figure 10.4). Semi-urgent admissions made up 5% of major trauma admissions.

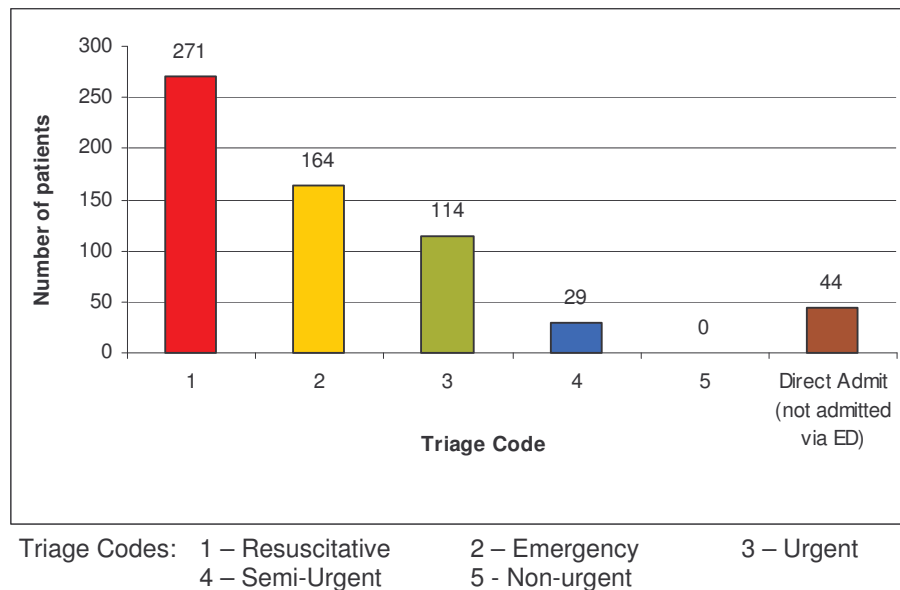


Figure 10.4 Triage codes for major trauma in the WATR (2003)

10.4 Investigations

The most common investigations performed on major trauma patients were a chest X-ray and CT scan (Figure 10.5). More than one investigation can be performed on a single patient.

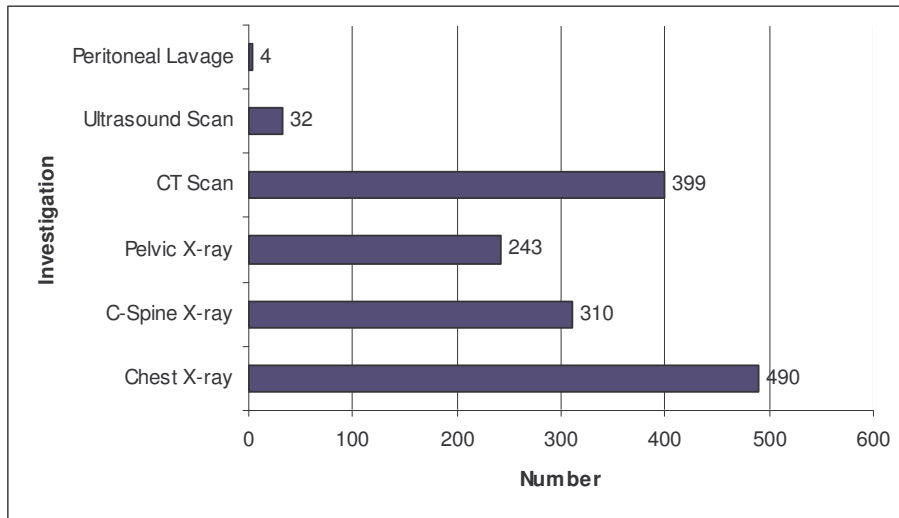


Figure 10.5 Investigations performed on major trauma patients in the Emergency Department (2003)

10.5 Resuscitation measures

The most common resuscitation methods were an ET tube and Arterial line (Figure 10.6).

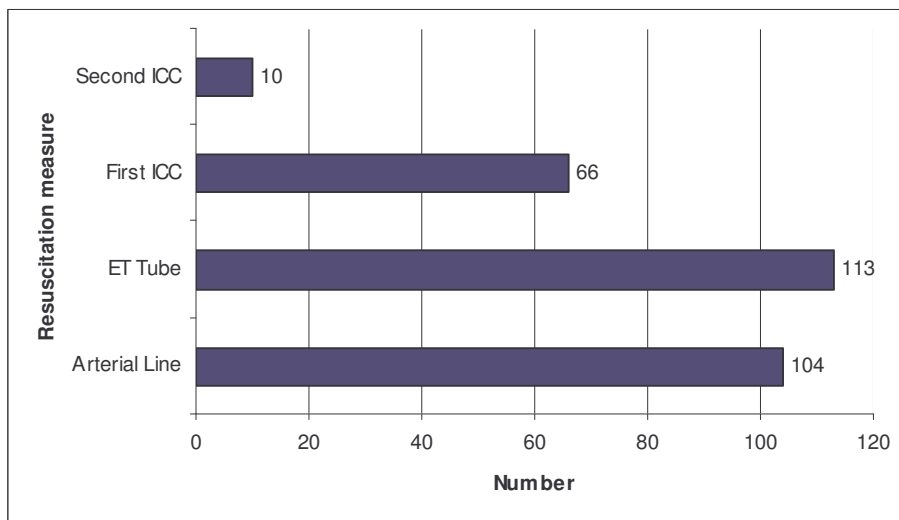


Figure 10.6 Resuscitation measures performed on major trauma patients in the Emergency Department (2003)

10.6 Time spent in Emergency Department

Overall, the average time spent in the Emergency Department was 3.5 hours (including deaths) (Table 10.1).

Table 10.1 Average time in Emergency Department by ISS (2003)

Injury Severity Score (ISS)	Average time (hours) in Emergency Department	
	Including deaths	Excluding deaths
16-24 (moderate)	3.9	3.9
25-40 (severe)	3.1	3.4
41-75 (critical)	2.8	3.1

11. POST EMERGENCY DEPARTMENT CARE

11.1 Intensive care admissions

Almost one-half (43%) of major trauma patients were admitted to Intensive Care Units (ICU) where they spent an average of 7.5 days (Table 11.1).

Table 11.1 Number of major trauma admissions to Intensive Care Units in the WATR (2003)

Year	Total admissions	Admissions to ICU	%
2003	622	267	42.9

11.2 Time spent in Post Emergency Departments

The four hospitals differ in the type of admission areas utilised after discharge from the Emergency Department. Therefore, some categories in Table 11.2 are not applicable to all hospitals. For example, information on length of stay in the Burns Unit came from two hospitals only. Major trauma patients admitted to the Burns Unit spent the greatest amount of days in hospital (averaging 32.6 days) compared to patients admitted to other post-emergency specialist departments (Table 11.2).

Table 11.2 Average time spent in post-emergency specialist department areas (2003)

Department	Average time spent (days)
Intensive Care Unit	7.5
High Dependency Unit	N/A to all hospitals
Burns Unit*	32.6
No. of days ventilated	6.1
No. of days on dialysis**	7.4

* Does not apply to SCGH and Fremantle Hospital

**Does not apply to PMH

12. WESTERN AUSTRALIAN HOSPITAL TREATMENT

12.1 Admitting medical specialities

More major trauma patients were admitted under neurosurgery (32%) and orthopaedic surgery (20%) than other specialities (Table 12.1).

Table 12.1 Admitting medical specialities in the WATR (2003)

Admitting section	Frequency
Cardiothoracics	55
General Surgery	91
Neuro Surgery	199
Orthopaedic Surgery	123
Plastic Surgery/Burns	52
Oral Surgery	5
Emergency Medicine	25
General Medicine	28
Paediatric Intensive Care*	31
Other	13
Total	622

12.2 Operations at WA Registry Hospitals

In 2003, 393 trauma patients required operations, representing 63% of all major trauma admissions (Table 12.2).

Table 12.2 Operations performed on major trauma patients in the WATR (2003)

	2003
Trauma admissions	622
Patients requiring operations	393
Percentage (%)	63

A total of 1054 operations were performed. Of these 384 (36%) were performed on the extremities of the body, and 309 (29%) performed on the head and neck (Figure 12.1).

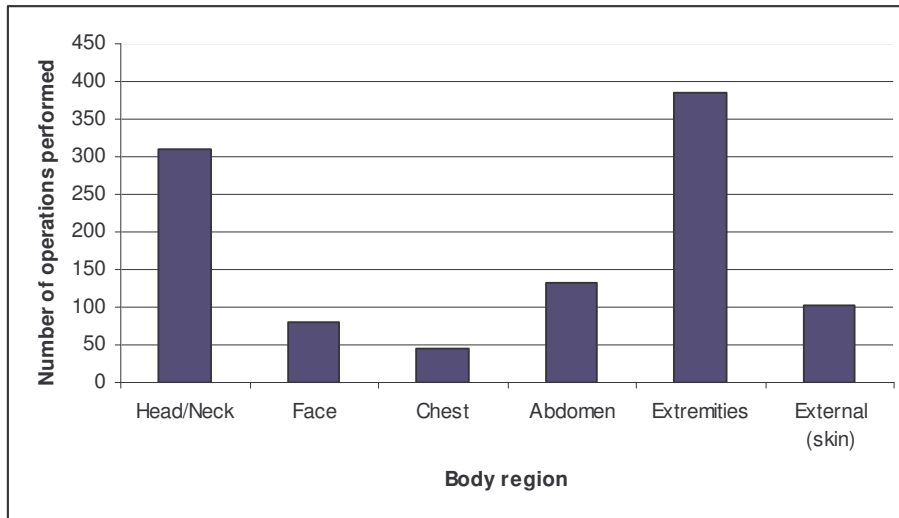
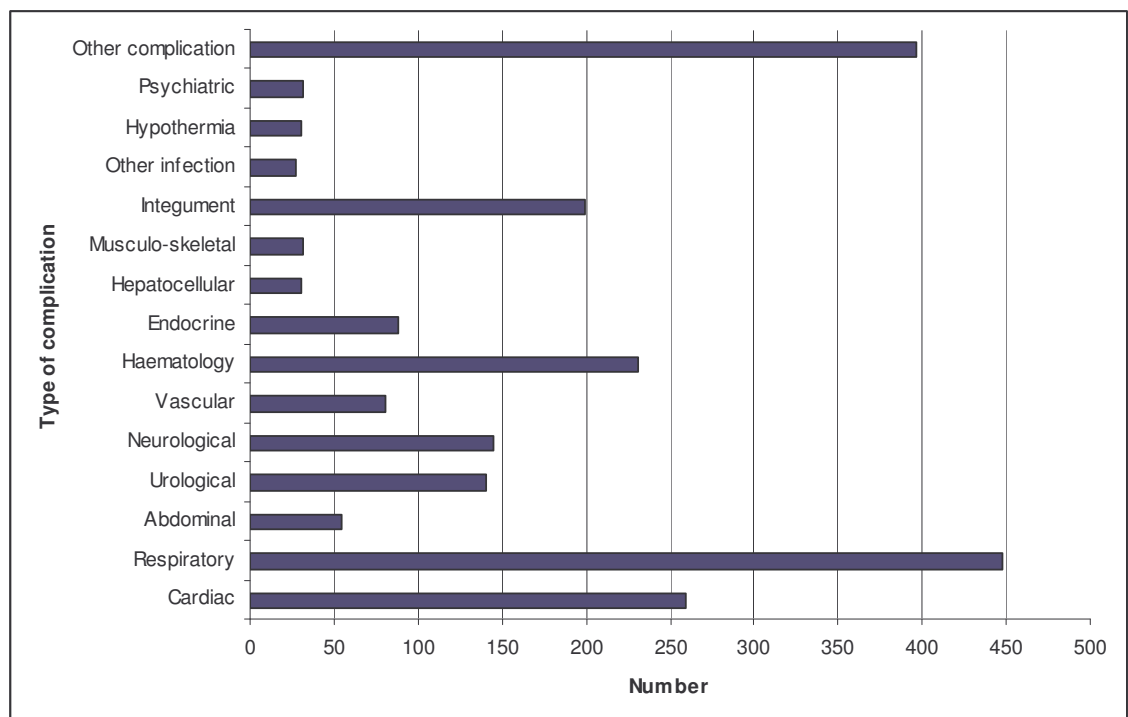


Figure 12.1 Operations performed by body region in the WATR (2003)

12.3 Complications

A respiratory complication was the most common complication in patients admitted with major trauma, affecting 448 of the 622 major trauma patients (72%) (Table 12.3). More than one complication can be recorded for each patient.

Table 12.3 Complications in trauma patients in the WATR (2003)



13. DEATH DETAILS

Overall, 15% of all major trauma patients admitted to a WA Registry Hospital died as a result of their trauma. Table 13.1 identifies the location of these deaths. The majority of deaths occurred in an Intensive Care Unit (43%).

Table 13.1 Location of death of major trauma patients in the WATR (2003)

Location of death	Percentage of all major trauma deaths (n=94)
Resus	18.1
Intensive Care Unit (ICU)	42.6
General ward	30.9
Burns unit	2.1
Operating theatre	3.2
Other	3.2

Almost one-half of deaths were caused by a head injury (48%) (Table 13.2).

Table 13.2 Cause of death of trauma patients in the WATR (2003)

Cause of death	Percentage of all major trauma deaths (n=94)
Cardiovascular failure	2.1
Respiratory failure	3.2
Respiratory infection	3.2
Renal failure	2.1
Multi organ failure	7.4
Head injury	47.9
Brain death	10.6
Pulmonary embolism	1.1
Cerebrovascular accident	3.2
Haemorrhage	13.8
Sepsis	2.1
Cardiac Arrhythmia	1.1
Unknown	2.1

While blunt injuries were more common than penetrating injuries among major trauma admissions, patients were more likely to die from a penetrating injury (32% compared to 14% from a blunt injury) (Table 13.3). Please refer to the Western Australian Trauma Registries Definitions for Data Collection and Entry (State Trauma Advisory Committee, 2002) for more detail about blunt/penetrating injuries.

Table 13.3 Mortality rate of blunt vs. penetrating injuries (2003)

	Type of trauma injury			
	Blunt		Penetrating	
	Number	Percentage	Number	Percentage
All major trauma	597	91.5	25	8.5
Major trauma deaths	86	14.4	8	32.0

14. DISCHARGE DETAILS

14.1 Length of stay at a WA Registry Hospital (2003)

The majority of trauma patients stayed in hospital between four and 14 days (Figure 14.1). Excluding those patients who died, on average, patients spent almost 20 days in hospital following their injury (Table 14.1).

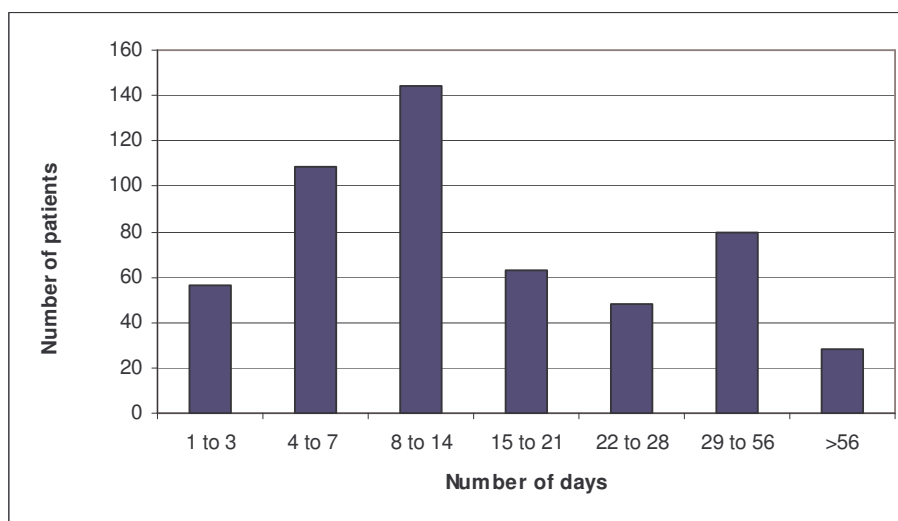


Figure 14.1 Number of days in hospital (excluding deaths) (2003)

Table 14.1 Average length of stay in hospital (2003)

Average time spent (days)	
Including deaths	17.6
Excluding deaths	19.7

14.2 Discharge destination

One-half of all major trauma patients were discharged to their residential homes after their hospital treatment (Figure 14.2). The next most common discharge destination was to Royal Perth Rehabilitation Hospital (23%), while 15% were deceased.

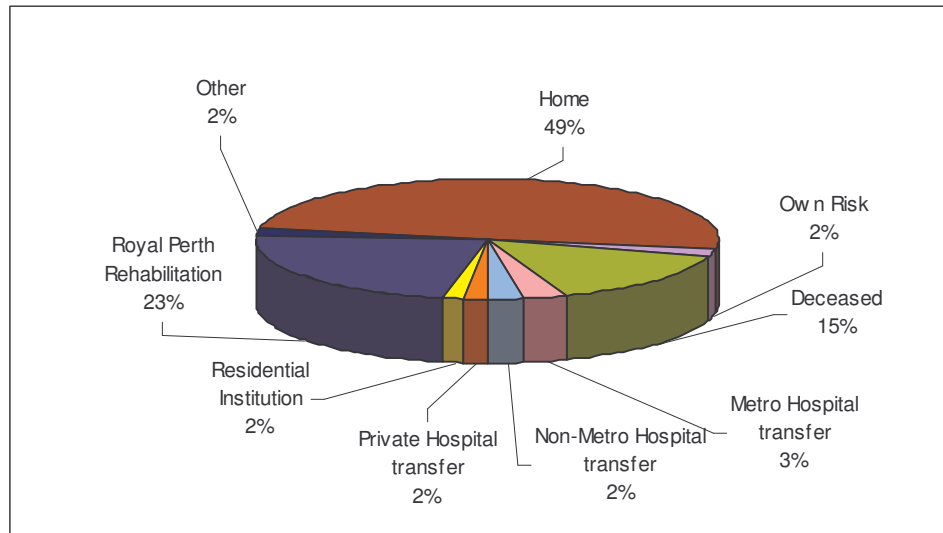


Figure 14.2 Discharge destination from WA Tertiary Hospital (2003)

15. INJURY SEVERITY SCORE

Excluding deaths, the higher the patient's ISS, the longer the hospital stay. Patients with an ISS greater than 40 (ie. critical) spent an average of 55 days in hospital compared to 17 days in hospital for patients with an ISS between 16 and 24 (ie. moderate) (Figure 15.1).

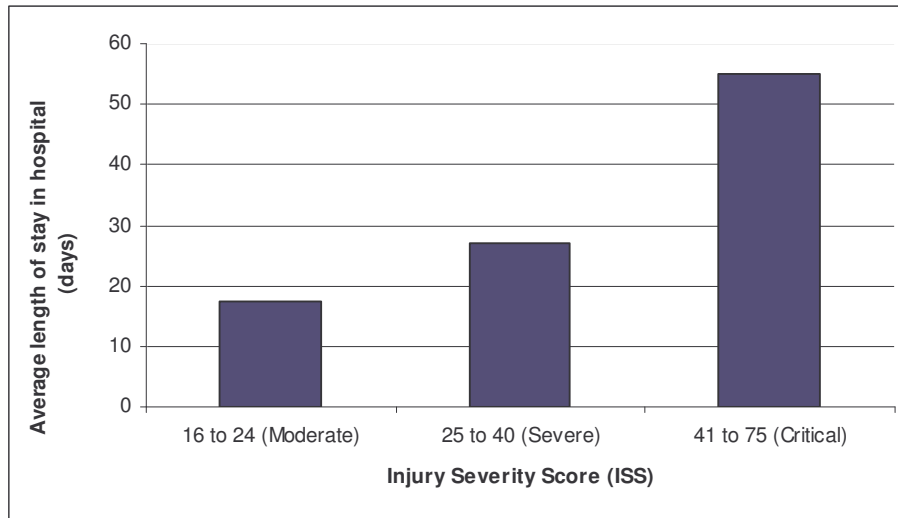


Figure 15.1 ISS vs. Average length of stay in hospital (excluding deaths) (2003)

Almost one-half (46%) of the patients with a critical ISS died as a result of their injury, while only 5% of patients with a moderate ISS died (Table 15.1).

Table 15.1 Mortality rate within each ISS category (2003)

ISS Category	Total number of patients	Number of deaths	Percentage mortality
16-24 (moderate)	323	16	5.0
25-40 (severe)	231	47	20.3
41-75 (critical)	68	31	45.6

Patients aged 15-24 years had a higher number of injuries in all three ISS categories (Figure 15.2). Patients aged over 65 years presented with more severe injuries than either moderate or critical injuries.

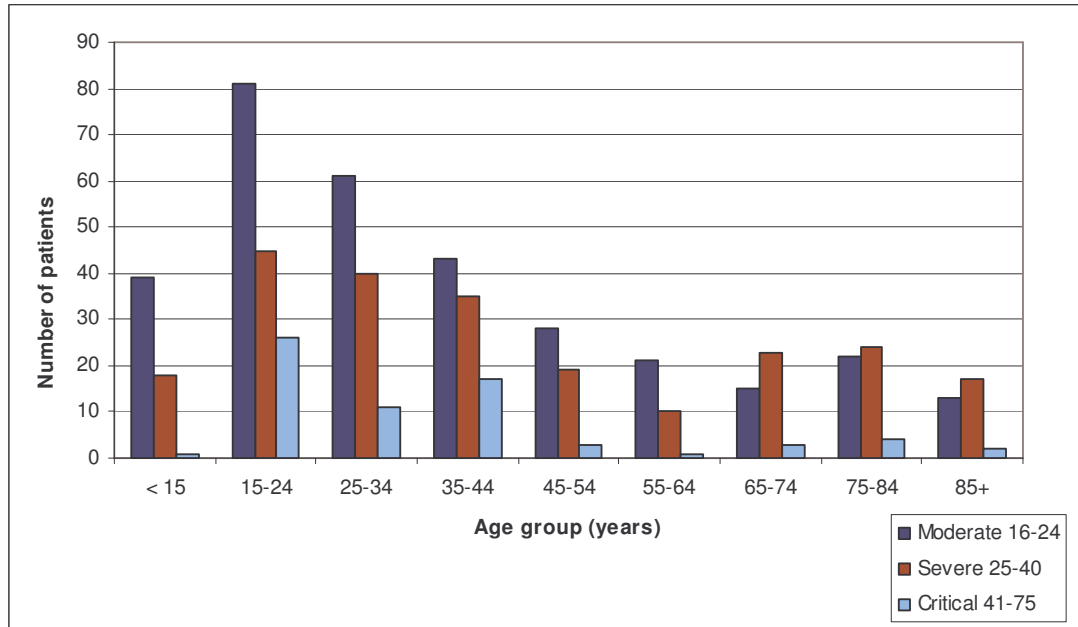


Figure 15.2 Injury Severity Score vs. Age group (2003)

16. CONCLUSIONS

This report details the demographic characteristics of patients who are admitted to a WA Registry Hospital with a major trauma; the event which caused the injury; contributing factors; the type and severity of the injury sustained; and information related to the patient's movement through the hospital system, from the Emergency Department to discharge.

The trauma registry is the principal tool for the systematic audit of the quality of care provided to the injured patient during all phases of trauma care from the pre-hospital phase through to discharge from the registry facility. Auditing the quality of care provides an opportunity to improve the outcomes of trauma patients. This 2003 report contributes to a body of knowledge on trauma care in WA and provides data which can facilitate interstate and possibly international injury comparisons.

17. REFERENCES

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