



Government of **Western Australia**  
Department of **Health**



Royal Perth Hospital

# Royal Perth Hospital Trauma Registry Report

Combined 2010 - 2011

## Director Trauma Services Report

In 2010 the Trauma Service and Registry at RPH had a reduction in staffing numbers, leading to a delay in the process of generating a final annual report. As a result, we have combined the 2010 and 2011 data into one report for this time only. We anticipate that subsequent reports will be more current and published annually.

The patterns of trauma epidemiology remain constant but the total number of such serious injuries continues to climb. While road trauma is the biggest threat to our population, an emerging issue is that of assaults and interpersonal violence (including domestic violence). A comparison of this particular group over the last ten years has shown a significant rise in the annual number of admissions due to serious assaults (i.e. admission for more than 24 hours) from 300 to 450. In this group, stabbings have almost doubled since 2002, and head injuries due to assaults have increased by a staggering 500%. Both these groups also share a common association with substance use (alcohol or drugs).

Alcohol and drug use statistics in our reports are limited by the fact that these are self-reported data and the validity of this is not strong. None the less, the clinicians in all aspects of the trauma service have to deal with the impact that drug usage has on the patients' care both as an inpatient and outpatient. Drug and alcohol support services within inpatient areas are starting to be stretched as the demand for this limited resource is increasing. Mental health services are often also partners in the management of these patients.

Across the wider state and in regional hospitals, the availability of advanced imaging with multidetector CTscanners, accompanied by the picture archiving system of PACS has brought a small part of modern trauma management to the regional centres. However, this needs further direction and careful structuring in order to ensure that it delivers better clinical care and not unwanted outcomes such as longer times to retrieval, unnecessary radiation, and increased costs.

I would like to again acknowledge the great work by the Trauma Registry staff through a period when resources were reduced, and in particular the innovations that were brought in to catch up with the gaps. I would also like to acknowledge the time and expertise devoted to training and supervising the recently employed State Trauma Registry Research Nurses.



SUDHAKAR RAO  
DIRECTOR TRAUMA SERVICES, ROYAL PERTH HOSPITAL

## Executive Summary

Royal Perth Hospital managed overall **3%** more trauma patients in 2010, compared to 2009 with a total of **5413** trauma admissions. There was a further increase of **4.3%** in 2011 with a total of **5647** trauma admissions. A total of **528** Major Trauma patients (ISS >15) were among this group in 2010, representing an increase of **11.6%** in major trauma cases from 2009 (**473** Major Trauma Patients). There was a further **4.7%** increase in 2011 with **552** Major Trauma Admissions (ISS >15).

### Demographic Data:

- Males continue to dominate trauma admissions with a ratio of 2 Males to 1 female (Males **64.9%**, Females **35.1%** in 2010; Males **66.8%**, Females **33.2%** in 2011) (figure 3b)
- **41.2%** of total trauma in males occurred in the 15-44 year age group, compared to **12.1%** in females in 2010; and **42.7%** males compared to **12.8%** in females in 2011 (figure 3b)
- **45.7%** of trauma in females occurred in the 65+ age group, compared to **15.5%** in males in 2010; and **41.3%** in females compared to **15.6%** in males in 2011 (figure 3b)
- **71%** of major trauma (ISS >15) occurred in males in 2010 and **76%** in 2011 (figure 3d)
- **62.1%** of major trauma in males occurred in the 15-44 age group; compared to **35.9%** in females in 2010; **62.3%** in males compared to **47.7%** in females in 2011 (figure 3d)
- Males outnumbered females in all age groups for major trauma except the 75+ and 85+ year age groups in 2010 and the 85+ age group in 2011 (figure 3d)

### Trauma Details:

- The majority of traumas were unintentional (**86.5%**) in both 2010 and 2011; followed by personal assaults (**8%** in 2010 and **7.8%** in 2011) (figure 4a)
- **76.4%** of minor traumas (ISS<16) occurred in the metropolitan area in 2010 and **74.2%** in 2011 (table 4a)
- **64.4%** of major traumas occurred in the metropolitan area in 2010 and **65.6%** in 2011 (table 4a)
- **46%** of major traumas in 2010 occurred on the roads; **47%** in 2011 (figure 4f)
- **43.4%** of major traumas in 2010 were directly attributed to vehicular trauma (MVAs and MBAs) and **44.1%** in 2011; and **25%** in 2010 were due to falls (**23%** in 2011) (figure 4h)

### Road Trauma:

For the purposes of the Trauma Registry, Road Trauma is defined as vehicular-related trauma *occurring on a street or highway*.

- There was a **7.8%** increase in major road trauma admissions from 2009 to 2010; and a further **4.7%** increase from 2010 to 2011 (figure 5a)
- Postcodes **6000** (CBD) (in 2010) and **6107** (Beckenham, Cannington, Kenwick, Queens Park, Wattle Grove, Wilson) (in 2011)) were the top metropolitan locations for Road Trauma (figure 4d)
- The pattern of road trauma in 2010 remains similar to 2009: MVA **57.5%**; MBA **24%**; Pedestrians **9.5%** and Pedal Cyclists **8.9%**; and for 2011: MVA **56.6%**; MBA **26.2%**; Pedestrians **8.3%** and Pedal Cyclists **8.8%** (figure 5b)
- Seatbelt compliance remains poor with MVA trauma, particularly among rear seat passengers, with **38%** being reported as not wearing a seatbelt, compared to **9%** of drivers (adjusted for not recorded). After an initial improvement in 2010, this figure has improved slightly since 2009 with rear seat non-compliance previously being reported as **49%**. However, in 2011, non-compliance in this category has increased once again to **48.7%** (drivers **7.5%**)(figure 5c)
- Helmet compliance has improved significantly for MBA trauma in 2010, with **92.8%** of patients reported as wearing helmets (adjusted for not recorded). There is a slight decrease in compliance reported in 2011 with **88.5%** (figure 5c)
- Being ejected from the vehicle would appear to be a major contributing factor to overall injury severity, with patients in this category having a median ISS of **17** (Range 1 - 54) in 2010 and **22** (Range 1-36) in 2011 (table 5a)
- Speed greater than 100 kph was the major contributing factor to increased ISS in MBA trauma, with a median of **12** (Range 1 -50) in 2010 and **10.5** (Range 1-33) in 2011(table 5b)
- **46%** of all road traumas were reported as travelling between 60 and 100 kph for both 2010 and 2011 (figure 5c)
- Higher crash speeds correlate with a higher ISS, with patients in the >100 kph category in 2010 having a median ISS of **10** (Range 1 -50) compared to **9** (Range 1 - 75) in the 60-100 kph group, and **4** (Range 1 - 54) for <60 kph; figures for 2011 show: patients in the >100 kph category having a median ISS of **14** (Range 1 -45) compared to **9** (Range 1 - 75) in the 60-100 kph group, and **5** (Range 1 - 45) for <60 kph (table 5d)

### Hospital Transfers:

- **57%** of major trauma admissions to Royal Perth Hospital in 2010, and **56%** in 2011, were transfers from other hospitals (**43.5%** metropolitan and **56.5%** country in 2010; **41.1%** metropolitan and **58.9%** country in 2011) (figure 6a)
- Metropolitan major trauma transfers were mostly distributed between South Metropolitan Area Health Service (SMAHS) (**53.4%** in 2010; **52.6%** in 2011) and North Metropolitan Area Health Service (NMAHS) (**40.4%** in 2010; **44.1%** in 2011) (figure 6c)

- Metropolitan major trauma patients spent on average **5.8** (2010) and **4.3** hours (2011) at NMAHS transferring hospitals and **4.6** (2010) and **4.8** hours (2011) at SMAHS facilities (figure 6f).
- Non-metropolitan major trauma patients spent between **3.1** and **7.8** hours (2010) and **3.9** and **9.5** hours (2011) on average at their respective rural hospitals, prior to transfer to Royal Perth Hospital (figure 6e). This is a significant improvement on 2009 (between **3.4** and **16.1** hours)

#### **RPH Arrival:**

- In 2010, the busiest days of the week for trauma admissions (both major and minor) at Royal Perth Hospital were Saturday (**16.7%**) and Sunday (**16.9%**), compared to Tuesday, which was the quietest day with **12.2%** of admissions; in 2011, the busiest admitting days were Saturday (**15.7%**) and Sunday (**17.4%**), compared to Wednesday, which was the quietest day with **12.3%** of admissions (figure 7a)
- Peak arrival time is between 12md and 6pm (**33.6%** in 2010; **33.2%** in 2011) (figure 7b)
- The majority of major trauma patients arrived to Royal Perth Hospital via St John Ambulance (**60.4%** in 2010; **59.4%** in 2011) and of these, **18.8%** (2010) and **11.6%** (2011) required Doctor and/or Nurse escort (figure 7c/7d)
- **26.7%** (2010) and **25.5%** (2011) of all major trauma patients were transferred from the country via Royal Flying Doctor Service (figure 7c)
- There were **56** trauma patients delivered to RPH by helicopter retrieval teams in 2010 and **63** in 2011; an increase on 2009 (**37** patients) (figure 7c)

#### **RPH Initial Treatment (Major trauma patients):**

- **81%** (2010) and **83%** (2011) of major trauma patients received a chest x-ray within 24 hours of arrival to RPH; CT scan was performed on **70%** (2010 and 2011) of patients; **18%** (2010 and 2011) patients were intubated; **37%** (2010 and 2011) of patients received an Arterial Line; FAST was performed on **13%** (2010) and **14%** (2011) of patients (figure 7e)
- Minor trauma patients (ISS <16, excluding deaths) continue to spend the longest time in the Emergency Department, prior to admission to a hospital bed (average **5.3** (2010) and **4.3** hours (2011)); compared to critical trauma patients (ISS 41-75, excluding deaths) who spent on average **2** (2010) and **2.4** (2011) hours in the department. These times are slightly longer than 2009 with an average of **2** hours reported (figure 7g)
- The majority of major trauma patients were admitted directly from the Emergency Department to the State Major Trauma Unit (**24.8%** in 2010; **31.7%** in 2011) or a general ward (**21.2%** in 2010; **23.5%** in 2011). A further **18.6%** (2010) and **19.6%** (2011) were admitted to the Intensive Care Unit (ICU) or High Dependency Area (HDA). However, **32.2%** (2010) and **23.2%** (2011) of major trauma patients transited via radiology or the operating theatre before ending up in a final ward destination, or a critical care area such as HDA or ICU (figure 7h)

### **RPH Admission:**

- Major trauma patients were mostly admitted under the Trauma admitting team (**61.2%** in 2010; **62.1%** in 2011); the next highest major trauma admitting specialties were Neurosurgery (**18.7%** in 2010; **17%** in 2011) and Orthopaedic Surgery (**5.1%** in 2010; **6.1%** in 2011) (figure 8b)
- **59.6%** (2010) and **60.3%** (2011) of major trauma admissions required surgery (compared to **67.4%** in 2009), with the largest proportion of these procedures being performed on the extremities (**34.4%** in 2010; **35.7%** in 2011) and head and neck (**27.1%** in 2010; **28.4%** in 2011) (figure 8c)
- **40.5%** (2010) and **39.4%** (2011) of major trauma patients were admitted to ICU with a median length of stay (LOS) in ICU of **6** and **5** days respectively. Median Injury Severity Score (ISS) for these patients was **26** (Range 16-75) (for both 2010 and 2011), with **7.9%** (2010) and **14.2%** (2011) of these patients falling into the critical ISS category (ISS 41-75) (excluding deceased) (table 8a)

### **Discharge Details:**

- The pattern of distribution for LOS has not varied from year to year with total trauma patients (excluding deceased) having a modal LOS in the **1 to 3** days group and major trauma patients having a modal LOS in the **8 to 14** days group (figure 9a/9b)
- The average LOS for: major trauma patients (excluding deceased) is **20** (2010) and **17** (2011) days; major trauma patients (including deceased) **18** (2010) and **15** (2011) days; and minor trauma patients **5** days (2010 and 2011)(figure 9c)
- The majority of trauma patients in 2010 and 2011 were discharged home (**68.7%** and **68.4%** respectively). **13.5%** (2010) and **14.7%** (2011) of patients were transferred to the Royal Perth Rehabilitation Hospital (RPRH) and **13.9%** (2010) and **12.8%** (2011) of patients were transferred to other metropolitan or non-metropolitan hospitals or residential institutions. There was a **1.9%** (2010 and 2011) mortality rate for all traumas at RPH Wellington Street Campus (figure 9d).

### **Burns Trauma Admissions:**

- There were **278** burns injury admissions in 2010 and **290** in 2011, with a modal LOS in the **8-14** days group for minor burns (for both 2010 and 2011) and a modal LOS in the **22-28** days (2010) and **29-56** days (2011) groups for major burns (figure 10b). This figure represents an increase in the overall number of burns admissions from 2009 to 2011 of **26.6%**, but a **21.7%** decrease in major burns admissions over the same time period (table 10a). Major trauma numbers, however, in 2009 were artificially inflated due to the Ashmore Reef disaster
- Fire was the most common cause of burns injuries (**51%** in 2010; **50%** in 2011) followed by hot liquids (**20%** in 2010; **22%** in 2011) (figure 10a)



### **Trauma Mortality:**

- There was a total of **109** deaths in 2010 and **115** in 2011, with Head Injury and Brain Death as the major cause of death (**37%** in 2010 and **35%** in 2011) followed by Haemorrhage in 2010 (**15%**) and respiratory in 2011 (**21%**) and cardiac causes (**14%** in 2010 and **8%** in 2011) (figure 11a)
- **504/528** major traumas (**95.4%**) in 2010 and **529/552** (**95.8%**) in 2011 were blunt traumas (including **14** and **18** burns admissions respectively), with a **12.1%** (2010) and **12.8%** (2011) mortality rate in this group. **0.9%** (2010) and **1.1%** (2011) of blunt minor traumas died of complications following their injuries (table 11a)
- The mortality rate of **34.7%** (2010) and **43.9%** (2011) for critically injured patients (ISS 41-75) was predictably higher than that of minor trauma patients (**0.8%** in 2010; **0.9%** in 2011) (table 12a)
- Overall, there were **69** major trauma deaths (ISS >15) in 2010 (**13%**) and **71** (**12.8%**) in 2011 ((table 12a)
- Mortality rates for Major trauma deaths ISS >12 were **10.4%** (2010) and **9.9%** (2011)

### **Injury Severity Scores (ISS):**

- Increased injury severity correlates with a longer length of hospital stay, with patients in the ISS 41-75 (excluding deceased) category staying for an average of **57** days (2010) and **56** days (2011) at RPH, compared to **5** days for minor trauma patients (2010 and 2011) (figure 12a)
- In 2010, the 15-24 year age group formed the largest category of major traumas (**20.8%**), closely followed by 35-44 years (**17.4%**) and 25-34 years (**16.3%**). Combined, these groups comprised **54.5%** of all major traumas (figure 12f). In 2011, there was a slight shift to the younger age group with the 15-24 age group comprising **26.3%** of all major traumas, followed by the 25-34 year group (**18.5%**) and the 35-44 year group (**14.1%**). Combined these groups comprised **58.9%** of all major traumas for 2011 (figure 12f)
- The majority of major trauma patients (ISS>15) are triaged to Australasian Triage Scale (ATS) Category 1 (immediately life-threatening) or Category 2 (imminently life-threatening) (**78.2%** in 2010; **76.6%** in 2011) (figure 12g)
- The Injury Severity Score (ISS) has often been criticised because of a lack of consideration of the impact of multiple injuries within one body region, in its assessment. The New Injury Severity Score (NISS) calculates an injury severity score based on the worst three injuries, regardless of body region. Comparison of ISS with NISS (>15) demonstrates a significantly higher number of “major” traumas admitted to Royal Perth Hospital (**830** NISS > 15 compared to **528** ISS >15 in 2010; **829** NISS > 15 compared to **552** ISS >15 in 2011) and could reasonably be seen as an indication of inpatient workload and resource use.

### **Spinal Trauma Admissions:**

- There were **557** spinal injury admissions in 2010 and **569** in 2011, of which **184 (33%)** and **208 (36.5%)** respectively were major traumas with an ISS >15. This represents an overall **10%** increase in major trauma patients with spinal injuries from 2009 to 2011, with a corresponding **20%** increase in patients with neurological deficit (**40** in 2009 and **48** in 2011) (table 13a)
- Vehicular-related trauma (MVA/MBA/pedal cyclists/pedestrians) was the main cause for spinal injuries (**55%** in 2010; **56%** in 2011), followed by falls (**32%** and **25%** respectively) (figure 13a)

### **Head Injury Admissions:**

- There were **651** head injury admissions in 2010, and **709** in 2011 (Abbreviated Injury Scale score  $\geq 2$ ). Of these, **326 (50%)** in 2010 and **329 (46.4%)** in 2011 were major traumas with an ISS > 15 (table 14a)
- Following the same pattern as spinal trauma, the main cause of trauma for head injury patients was vehicular-related trauma (**40%** in 2010; **47%** in 2011), followed by falls (**37%** in 2010; **32%** in 2011). The next most significant group was “struck by object” (**15%** in 2010 and **14%** in 2011) (figure 14a)

### **RPH Trauma Service:**

- Since its inception in August 1994, the Trauma Registry at Royal Perth Hospital has seen an overall increase of **149%** in annual major trauma admissions (ISS >15), and an increase of **110%** in minor trauma admissions. The overall increase in annual total trauma admissions has been **114%** (figure 15a/15b)



# Royal Perth Hospital Trauma Committee

## Director, Trauma Services:

Mr Sudhakar Rao, Consultant

Department of General Surgery

## Committee Members:

Ms Maxine Burrell

Trauma Program Manager, Trauma Services

Assoc. Professor John Buchanan

HoD Allied Health

Dr Cyrus Edibam

Consultant, Intensive Care Unit

Dr Niall Henry

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Mr Stephen Honeybul

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Mr Terry Jongen

CNS, Emergency Department

Ms Carmel McCormack

Nurse Coordinator, Theatres (notification only)

Dr John Martyr

Consultant, Department of Anaesthesia

Mr Alan Prosser

Consultant, Orthopaedic Surgery Department

Dr Swithin Song

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# Trauma Service

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| Mr Sudhakar Rao  | Trauma Surgeon                        |
| Mr René Zellweger  | Trauma Surgeon                        |
| Dr Nikhil Agrawal  | Trauma Fellow                         |
| Dr Roshan Nair   | Trauma Registrar                      |
| Ms Sheryl Jonescu  | Trauma Case Manager                   |
| Ms Tanya Douglas   | CNS, SMTU                             |
| Ms Maxine Burrell  | Trauma Program Manager                |
| Claire Pigliardo, Marcel Palencia,<br>Claire Finley, Dylan Galloghly | Trauma Clinical Psychologists         |
| Ms Fiona Coll  | Senior Trauma Physiotherapist         |
| Ms Diane Atkinson  | Senior Trauma Social Worker           |
| Ms Sonja De Munck/ Ms Fiona Khamhing                                 | Senior Trauma Occupational Therapists |
| Ms Mary Hunt   | Trauma Speech Pathologist             |
| Ms Jacqui Tuck   | Trauma Dietician                      |
| Helen James/Bo Kim   | Trauma Pharmacist                     |

**Trauma Registry Website:** <http://www.rph.wa.gov.au/trauma/index.html>

All the data contained in this report has been obtained from the Royal Perth Hospital Trauma Registry and therefore should not be reproduced, quoted or copied without reference to the source. Any queries regarding the data in this report, or any requests for further information, should be directed to the Trauma Registry, Ph: (08) 9224 2551

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# 1. Trauma Activities at Royal Perth Hospital

## 1.1 Hospital Trauma Activities

### *Mortality and Morbidity Committee*

A multidisciplinary panel of Trauma Specialists reviews all trauma deaths. Each death is determined to be preventable, possibly preventable or not preventable, according to in-hospital patient management and potential system errors. Where appropriate, recommendations for improved patient care are made to the Surgical Division and the Director of Clinical Services.

Of the 109 trauma deaths eligible for audit in 2010, 107 patient records (98.1%) have been reviewed to date. A Trauma Registry Key Performance Indicator (KPI) recommends that all trauma deaths be reviewed within 90 days of data complete (80% target threshold). However it is the Trauma Registry's policy that, where applicable, deaths will only be eligible for review after sighting of the autopsy report to confirm injuries. In 2010, 94/107 (87.85%) of eligible trauma deaths to date were reviewed within the 90 day KPI recommendation. This shows an increase in compliance on 2009 (74.69%).

However, of the 115 trauma deaths eligible for audit in 2011, only 73 patient records (63.47%) have been reviewed to date. In 2011, 31/73 (42.46%) of eligible trauma deaths were reviewed within the 90 day KPI recommendation. This shows a marked decrease in compliance on 2010 (87.85%). The biggest challenge faced by the Trauma Registry in meeting the KPI is the availability of the patient's medical record. Other compounding factors include delay in obtaining autopsy reports, resulting in delay to data complete, and the number of patient records that can be reviewed at each Audit. At the time of writing this report, there are 28 patient records from 2011 that are data complete and awaiting review at Audit. The number of records being audited at alternate Mortality Audit Committee Meetings has increased from 8 records to 10 in an attempt to catch up on backlog. An extra 24 patients have been reviewed compared with 2010.

A total of 11 Mortality Audits were conducted in 2010, reviewing 79 patient records; and 12 conducted in 2011, reviewing 103 patient records.

The cause of death determined at audits for 2010 and 2011 is as follows:

| Cause of Death              | Number of Patients |
|-----------------------------|--------------------|
| Acute Myocardial Infarction | 11                 |
| Brain Death                 | 21                 |
| Cardiac Arrhythmia          | 8                  |
| Cardiac Failure             | 14                 |
| CVA                         | 3                  |
| Haemorrhage                 | 19                 |
| Head Injury                 | 42                 |
| Multi Organ Failure         | 13                 |
| Other                       | 5                  |

| Cause of Death        | Number of Patients |
|-----------------------|--------------------|
| Pulmonary Embolism    | 5                  |
| Respiratory Failure   | 16                 |
| Respiratory Infection | 13                 |
| Sepsis                | 10                 |
| Unknown               | 2                  |
| <b>Total</b>          | <b>182</b>         |

The following trauma management issues were discussed:

- Tasking of helicopter and clinical co-ordinator of trauma retrieval in the country
- Pre-hospital airway management
- Femoral vein access by St John Ambulance in peripherally shut down patients
- Minor head trauma in the elderly on anticoagulants
- Timing of beta blocker administration in patients with junctional rhythm
- Patient with NFR order receiving CPR
- Management of patients with severe facial fractures
- Access to theatre for #NOF patients
- St John Ambulance RSI Clinical Practice Guidelines - helicopter versus road ambulance
- Alternative venous access at scene e.g. Femoral vein, intra osseous
- Monitoring capabilities in cardiology
- IVC filters - lack of protocol
- Use of Pre-hospital Midazolam
- Complications re angiograms - acceptable risk
- Reversal of Warfarin
- Management of renal failure
- Pre-hospital fluids TKVO in patient with extensive injuries
- Anticoagulation - chemical prophylaxis pre-operatively
- Delayed diagnosis: PE on CTPA
- Prolonged secondary hospital phase
- Prolonged hypotension during intubation
- Direct transfer to ICU
- Delay to Theatre
- Propofol Infusion Syndrome
- Operative versus conservative management in patient with severe co-morbidities
- Pre-hospital management of combative patient
- Use of NSAIDs in patient with renal impairment
- Compliance with MET Call Criteria
- Glucose management
- Local anaesthetic toxicity
- Cardiology reviews
- DVT prophylaxis
- Access to coagulation products in regional hospitals
- Monitoring of deteriorating patients

### **Missed Injuries**

A panel of Emergency Medicine and Trauma specialists conducts weekly audits of injuries that were missed until after the secondary survey of trauma patients at Royal Perth Hospital. In addition, cases with injuries that are initially missed in the first presentation and who subsequently require admission for management (delayed diagnosis) are reviewed. In each case the reviewers attempt to determine and categorise the reason for the injury being missed initially: e.g. inadequate examination, inadequate history, inadequate or no investigation, wrong interpretation of investigation results and limitation of investigation. During this report period the audit panel also reviewed and categorised the clinical significance of the missed injury to the patient: caused death; disability permanent; disability transient; required additional surgery; no clinical impact and other (e.g. increased length of stay). Audit results are fed back to individual Emergency Department and Trauma Services medical staff where appropriate. Senior staff use the audit forum to identify ways of improving patient assessment that will potentially reduce the number of missed injuries in the future.

In 2010, 105 patients had 207 missed injuries. Sixteen of these patients had delayed diagnosis after initial assessment. In 2011 109 patients had 228 missed injuries, 17 of which had delayed diagnosis after initial assessment. Of the 109 patients for 2011 who were reviewed by the panel the median ISS was 19, with a range of 4 – 36. The region with the most missed injuries was the extremities followed by head/neck and chest injuries. There appeared to be a cluster of upper T-spine fractures in this group of patients. The most common cause for missing injuries was inadequate or no investigation followed by inadequate examination and limitation of investigation. Most (53%) had no clinical impact, with the remainder requiring additional surgery, increased length of stay or having transient disability.

### **Trauma Registry Database**

The Trauma Registry has been collecting data on trauma patients since August 1994 and the database now contains over **67,000** patients. This data is available on application for research or audit use and has been extensively utilised in the presentation of Trauma Grand Rounds and various research projects (*Appendix vii*). The Trauma Registry also provides data for the strategic planning of trauma services, as well as for trauma-related clinical indicators (*Appendix v*). Data is also provided annually to the Department of Health, Western Australian Data Linkage Unit.

The web-based SQL Trauma Registry database allows direct interface with other hospital information systems (The Open Patient Administration System, Emergency Department Information System, Theatre Management System), enabling automatic download of verified data such as demographics and surgical procedures, as well as augmented data quality via the use of improved validation rules and mandatory fields.

### ***Trauma Services***

The State Major Trauma Unit (SMTU) provides 30 dedicated trauma beds, including four high acuity beds. This facility, along with an experienced multidisciplinary health care team, provides a dedicated resource for the treatment and management of complex trauma patients admitted to the designated State Adult Major Trauma Service.

In June 2009, Royal Perth Hospital underwent formal assessment via the Royal College of Surgeons' multi-disciplinary, inter-collegiate Trauma Verification process. Successful attainment of Level 1 Trauma Verification Status further endorses Royal Perth Hospital's designation as the WA State Major Trauma Service. Formal re-verification has been scheduled for May 2012.

### ***Prevent Alcohol Risk-Related Trauma in Youth (P.A.R.T.Y)***

P.A.R.T.Y (Prevent Alcohol and Risk Related Trauma in Youth) is an injury prevention program designed to empower 15 to 24 year olds to make positive choices and reduce consequences of risk related trauma. The success of the program continues to be directly attributable all those who contribute in administration or giving presentations, both hospital staff and members of the community, who give their time to make the day both dynamic and confronting for those who attend.

Founded in Canada in 1996 and now in its' 7<sup>th</sup> year at Royal Perth Hospital with a weekly presentation to a maximum of 30 students in high school years 10 – 12, the program provides an interesting and thought provoking look at the dangers and results associated with Trauma, encouraging the target groups to alter their attitudes and focus on safer and smarter choices.

Once each month the P.A.R.T.Y. program is produced for the Juvenile Justice Service system, where targeted youths are encouraged to attend the program and gain insight into their risk taking behaviour. Additionally during the winter holiday break a session is held for young relatives and friends of hospital staff.

The day commences with a questionnaire being completed to indicate baseline risk-taking behaviour and attitudes. Further questionnaires are completed at the end of the day and 3 – 5 months post program to assess ongoing alterations in behaviour and attitudes.

In order to offer the Program to students that are unable to attend for the day an abridged Outreach version is conducted upon request, to youth over the age of 14 yrs. The program at RPH is at present fully booked until the end of 2013.

Twice yearly presentations at Curtin University, given to 1<sup>st</sup> year nursing students, allow knowledge of the program to be disseminated to future hospital staff, whereby they are aware of the aims and benefit to youth of the P.A.R.T.Y. program.



A total of 5578 youths have attended the program at RPH since its inception in 2006. 895 youths attended the hospital P.A.R.T.Y. day in 2010 and 1037 in 2011. Ages of those attending ranged from 14 to 19 inclusive, with the vast majority (93.2%) being 15 to 17 years old at time of attendance. Male to female ratio sees slightly more male attendees (52.2%).

Our data indicates alterations in the attitude of students by the end of the day, and further indicates that these alterations persist over time, though dropping from the high at the end of the P.A.R.T.Y. day. For example, the data for 2010 to 2011 shows that on the initial questionnaire 68.2% of respondents would not drive if they had been drinking, with the figure rising to 87.5% by the end of the day, and remaining raised at 81.2% when they completed the follow up questionnaire. For further information please refer to <http://www.partyprogram.com/> for the complete annual report.

### **Trauma Symposium**

The RPH Trauma Service, in conjunction with the Australian College of Ambulance Professionals (ACAP), held their 5<sup>th</sup> Annual Trauma Symposium on 6 November, 2010, at the University Club, UWA. Dr Tony Smith, Intensivist at Auckland City Hospital and Medical Director of St John Ambulance Service in Auckland, NZ, was the keynote speaker, and provided food for thought with his discussion: *“What is the best pre-hospital model for trauma care and retrieval, and why?”* and later on in the day with his presentation on *“Pre-hospital Airway Management”*.

The 6<sup>th</sup> Annual Trauma Symposium followed in November 2011, at the same venue. We were delighted to have Professor Kenneth Boffard, Professor and Clinical Head of the Department of Surgery at Johannesburg Hospital and the University of Witwatersrand in South Africa as our keynote speaker and he provided the keynote address: *Current global trends in trauma care*. In addition, Professor Boffard very generously presented some interactive case studies on: *Initial Hospital Patient Assessment and Management Plan*, before closing the day with a presentation on *Trauma Systems – Future Directions*.

As usual, the convenors of this annual symposium were keen to cover the whole spectrum of trauma management and recognise the multidisciplinary contribution of all our health care providers, from time of injury through to rehabilitation. This was achieved through some outstanding presentations from all of these areas, ensuring something for everyone for those attending.

In 2009 the RPH Trauma Service was a recent winner of a Perth Convention Bureau Professional Development Scholarship. This scholarship was used to assist us in our bid to host a national Trauma Conference in WA and we were successful in our bid to attract the Australasian Trauma Society’s national conference to Perth in 2012. “Trauma 2012: “Resuscitation to Rehabilitation” is scheduled for 24-26<sup>th</sup> October 2012. The RPH Trauma Symposium will continue in its usual one-day format in November 2013.

## Trauma Grand Rounds

Meetings are held fortnightly, and present an opportunity for departments within the hospital, to present topics relevant to trauma. The presentations generally consist of a case review, combined with a review of current literature and Trauma Registry data. On occasion, these case reviews may be replaced by presentations by invited guest speakers on topics related to trauma.

### List of Trauma Grand Round Presentations for 2010

| Date     | Topic   | Presenter   |
|----------|---|---|
| 04/02/10 | <i>Diaphragmatic injuries.</i>  | Dr N. Agrawal, Trauma Registrar, RPH  |
| 04/03/10 | <i>Taser injuries.</i>  | Dr A. Willis, Emergency Department Registrar, RPH                           |
| 18/03/10 | <i>Paediatric abdominal trauma.</i>   | Dr J. Tee (General Surgery Registrar) & Dr. S. Ooi (Urology Fellow), PMH    |
| 01/04/10 | <i>Damage Control Resuscitation.</i>  | Dr G. Brown, Emergency Department Registrar, RPH                            |
| 15/04/10 | <i>Penetrating neck trauma.</i>   | Dr J. Stein, General Surgery Registrar, RPH                                 |
| 13/05/10 | <i>End points to resuscitation.</i>   | Dr S. Kantavil, Emergency Department Registrar, RPH                         |
| 27/05/10 | <i>Trauma Reception and Resuscitation Study.</i>  | Dr A. Mori, Emergency Department Consultant, The Alfred Hospital, Melbourne |
| 10/06/10 | <i>Bombs, bullets, body armour and the bad things that happen.</i>                        | Dr P. Watson, Emergency Department Registrar, RPH                           |
| 24/06/10 | <i>Abdominal vascular injuries.</i>   | Dr A. Noches Garcia, General Surgery Registrar, RPH                         |
| 08/07/10 | <i>Disaster preparedness and WA's involvement in Australian Medical Assistance Teams.</i> | Ms Murielle Leclercq, Disaster Preparedness and Management Unit             |
| 22/07/10 | <i>Liver injuries.</i>  | Dr R. Tipnis, Trauma Registrar, RPH   |
| 05/08/10 | <i>Prehospital Trauma Retrieval Challenges.</i>   | Mr Clinton van der Westhuyzen, Ambulance Paramedic, SJA                     |
| 19/08/10 | <i>A Model of Care for Alcohol Related Trauma Admissions at Royal Perth Hospital.</i>     | Ms M. Newton & Dr A. Browne, Clinical Psychologist, Trauma Services, RPH    |
| 02/09/10 | <i>Electrical injuries.</i>   | Dr Y. Teoh, Emergency Department Registrar, RPH                             |
| 30/09/10 | <i>Spinal injuries: A case presentation and discussion.</i>                               | Dr P. Brooks, Emergency Department Registrar, RPH                           |
| 14/10/10 | <i>Unusual things we see in trauma: three case presentations.</i>                         | Dr J. Tee, Trauma Registrar, RPH  |
| 28/10/10 | <i>Trauma in the Obese Patient.</i>   | Dr P. Dewing, Emergency Department Registrar, RPH                           |
| 11/11/10 | <i>Tranexamic Acid and CRASH 2 Study</i>  | Dr N. Staples, Transfusion Medicine Specialist                              |

List of Trauma Grand Round Presentations for 2011

| Date       | Topic  | Presenter   |
|------------|--|---|
| 17/02/2011 | <i>Bombs and Bullets</i>   | Dr Rafid Alzubaifdy, Surgical Registrar; Dr Trevelyan Edwards, ED Registrar   |
| 17/03/2011 | <i>Crushed Limbs and Entrapment</i>  | Clinton Van der Westhuyzen, SJA Paramedic; Dr Amy Bosomworth, ED Registrar, Dr Nikhil Agrawal, Trauma Registrar, RPH                        |
| 21/04/2012 | <i>Emergency Department Thoracotomy</i>  | Dr Sudhakar Rao, Trauma Director, RPH   |
| 19/05/2011 | <i>Traumatic Pelvic Fractures – Investigations, Complications And Management</i> | Dr Zaw Paing Soe, Emergency Department Registrar; Dr Martin Marshall, Interventional Radiologist; Dr Vineeta Singh, Surgical Registrar, RPH |
| 16/06/2011 | <i>Coagulopathy and Head Trauma; Penetrating Neck Injuries</i>                   | Dr Veronica Reigler, Dr Roshan Nair   |
| 21/07/2011 | <i>Ejection Seats and Associated Injuries in Military Aviation</i>               | Dr David Holt, Senior Medical Officer RAAF Base, Pearce   |
| 25/08/2011 | <i>Head Injury Outcomes</i>  | Dr Susan Sharpe, ED Registrar; Dr Laurie Webber, Surgical Registrar   |
| 15/09/2011 | <i>Experiences of a Retired Orthopaedic Surgeon in War Zones</i>                 | Dr Tim Keenan   |
| 13/10/2011 | <i>What Lurks Beneath: Crush and Compartment Syndrome</i>                        | Dr Clare Trythall, ED Registrar; Dr Andrew Finlayson, Surgical Registrar  |

## 2. Data Collection and Quality

### 2.1 Definition of Registry Population

For the purposes of the registry **Trauma** is defined as “an injury or wound resulting from an external force” (Miller and Keane, 1983).

The criteria for **inclusion** into the registry are:

- All trauma patients who present to Royal Perth Hospital for treatment within 7 days of their date of trauma and who were hospitalised for greater than 24 hours at Royal Perth Hospital;
- All trauma-related deaths at Royal Perth Hospital regardless of hospital length of stay.

Patients who have suffered the effects of poisoning and drug overdose are **excluded** from the registry.

The Registry population is divided into major and minor trauma admissions according to the Injury Severity Score (ISS) (see *Appendix II*). Major trauma admissions are those patients who have an ISS of greater than 15. An extensive dataset is collected on these patients, from the time of trauma to discharge from Royal Perth Hospital, including pre RPH treatment.

Minor trauma admissions are those patients who meet the registry inclusion criteria and have an ISS of less than 16. A limited dataset is collected on these patients.

Four full-time research nurses collect data on admissions meeting the Registry inclusion criteria. Patients for inclusion are identified through a custom-designed Microsoft Access database. This database was designed by the Business Performance Unit at Royal Perth Hospital and contains daily updates of all Emergency Department presentations and hospital admissions for the previous 24 hours. The patient’s medical record is the main source of data for the registry, in conjunction with the hospital’s computerised Patient Administration System (TOPAS), Emergency Department Information System (EDIS), iSoft Clinical Manager, The Electronic Discharge Summary (TEDS), The Picture Archiving Clinical System (PACS) and the Theatre Management System (TMS) providing supplementary data sources. Data is initially collected on a hard copy data collection form and then entered onto a Web-based, SQL database.

The *Abbreviated Injury Scale 2005 (2008 Update)* is currently in use.

Major trauma admissions are reviewed during their stay in hospital on a regular basis and details of their condition, surgical management, complications and injuries at discharge are recorded on the data sheets. Patients that are transferred to the Royal Perth Rehabilitation Hospital (RPRH) are also followed throughout the course of their stay.

## 2.2 Registry Data Quality Improvement

In line with the commitment of Trauma Registry research staff to maintain the integrity of information held in the Registry database, a series of quarterly data checks are conducted. These QI activities check for common injury scoring errors, null data fields, and discrepancies between data collection forms and data entry.

Ad hoc Quality Improvement (QI) activities are also performed when problem data entry areas are identified, and if necessary these are incorporated into the quarterly checks. A list of the QIs that are currently carried out are listed in [\(Appendix i\)](#)

During 2010, an average of 19895 data elements were checked each month demonstrating an overall annual accuracy of 98%.

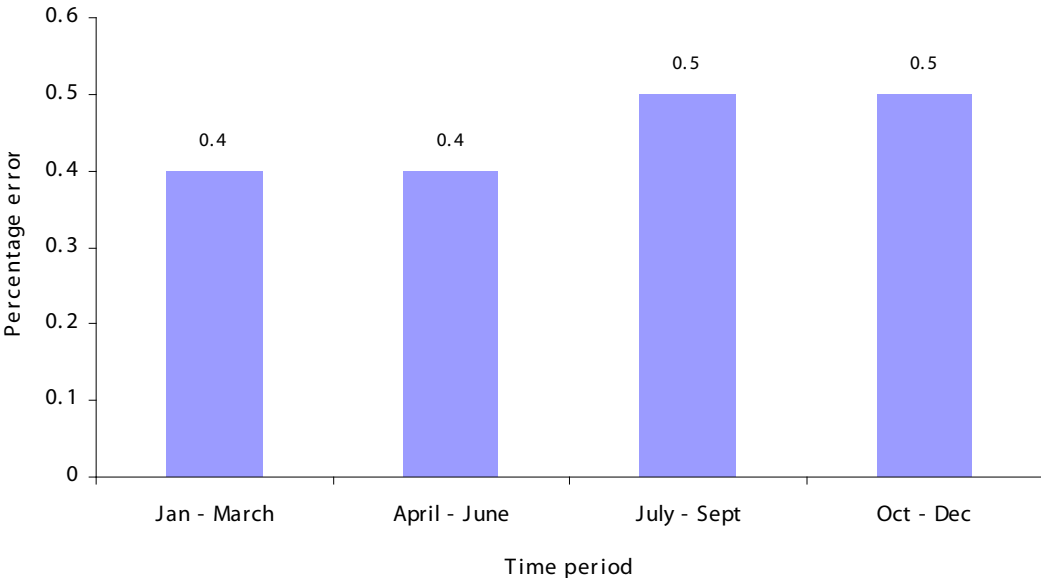
In 2011, the frequency of QI Queries was changed to a quarterly basis, however during orientation of new staff members, data checks are run with increased frequency to quickly identify problem data entry areas so that education can be appropriately targeted. Similarly data checks related to injury scoring issues are used to target education for new Research staff.

During 2011, an average of 86765 data elements was checked each quarter demonstrating an overall annual accuracy of 98.7%. The following graphs demonstrate the error rates on a quarterly basis.

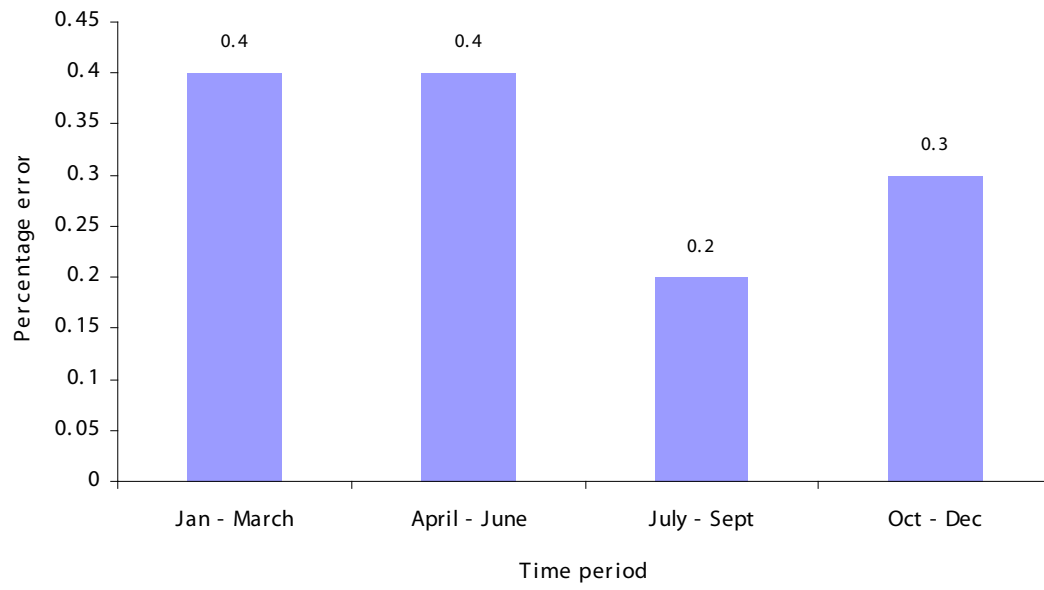
### Calculation of error rate:

$$\% \text{ error rate} = \frac{\text{Number of errors identified}}{\text{Number of fields examined} \times \text{number of patients}} \times 100$$

### 2010



## 2011



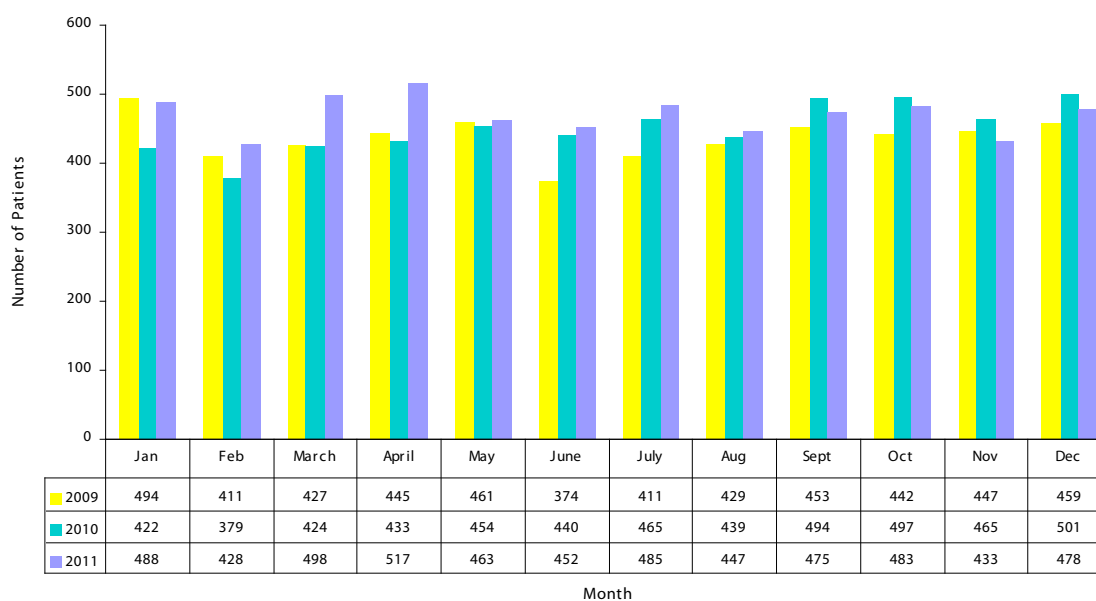
## 3. Demographic Data

### 3.1 Total Trauma Admissions

|                                    | <u>2009</u> | <u>2010</u> | <u>2011</u> |
|------------------------------------|-------------|-------------|-------------|
| <b>TOTAL TRAUMA ADMISSIONS:</b>    | 5253        | 5413        | 5647        |
| <b>AVERAGE MONTHLY ADMISSIONS:</b> | 437         | 451         | 470         |
| <b>RANGE:</b>                      | 374 - 494   | 381 - 501   | 428 - 517   |

There has been an overall increase of **3%** in total trauma admissions to Royal Perth Hospital from 2009 to 2010, and a further **4.3%** increase from 2010 to 2011.

**Figure 3a Total Trauma Admissions**

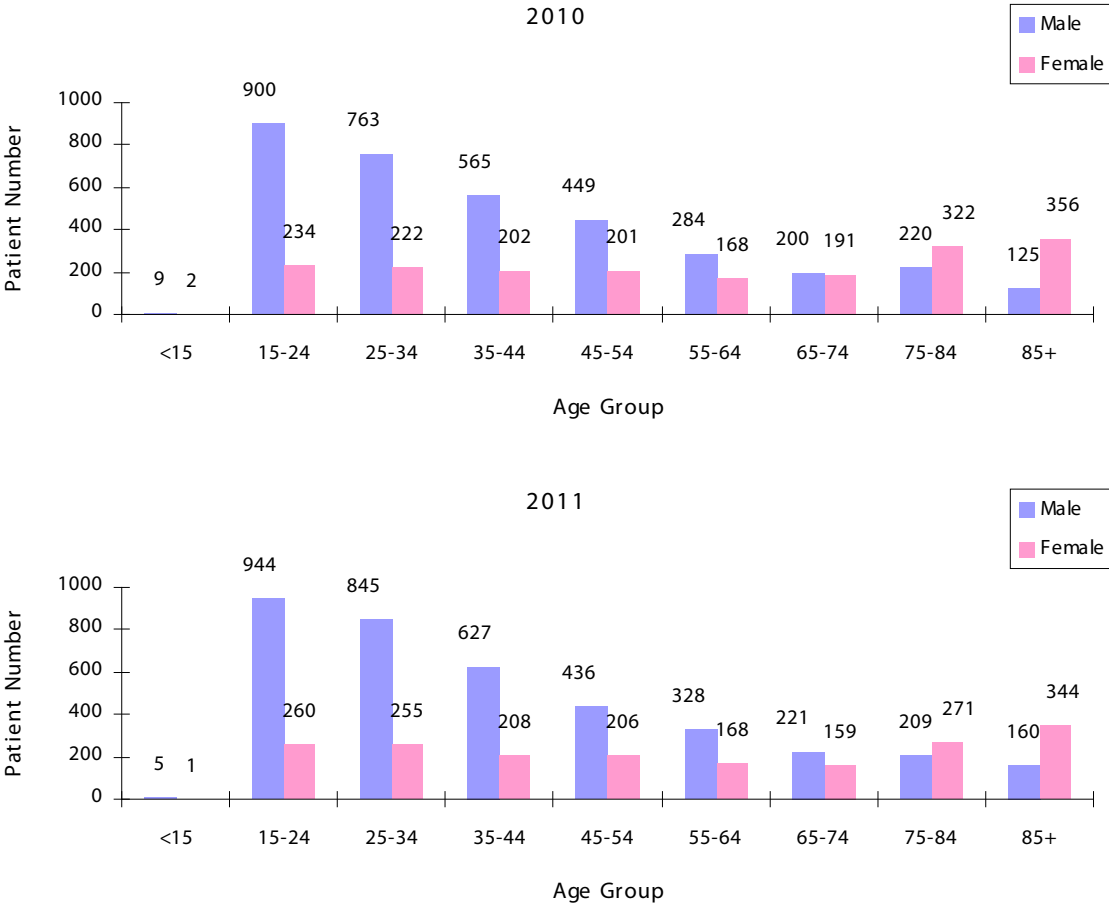




### 3.2 Age and Sex Distribution (Total Trauma Admissions)

|             |         |             |                                  |
|-------------|---------|-------------|----------------------------------|
| <b>2010</b> | Male:   | <b>3515</b> | <b>64.9%</b> of Total Admissions |
|             | Female: | <b>1899</b> | <b>35.1%</b> of Total Admissions |
| <b>2011</b> | Male:   | <b>3775</b> | <b>66.8%</b> of Total Admissions |
|             | Female: | <b>1872</b> | <b>33.2%</b> of Total Admissions |

Figure 3 b Age and Sex Distribution of Total Trauma Admissions



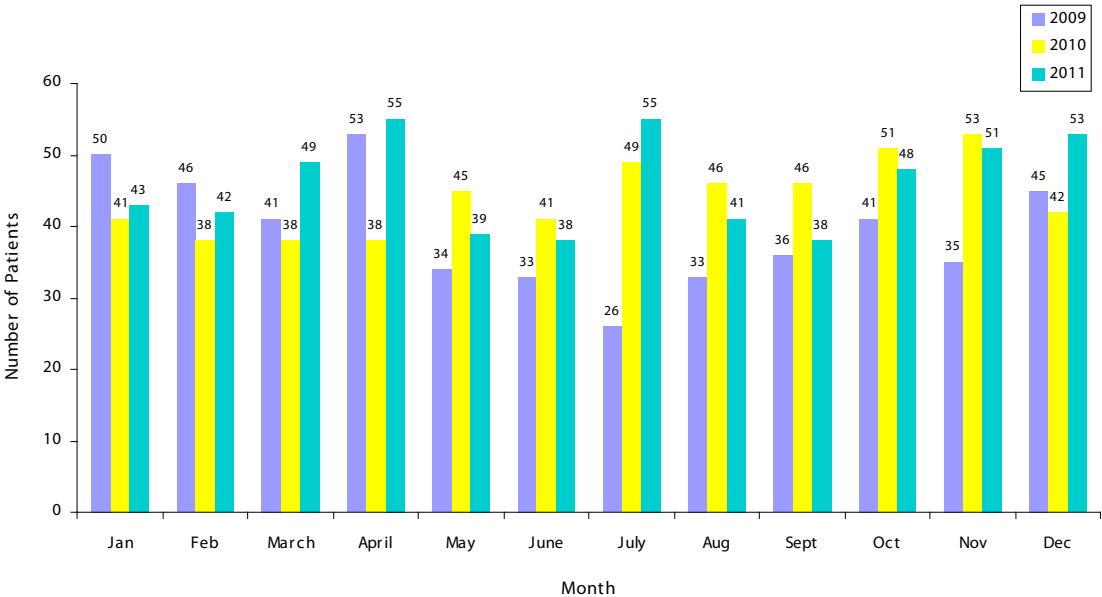
### 3.3 Major Trauma Admissions

The trauma population is divided into major (patients with an ISS > 15), and minor trauma. Major trauma patients comprised **9.7%** of the total trauma admissions for both 2010 and 2011. This is slightly higher than 2009 (**9%**). These patients generally spend longer in hospital and often require Intensive Care treatment as well as extensive rehabilitation. Thus, although forming a small part of the total trauma admissions, it is the major trauma patients on whom the registry collects the majority of data.

|                                   | 2009  | 2010  | 2011    |
|-----------------------------------|-------|-------|---------|
| Total major trauma admissions:    | 473   | 528   | 552     |
| Average monthly major admissions: | 39.4  | 44    | 46      |
| Range:                            | 26-53 | 38-53 | 38 - 55 |

There has been an **11.6%** increase in Major Traumas (ISS>15) from 2009 to 2010, based on AIS 2005(2008 Update), and a further **4.7%** increase from 2010 to 2011.

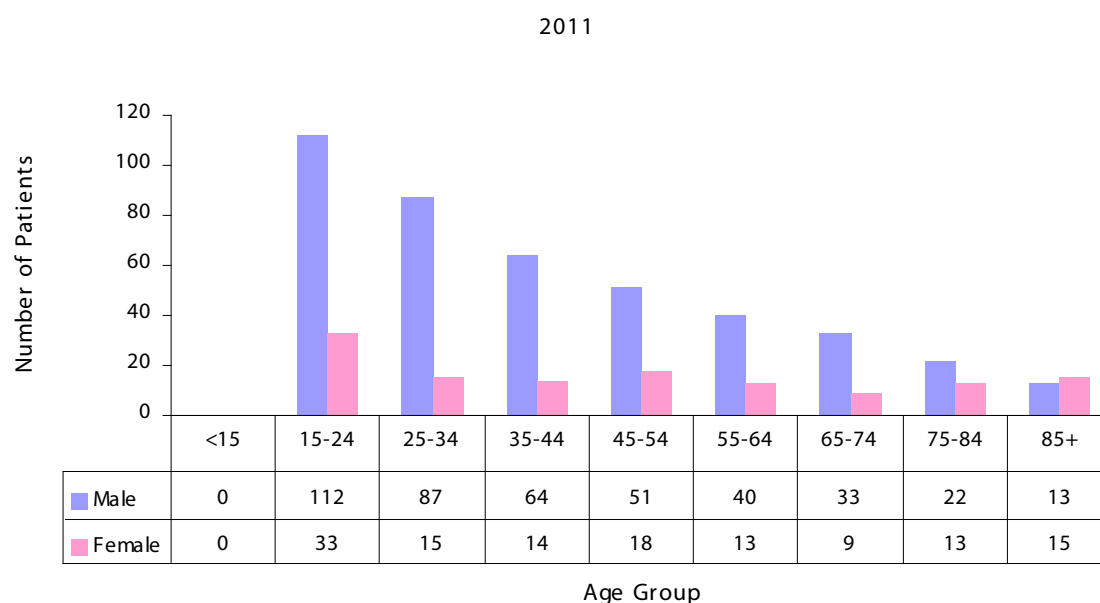
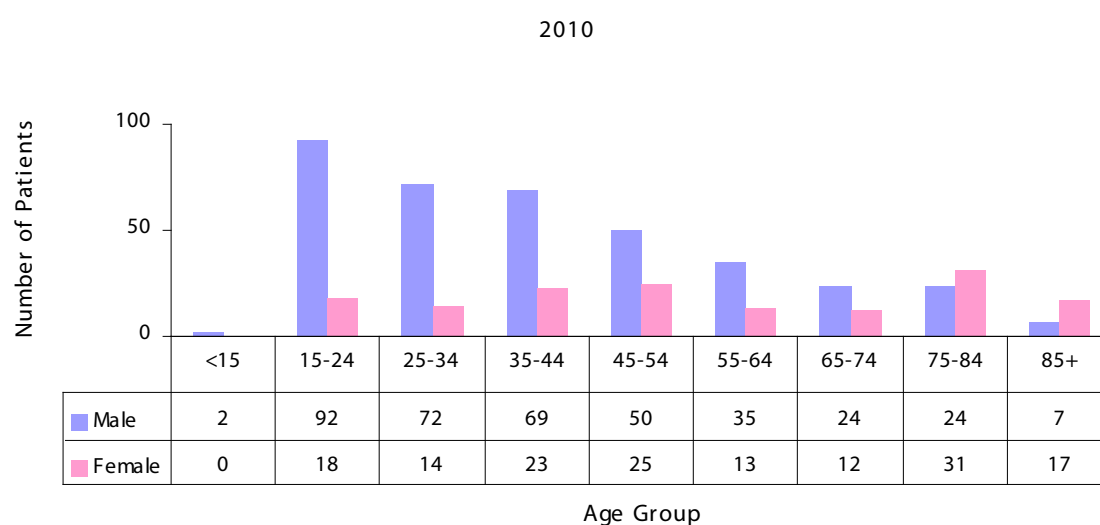
Figure 3 c Major Trauma Admissions



### 3.4 Age and Sex Distribution of Major Trauma Admissions

|         |             |             |
|---------|-------------|-------------|
|         | <b>2010</b> | <b>2011</b> |
| Male:   | 375 (71%)   | 422 (76%)   |
| Female: | 153 (29%)   | 130 (24%)   |

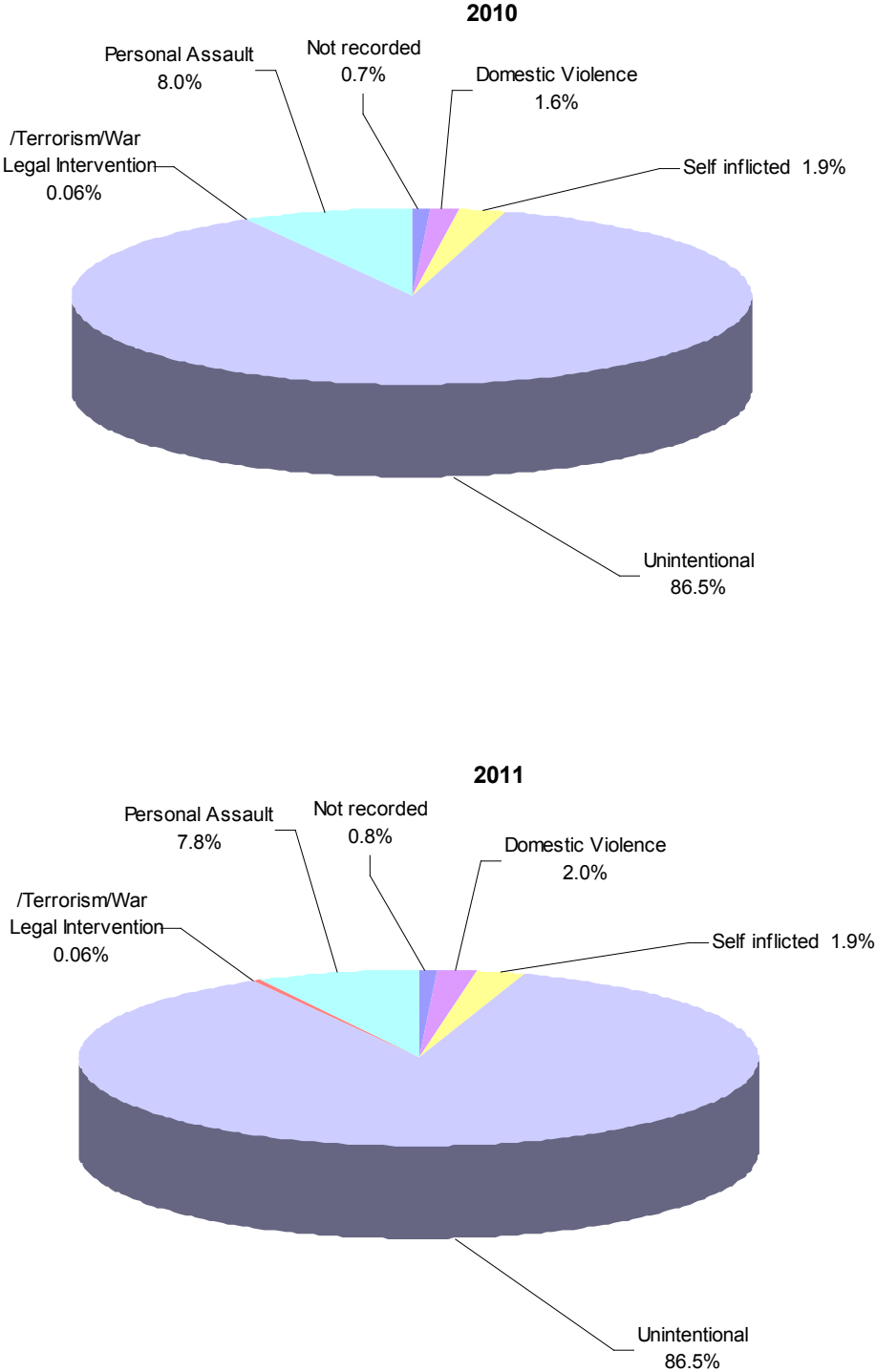
**Figure 3 d Age and Sex Distribution of Major Trauma Admissions**



# 4. Trauma Details

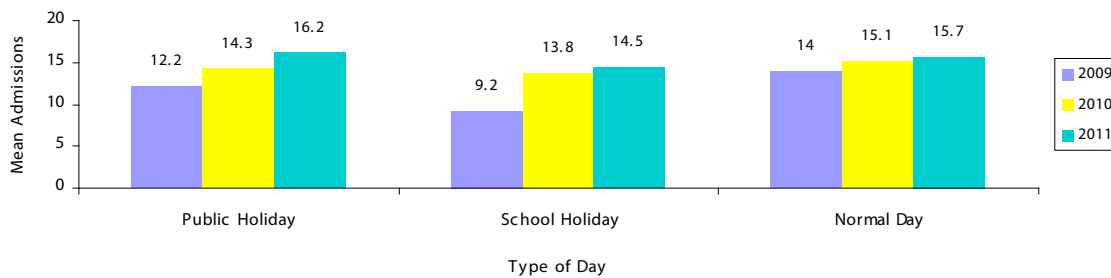
## 4.1 Intent of Trauma (Total Trauma Admissions)

Figure 4 a Intent of Trauma



## 4.2 Trauma Incidents by Holiday Code (Total Trauma Admissions)

Figure 4 b Mean Daily Trauma Incidents by Type of Day



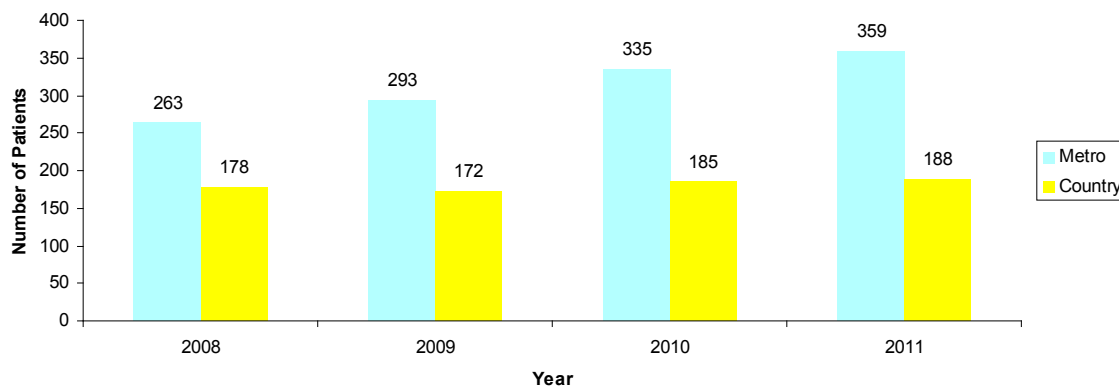
## 4.3 Location of Trauma Incident

Table 4 a Location of Trauma Incident

|              | Country      | % Change | Metro        | % Change |
|--------------|--------------|----------|--------------|----------|
| <b>Major</b> |              |          |              |          |
| 2009         | 172 (37%)    | -3.4%    | 293 (63%)    | 11.4%    |
| 2010         | 185 (35.6%)  | 7.5%     | 335 (64.4%)  | 14.3%    |
| 2011         | 188 (34.4%)  | 1.6%     | 359 (65.6%)  | 6.9%     |
| <b>Minor</b> |              |          |              |          |
| 2009         | 1216 (26.3%) | 10.6%    | 3402 (73.7%) | 0.3%     |
| 2010         | 1142 (23.6%) | -6.1%    | 3703 (76.4%) | 8.8%     |
| 2011         | 1304 (25.8%) | 14.2%    | 3754 (74.2%) | 1.4%     |

\*Unknown/International/Interstate admissions have been excluded from this table

Figure 4 c Location of Trauma Incident (Major Trauma Admissions)



\* Unknown/International/Interstate or unknown admissions have been excluded from this graph.

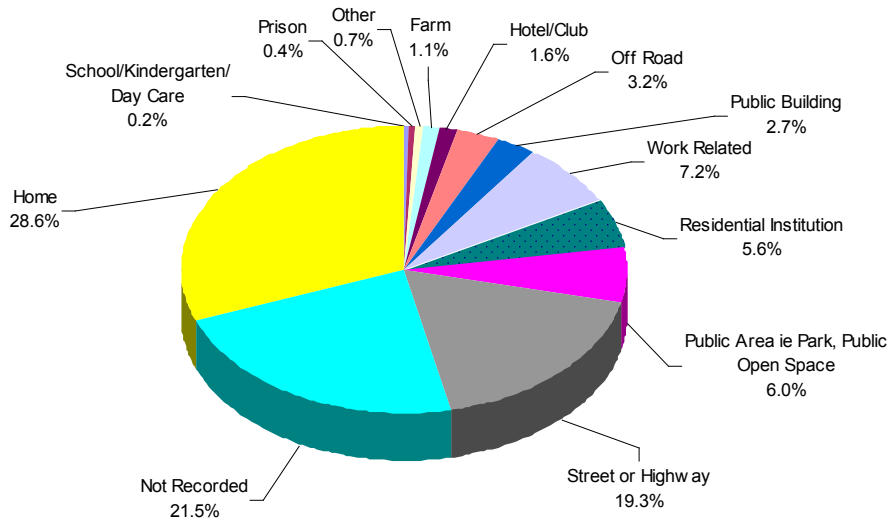
**Figure 4 d Top Ten Metropolitan Road Trauma Locations 2010 and (2011)  
(Total Road Trauma) by Postcode**

| Post Code | Suburbs   | No. of Patients   |   |   |      |
|-----------|---|---|---|---|------|
| 6000      | CBD Perth   | 28 (27)   |   |   |      |
| 6104      | Ascot<br>Belmont<br>Redcliffe   | 19 (20)   |   |   |      |
| 6100      | Burswood<br>Lathlain<br>Victoria Park                                   | 18 (20)   |   |   |      |
| 6054      | Ashfield<br>Bassendean<br>Eden Hill                                     | Kiara<br>Lockridge  | 17  |   |      |
| 6152      | Como<br>Karawara<br>Manning   | Salter Point<br>Waterford                                     | 17  |   |      |
| 6210      | Barragup<br>Bouvard<br>Clifton<br>Coodanup<br>Dawesville<br>Dudley Park | Erskine<br>Falcon<br>Furnissdale<br>Greenfields<br>Halls Head | Herron<br>Lakelands<br>Madora Bay<br>Mandurah Meadow<br>Springs | Parklands<br>San Remo<br>Silver Sands<br>Stake Hill<br>Wannanup | 15   |
| 6076      | Bickley<br>Carmel<br>Gooseberry Hill<br>Hacketts Gully                  | Kalamunda<br>Lesmurdie<br>Pauls Valley<br>Pickering           | Brook<br>Piesse Brook<br>Reservoir<br>Walliston                 | 15 (19)   |      |
| 6112      | Armadale<br>Bedforddale<br>Brookdale                                    | Mount Nasura<br>Forrestdale<br>Mount Richon                   | Seville Grove<br>Wungong  | 14  |      |
| 6058      | Forrestfield  |   |   | 14  |      |
| 6111      | Canning Mills<br>Champion Lakes<br>Karragullen                          | Kelmscott<br>Roleystone<br>Westfield                          |   | 13  |      |
| 6062      | Embleton<br>Morley<br>Noranda   |   |   | 13  |      |
| 6101      | Carlisle<br>East Victoria Park  |   |   | 13  |      |
| 6050      | Coolbinia<br>Menora<br>Mount Lawley                                     |   |   | 13  |      |
| 6107      | Beckenham<br>Cannington<br>Kenwick                                      | Queens Park<br>Wattle Grove<br>Wilson                         |   | 13 (29)   |      |
| 6105      | Cloverdale<br>Kewdale<br>Perth Airport                                  |   |   | 13 (13)   |      |
| 6056      | Baskerville<br>Bellevue<br>Boya<br>Greenmount                           | Helena Valley<br>Herne Hill<br>Jane Brook<br>Koongamia        | Middle Swan<br>Midland Midvale<br>Millendon                     | Red Hill<br>Stratton<br>Swan View<br>Viveash<br>Woodbridge      | (24) |
| 6164      | Atwell<br>Aubin Grove<br>Banjub   | Beeliar<br>Hammond Park<br>Jandakot                           | Southlake<br>Success<br>Yangebup                                | (14)  |      |
| 6053      | Bayswater   |   |   | (14)  |      |
| 6004      | East Perth  |   |   | (13)  |      |
| 6109      | Orange Grove  |   |   | (13)  |      |

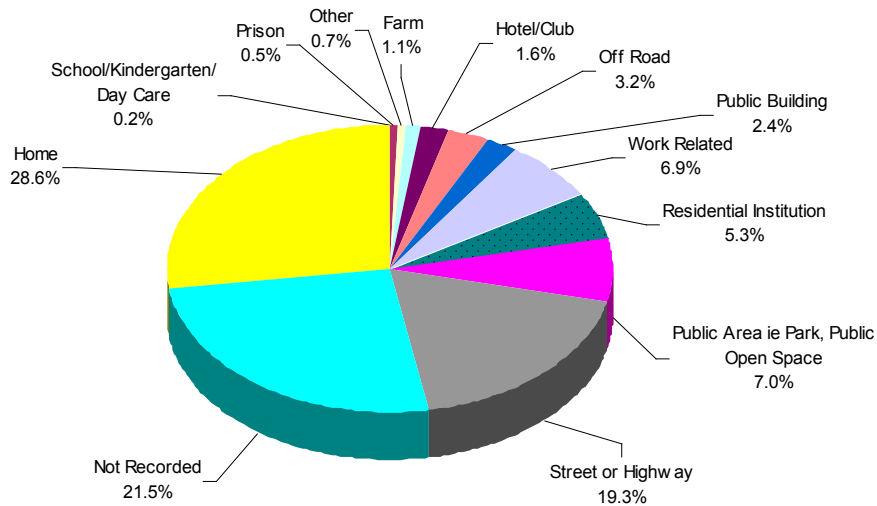
#### 4.4 Site of Trauma Incident

Figure 4 e Site of Trauma Incident (Total Trauma Admissions)

2010



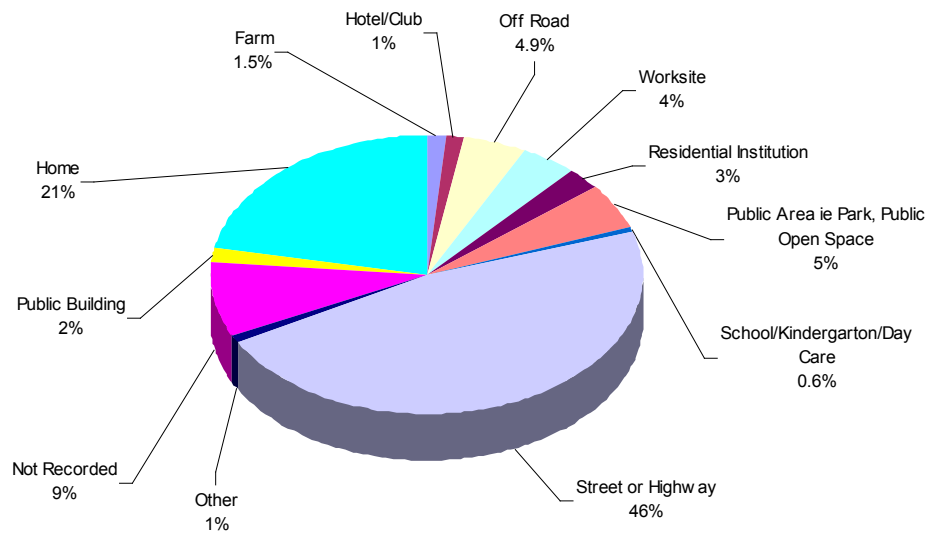
2011



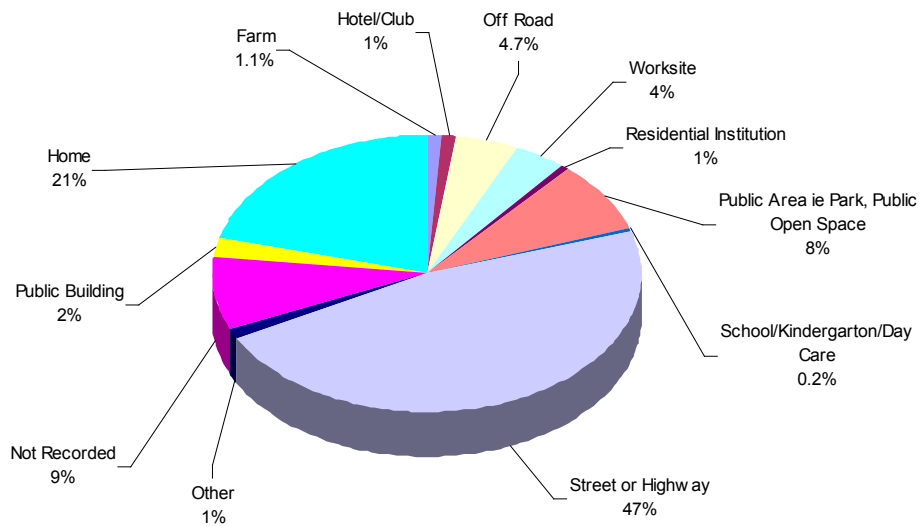


**Figure 4 f Site of Trauma Incident (Major Trauma Admissions)**

**2010**



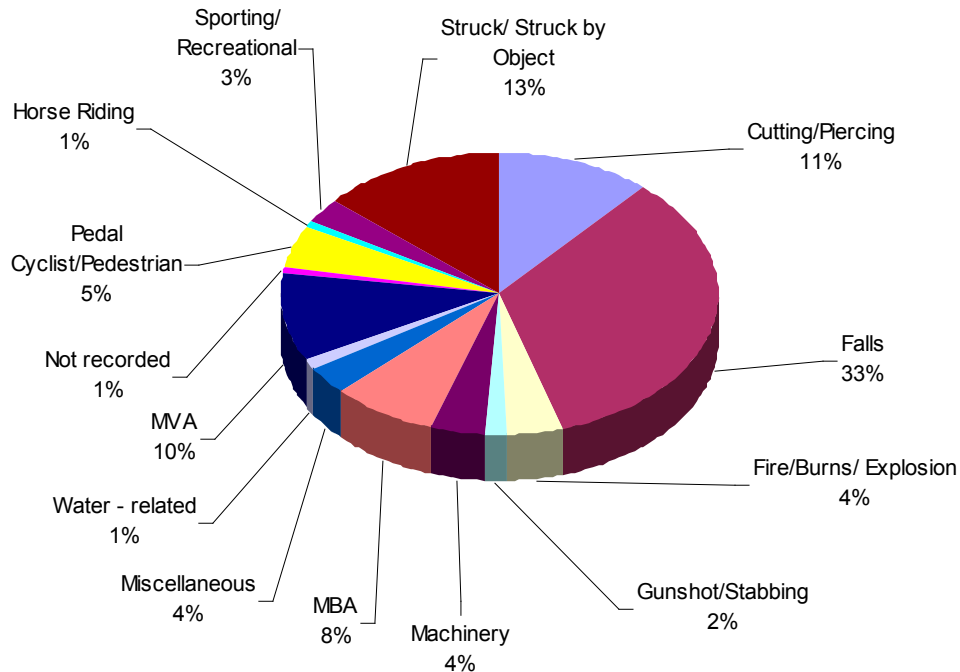
**2011**



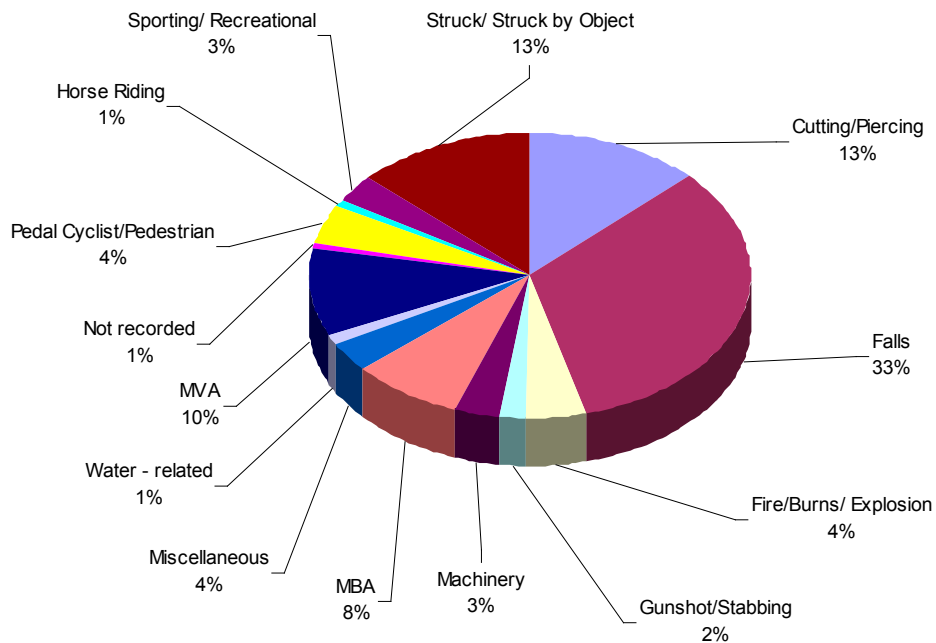
## 4.5 CAUSE OF TRAUMA

Figure 4 g Cause of Trauma (Total Trauma Admissions)

2010

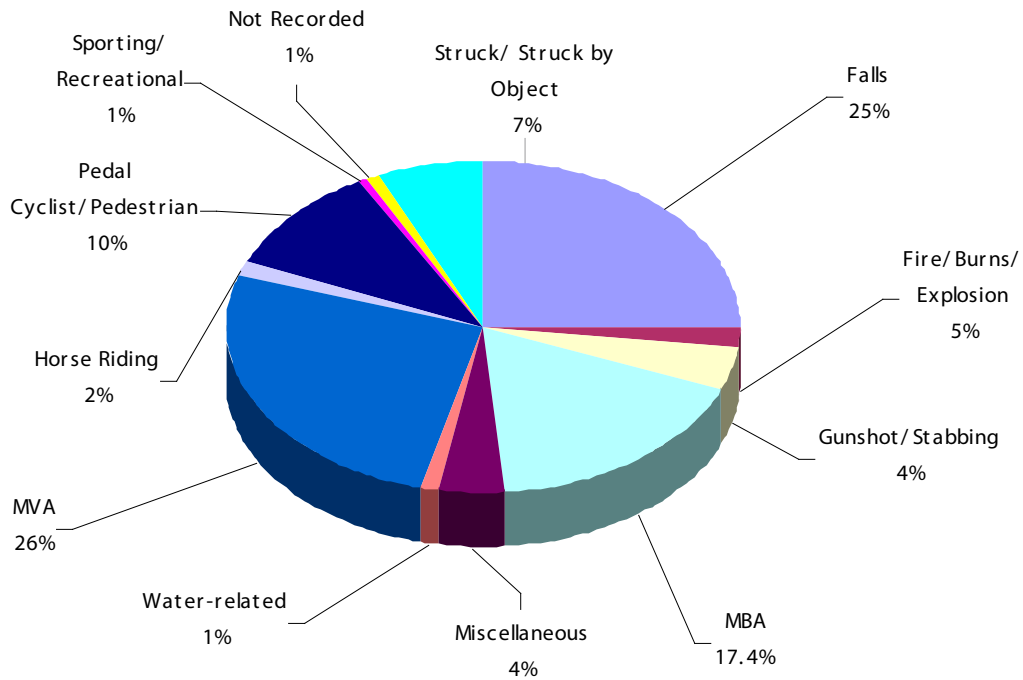


2011

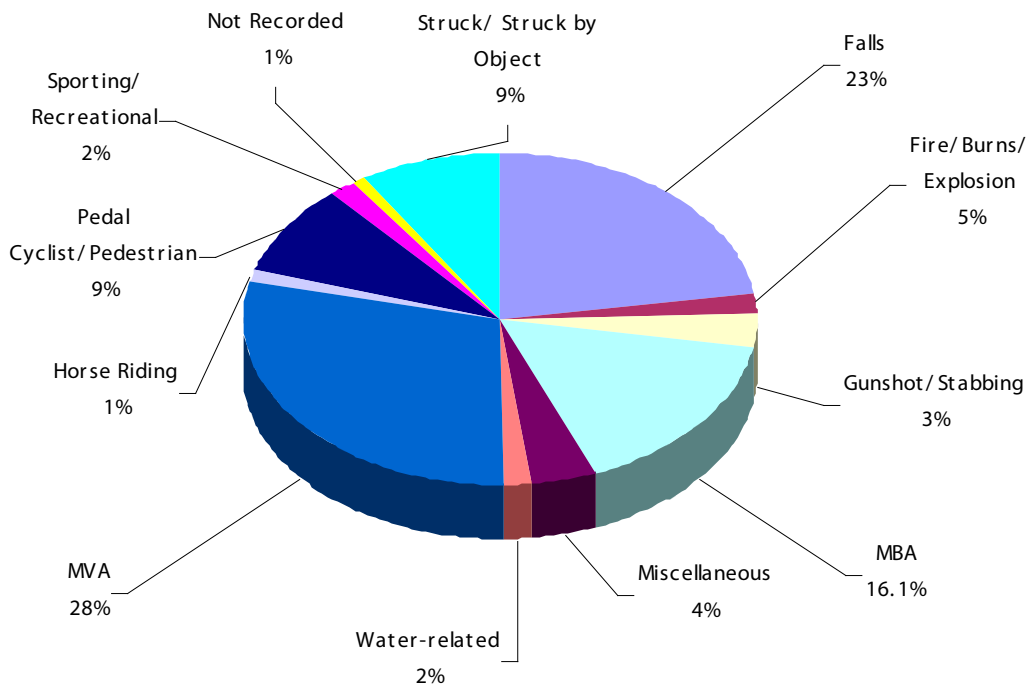


**Figure 4 h Cause of Trauma (Major Trauma Admissions)**

**2010**



**2011**



# 5. Road Trauma

For the purposes of this report, Road Trauma is defined as vehicular-related trauma occurring on a street or highway.

## 5.1 Admissions

Figure 5 a Total Road Trauma Admissions

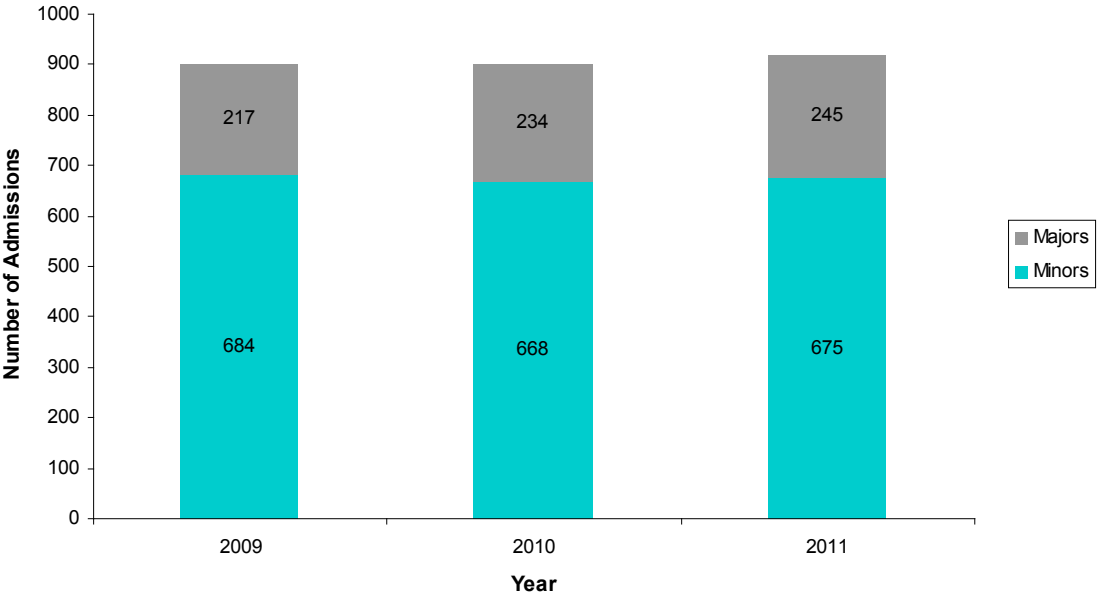
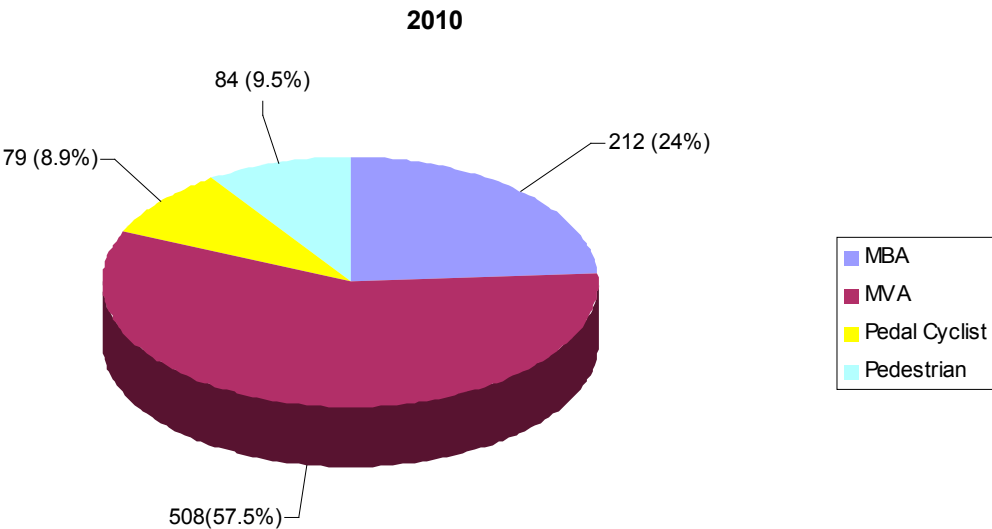
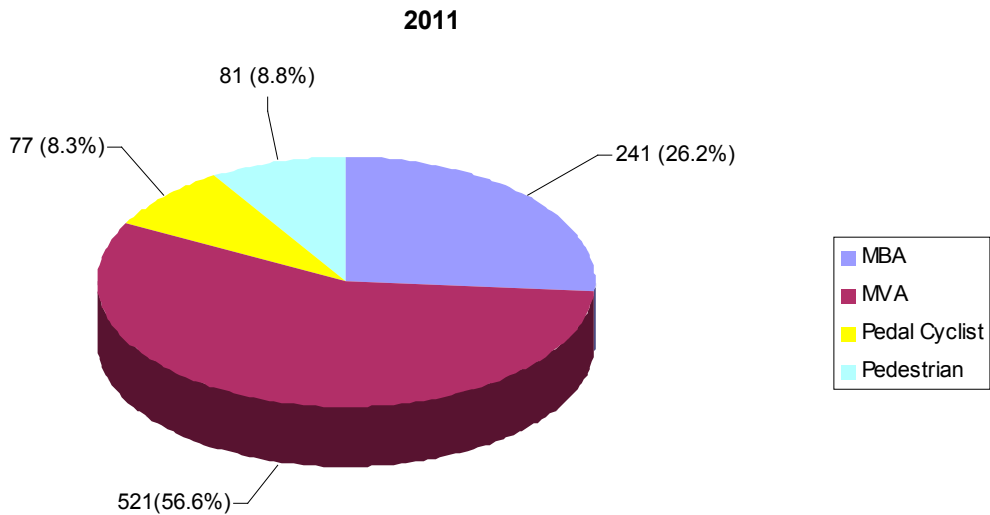


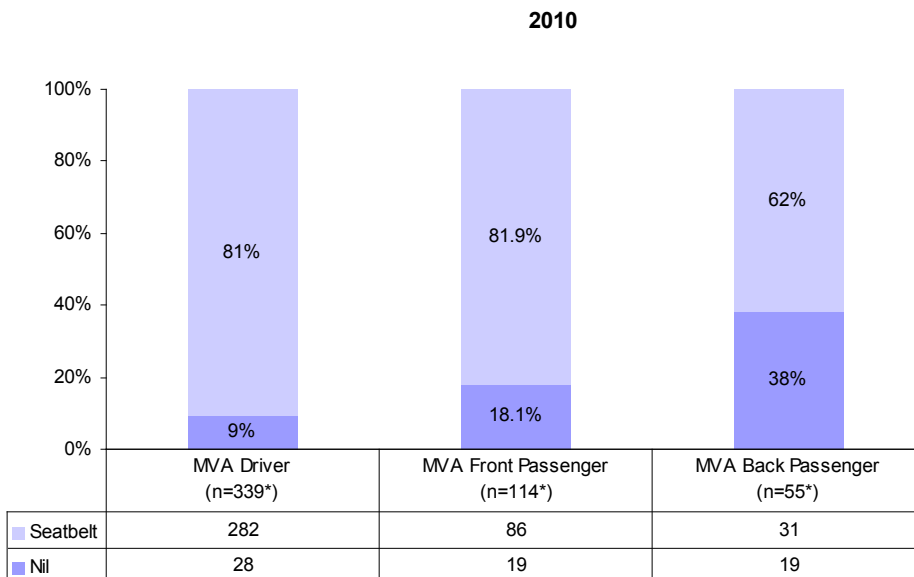
Figure 5 b Total Road Trauma Admissions by Category





## 5.2 SAFETY DEVICES

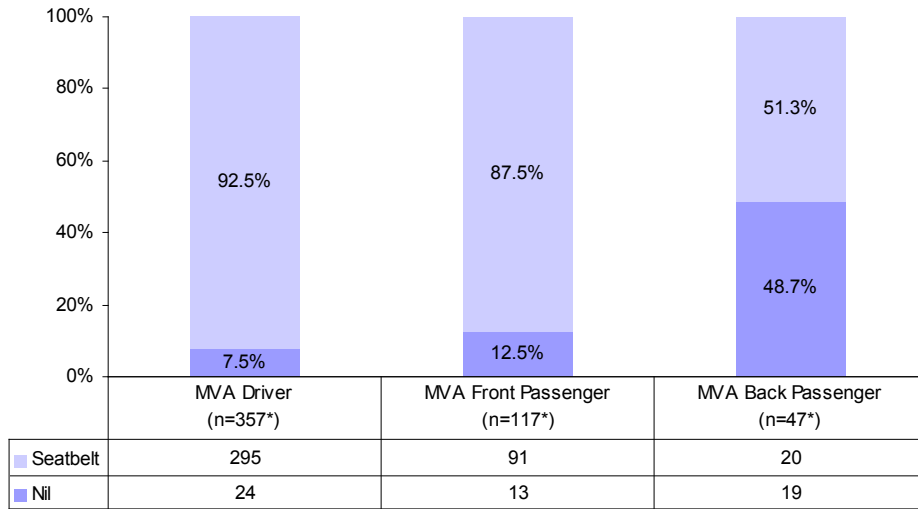
Figure 5 c Safety Devices for Road Trauma



MVA n = **508** minus:

- 4 Back Passenger trauma patients were not applicable (Car surfing/Jumped from moving vehicle); 1 no safety devices recorded
- 29 MVA Driver trauma patients no safety device recorded
- 9 Front seat passenger trauma patients no safety devices recorded

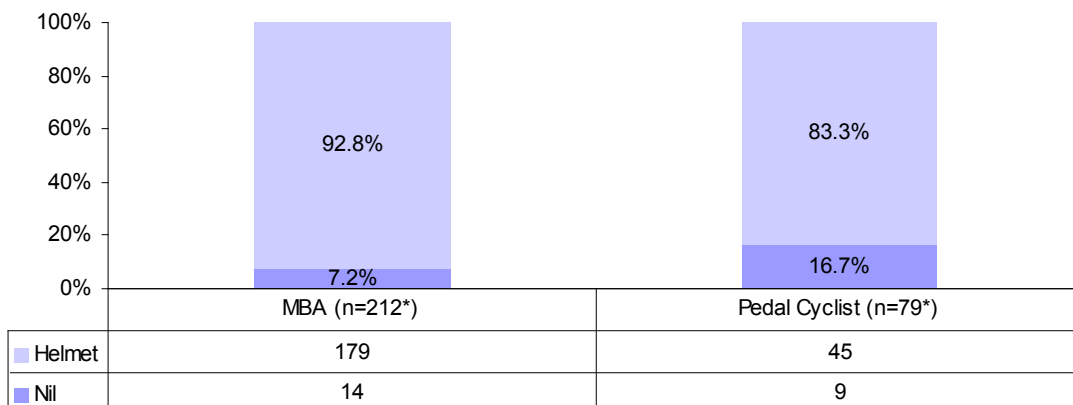
**2011**



MVA n= **521** minus:

- 3 Front Seat Passenger trauma patients were not applicable (Jumped from moving vehicle); 10 no safety devices recorded
- 4 Back Seat Passenger trauma patients were not applicable (Bus passenger/Car surfing/Jumped from moving vehicle); 4 no safety devices recorded
- 38 MVA Driver trauma patients no safety devices recorded

**2010**



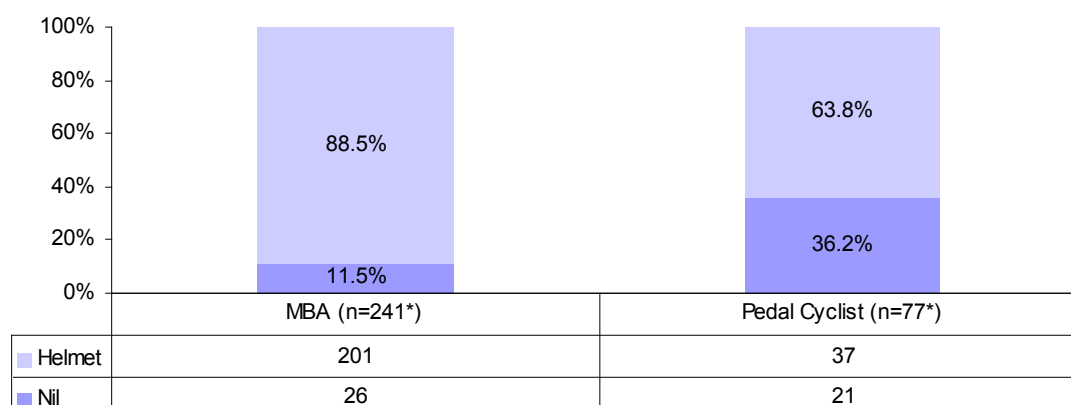
MBA n= **212** minus:

- 19 No Safety Devices recorded

Pedal Cyclists n = **79** minus:

- 25 No safety devices recorded

## 2011



MBA n= **241** minus:

- 14 No safety devices recorded

Pedal Cyclists n = **77** minus:

- 19 No safety devices recorded

### 5.3 Road Trauma Details (Total Trauma Admissions)

*Table 5 a Factors in Motor Vehicle and Motor Bike Accidents Affecting ISS - 2010*

| Factor                 | No. of MVAs | % of Road MVAs | Median ISS       |
|------------------------|-------------|----------------|------------------|
| No Risk Factors*       | 183         | 49.3%          | 5 (Range 1-38)   |
| Rollovers              | 144         | 28.3%          | 8.5 (Range 1-75) |
| Death in Same Accident | 42          | 8.3%           | 10 (Range 1-38)  |
| Speed > 100 Kmph**     | 86          | 22%            | 10 (Range 1-50)  |
| No Seatbelt***         | 66          | 13.2%          | 10 (Range 1-75)  |
| Trapped in Vehicle     | 135         | 26.6%          | 11 (Range 1-57)  |
| Ejected From Vehicle   | 29          | 5.7%           | 17 (Range 1-54)  |

MVA n= **508** minus:

- \*137 patients Speed AND Safety Not Recorded or Not Applicable
- \*\* 117 patients Speed not recorded
- \*\*\*43 patients Seatbelts not recorded or not applicable

| Factor              | No. of MBAs | % of Road MBAs | Median ISS      |
|---------------------|-------------|----------------|-----------------|
| No Risk Factors*    | 153         | 91.6%          | 10 (Range 1-75) |
| No Helmet**         | 14          | 7.2%           | 5 (Range 1-43)  |
| Speed > 100 Kmph*** | 18          | 9.9%           | 12 (Range 1-50) |

- MBA n= 212 minus:
- \*45 patients Speed AND Safety Not Recorded
- \*\* 19 patients Helmets not recorded
- \*\*\* 30 patients Speed not recorded



**Table 5 b Factors in Motor Vehicle and Motor Bike Accidents Affecting ISS - 2011**

| Factor                 | No. of MVAs | % of Road MVAs | Median ISS      |
|------------------------|-------------|----------------|-----------------|
| No Risk Factors*       | 168         | 47.2%          | 5 (Range 1-75)  |
| Rollovers              | 155         | 29.7%          | 9 (Range 1-45)  |
| Death in Same Accident | 21          | 4%             | 9 (Range 1-45)  |
| No Seatbelt**          | 56          | 12.1%          | 14 (Range1-43)  |
| Speed > 100 Kmph***    | 92          | 23.3%          | 14 (Range 1-45) |
| Trapped in Vehicle     | 158         | 30.3%          | 14 (Range 1-75) |
| Ejected From Vehicle   | 20          | 3.8%           | 22 (Range 1-36) |

MVA n= **521** minus:

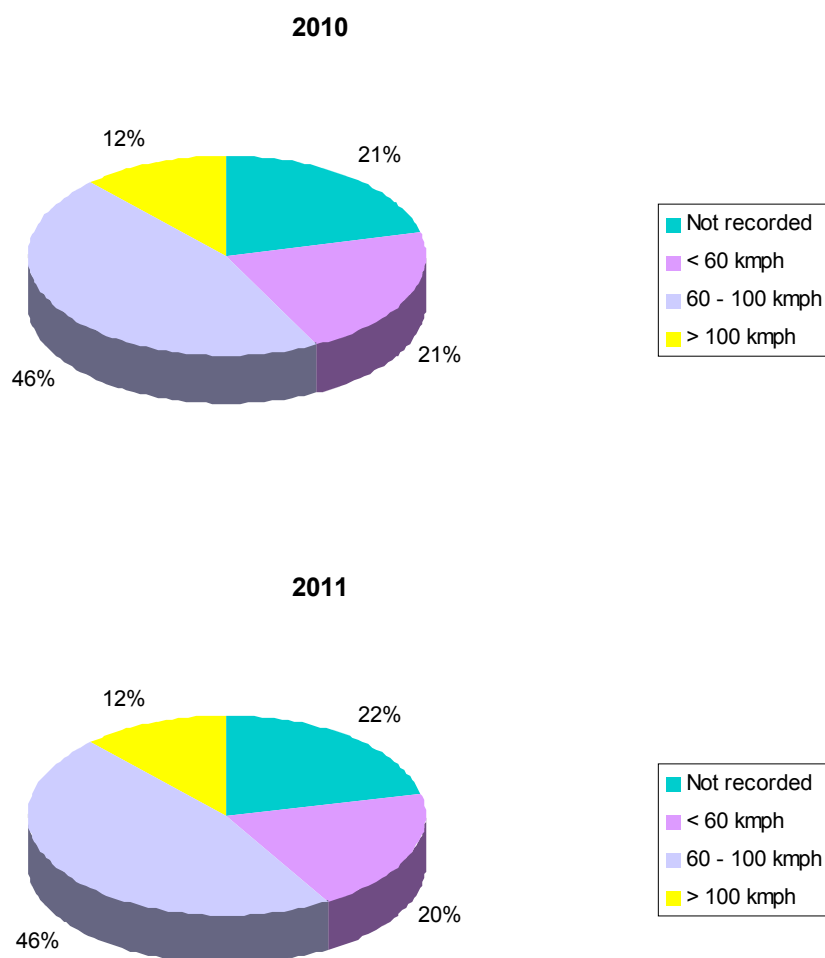
- \*165 patients Speed AND Safety Not Recorded or Not Applicable
- \*\*59 patients Seatbelts not recorded or not applicable
- \*\*\*127 patients Speed not recorded

| Factor              | No. of MBAs | % of Road MBAs | Median ISS        |
|---------------------|-------------|----------------|-------------------|
| No Risk Factors**   | 181         | 89.6%          | 9 (Range1-43)     |
| No Helmet**         | 26          | 11.4%          | 9.5 (Range 1-75)  |
| Speed > 100 Kmph*** | 14          | 6.6%           | 10.5 (Range 1-33) |

MBA n= **241** minus:

- \*39 patients Speed AND Safety Not Recorded
- \*\*14 patients Helmets not recorded
- \*\*\*30 patients Speed not recorded

**Figure 5 c Speed for all Road Trauma (MVAs and MBAs)**



**Table 5 d Effect of Speed on Injury Severity Levels**

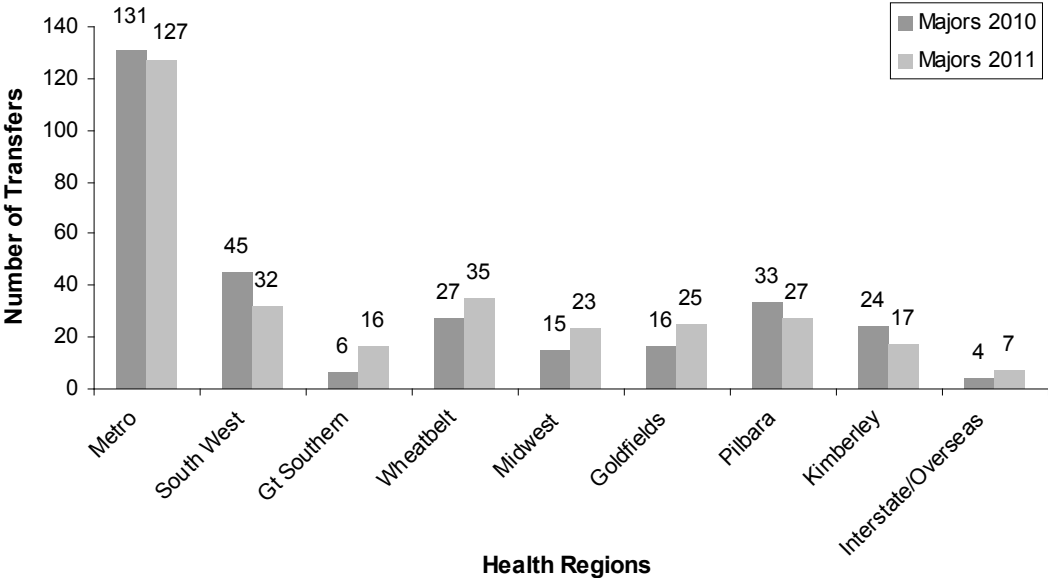
| Speed         | Median ISS 2010 | Median ISS 2011 |
|---------------|-----------------|-----------------|
| < 60 KMPH     | 4(1-54)         | 5(1-45)         |
| 60 - 100 KMPH | 9(1-75)         | 9(1-75)         |
| > 100 KMPH    | 10(1-50)        | 14(1-45)        |

# 6. Primary Hospital Treatment

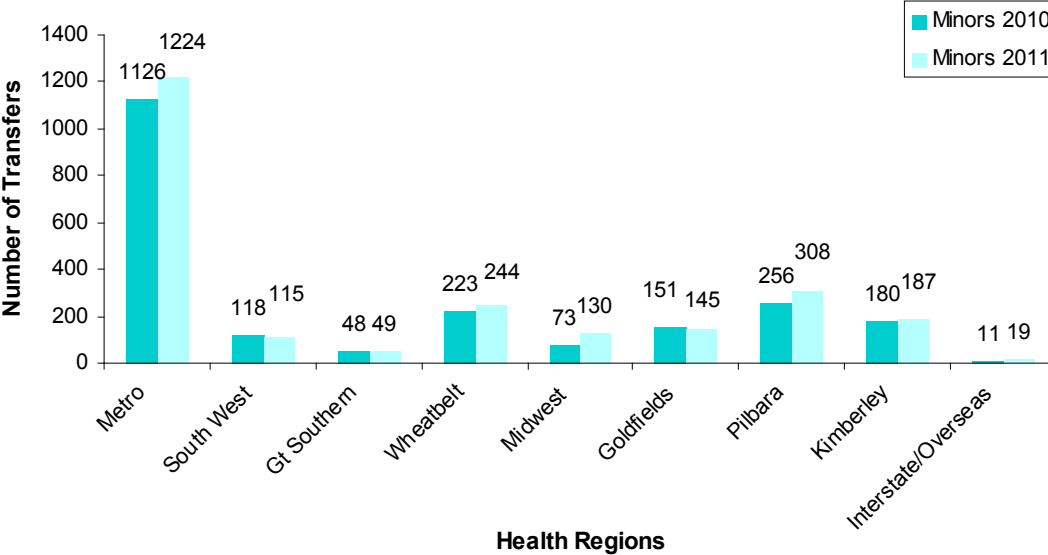
## 6.1 Treating Hospitals

See *Appendix ii* for a list of hospitals within the corresponding Health Regions

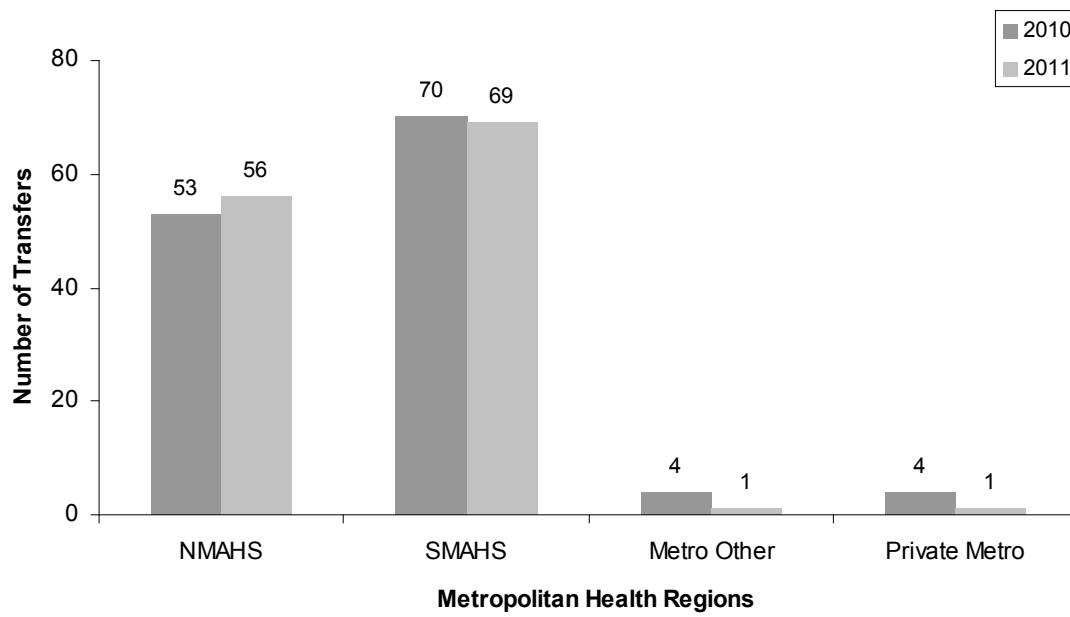
**Figure 6 a Transfers from Health Regions (Major Trauma Admissions)**



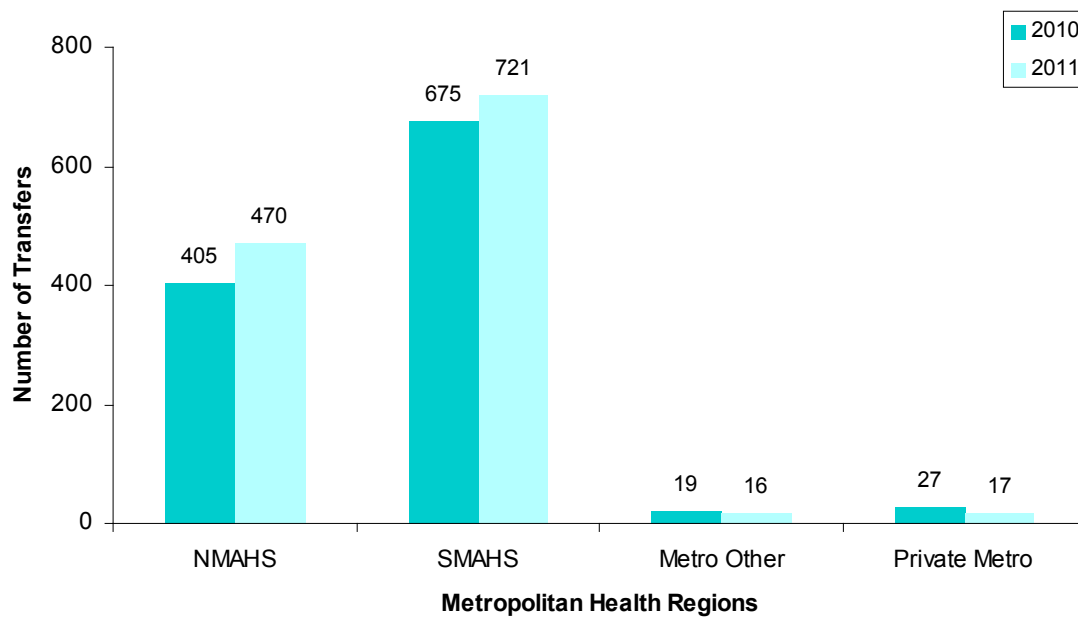
**Figure 6 b Transfers from Health Regions (Minor Trauma Admissions)**



**Figure 6c Transfers from Metropolitan Hospitals (Major Trauma)**

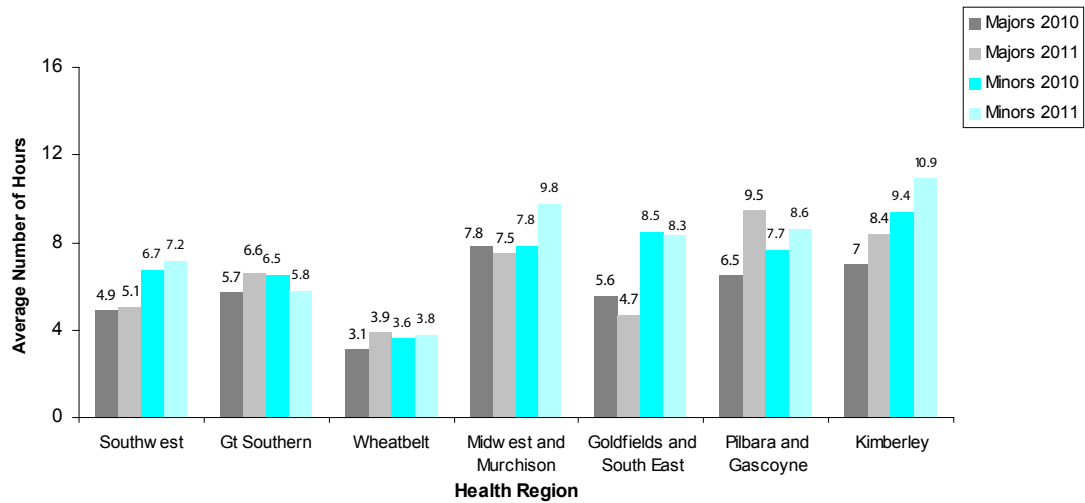


**Figure 6d Transfers from Metropolitan Hospitals (Minor Trauma)**

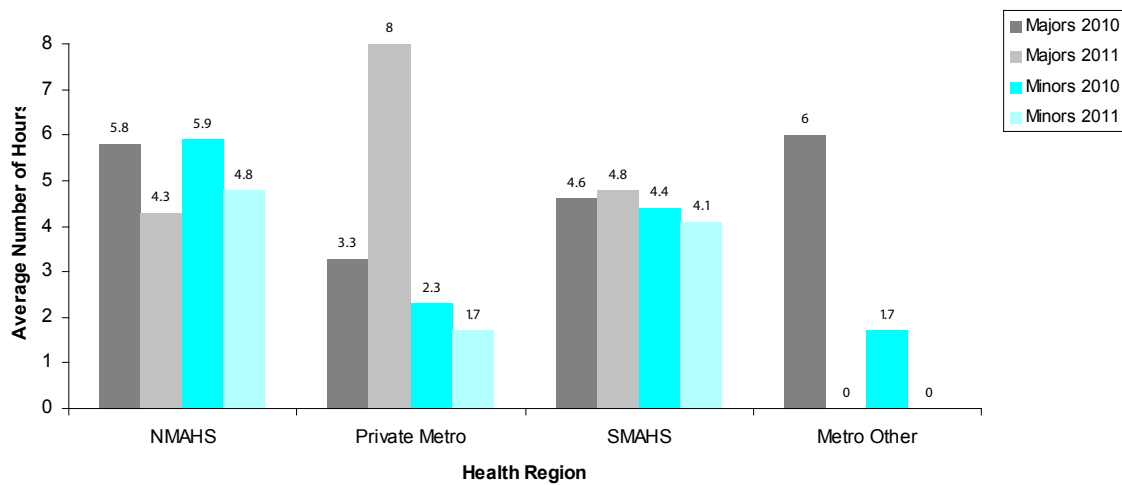


## 6.2 Time Spent Pre Royal Perth Hospital According to Health Regions

**Figure 6e Average Number of Hours Spent in Hospitals within Non-Metropolitan Health Regions**



**Figure 6f Average Number of Hours Spent in Metropolitan Health Regions**



\*Patients who spent more than 24 hours at the referring health regions have been excluded from these graphs.

### 6.3 Pre Royal Perth Hospital Interventions (Major Trauma Admissions)

Figure 6g Non Metropolitan Hospital Primary Interventions (Count of Patients)

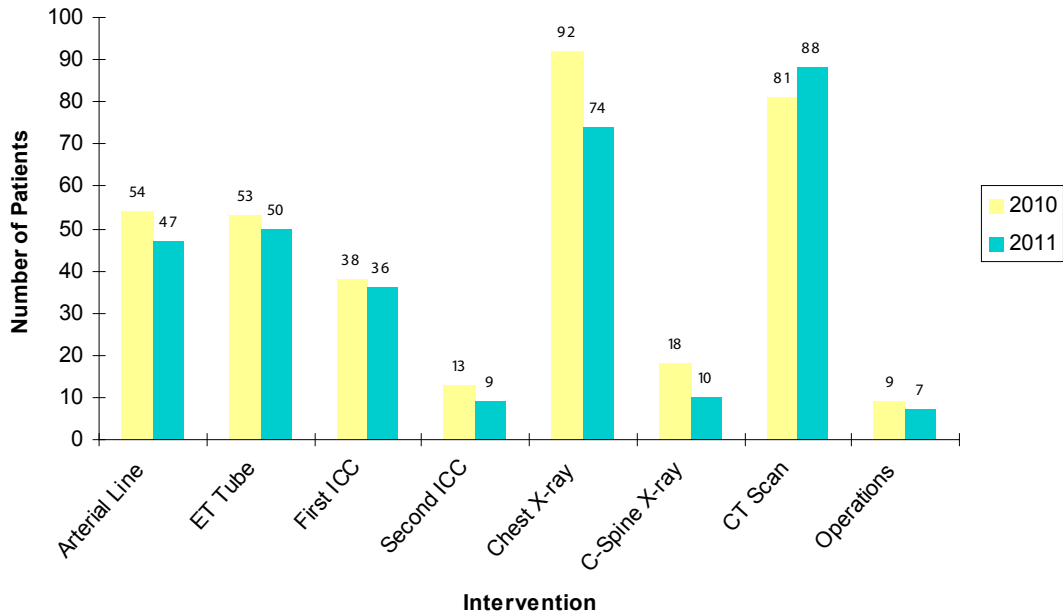
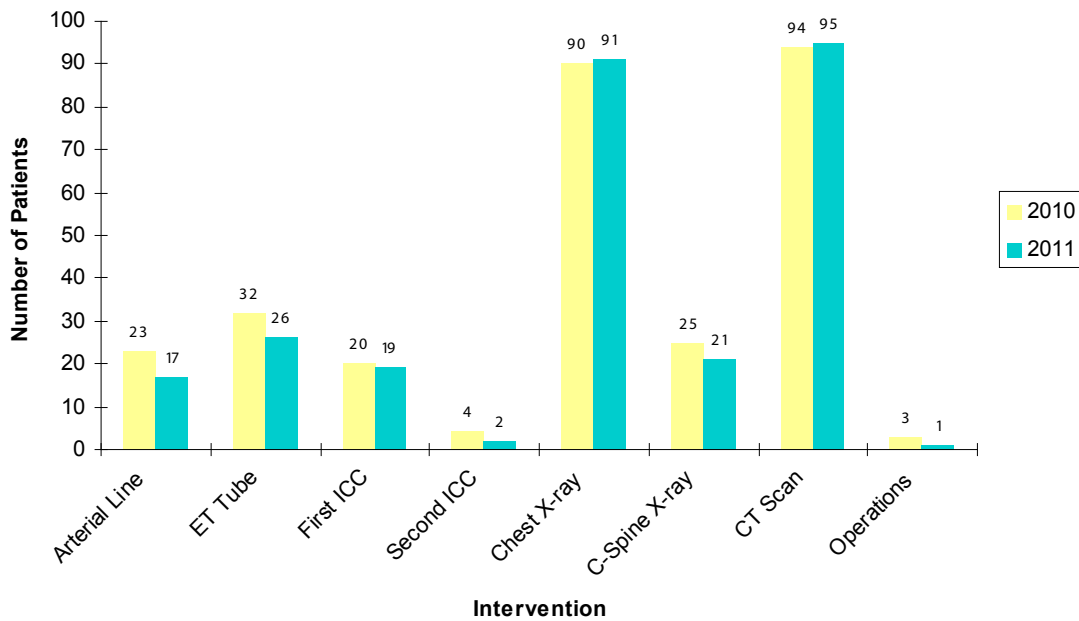


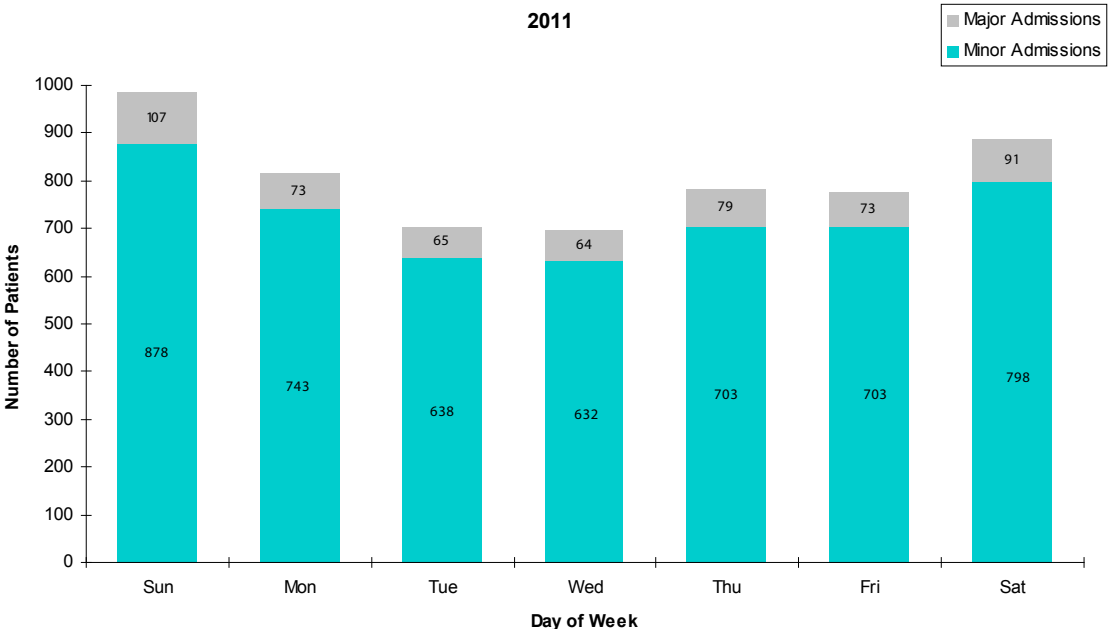
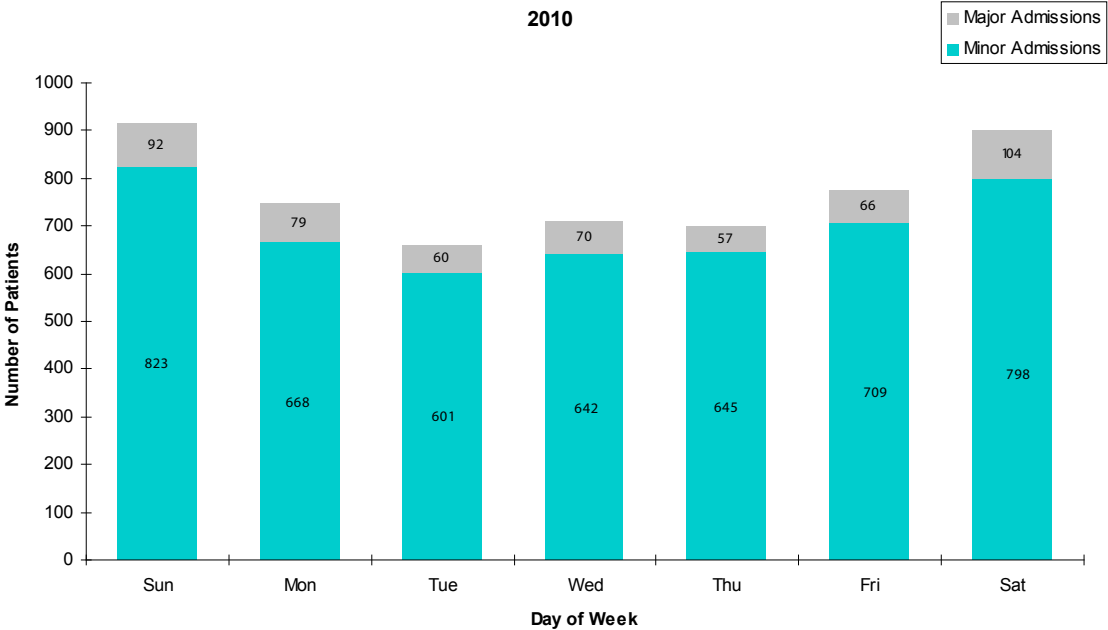
Figure 6h Metropolitan Hospital Interventions (Count of Patients)



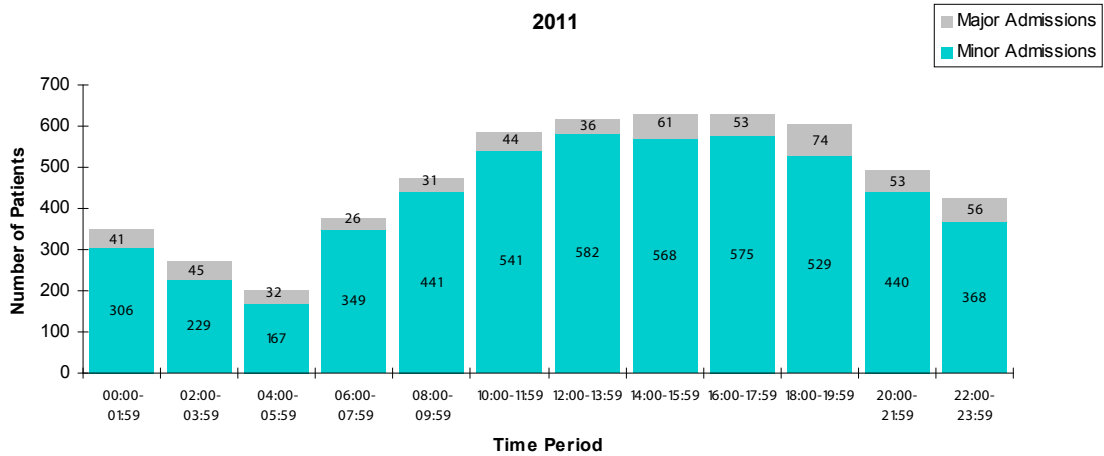
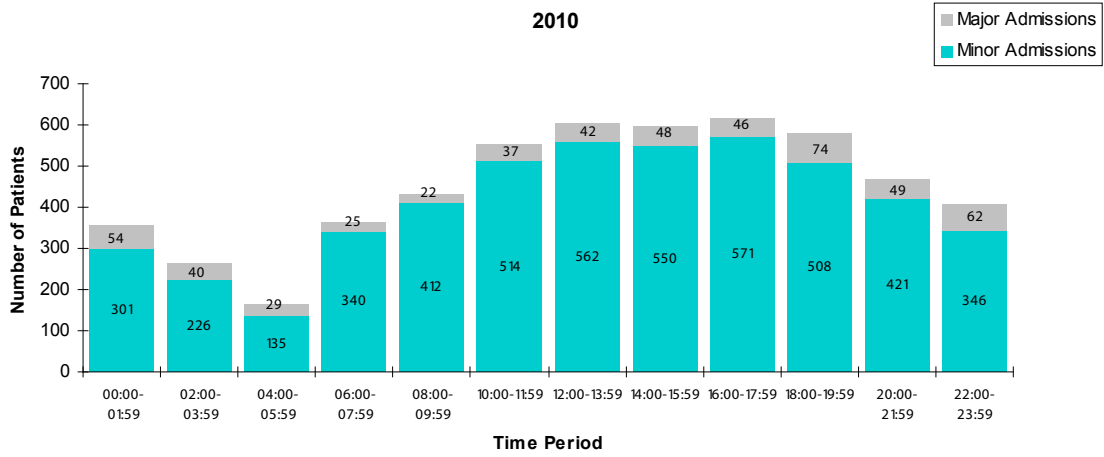
# 7. Royal Perth Hospital Emergency Department

## 7.1 Admissions

Figure 7a Annual Trauma Admissions by Day of Week



**Figure 7 b Annual Trauma Admissions by Time of Day**





## 7.2 Mode of Arrival (Major Trauma Admissions)

Figure 7 c Mode of Arrival to Royal Perth Hospital

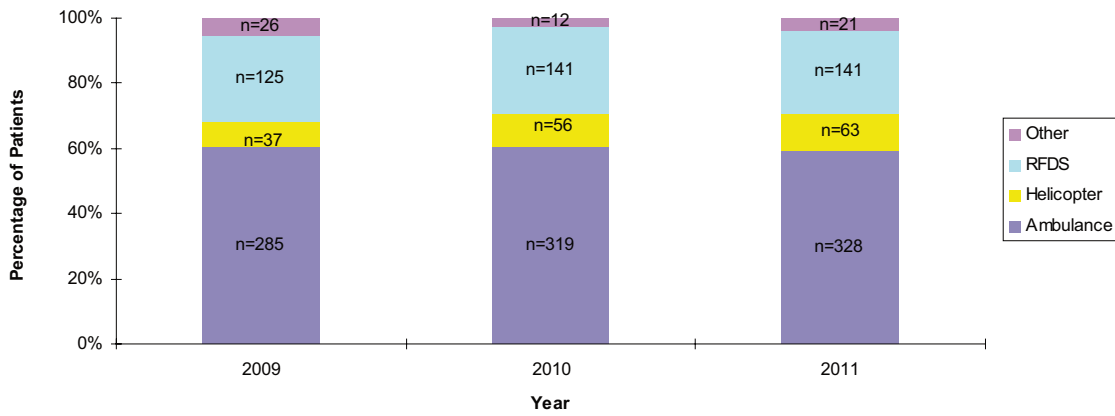
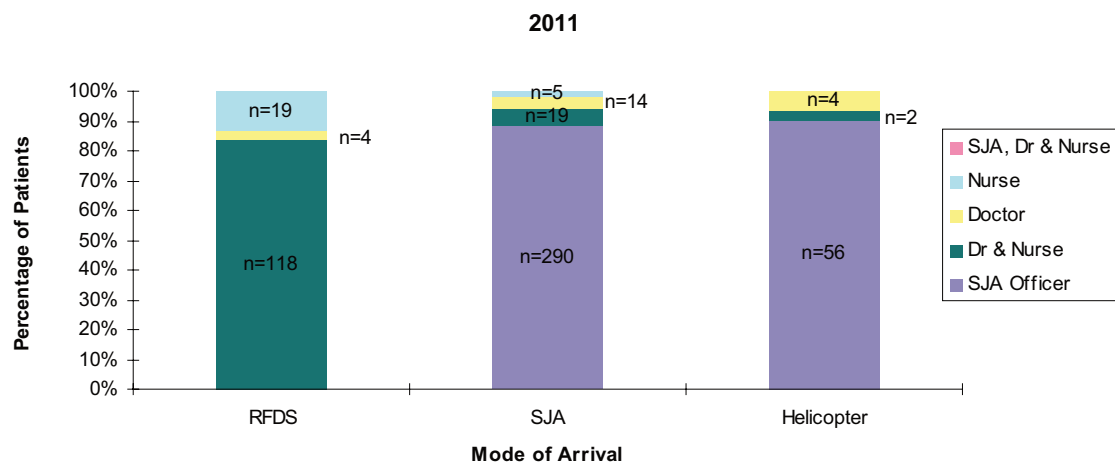
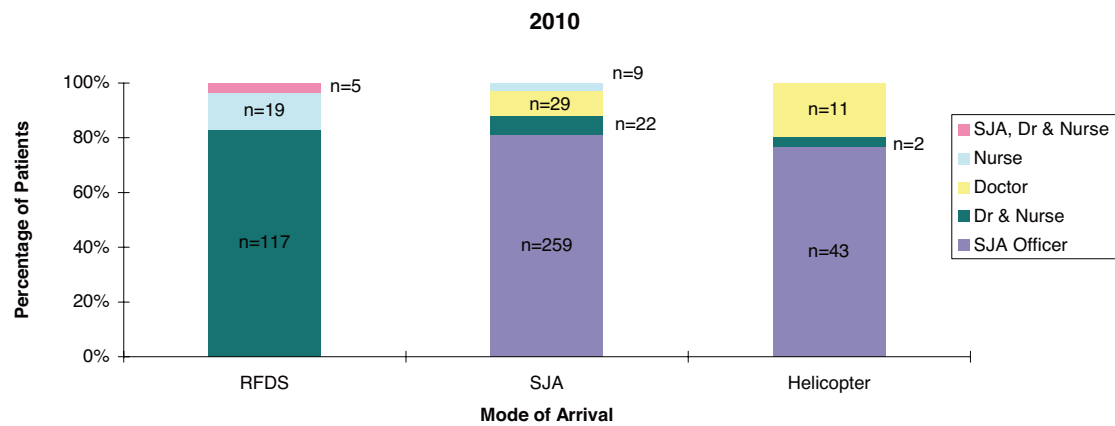
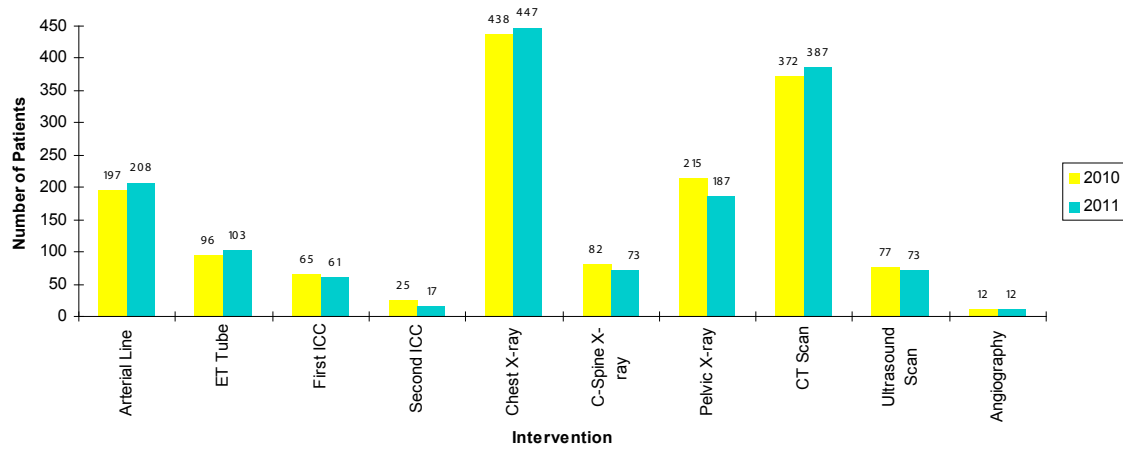


Figure 7 d Escort to Royal Perth Hospital



### 7.3 Interventions (Major Trauma Admissions)

Figure 7 e Interventions within first 24 hours of arrival to RPH (Count of Patients)



### 7.4 Time Spent in the Emergency Department

Figure 7 f Average Time in Emergency Department According to ISS (including Deaths)

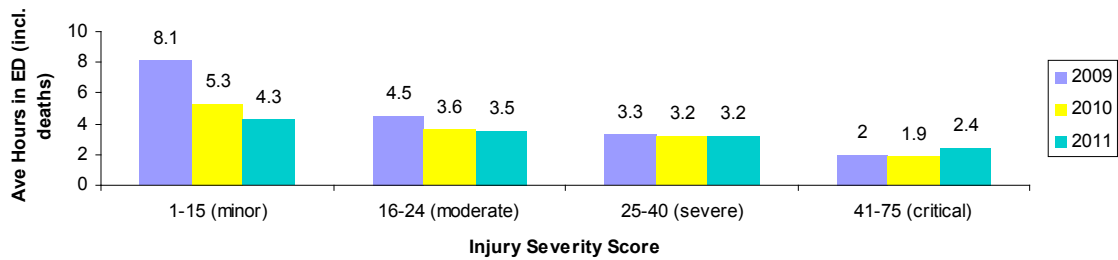
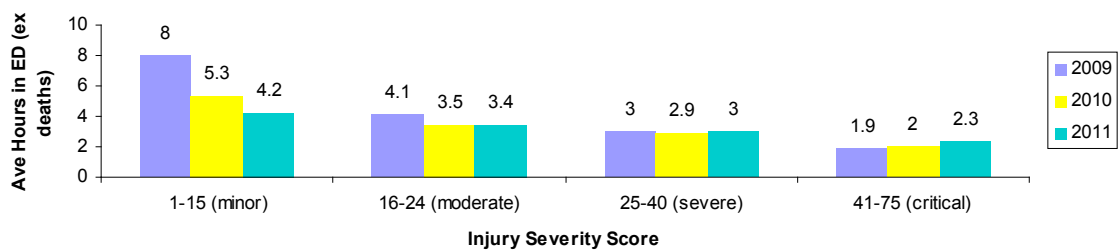
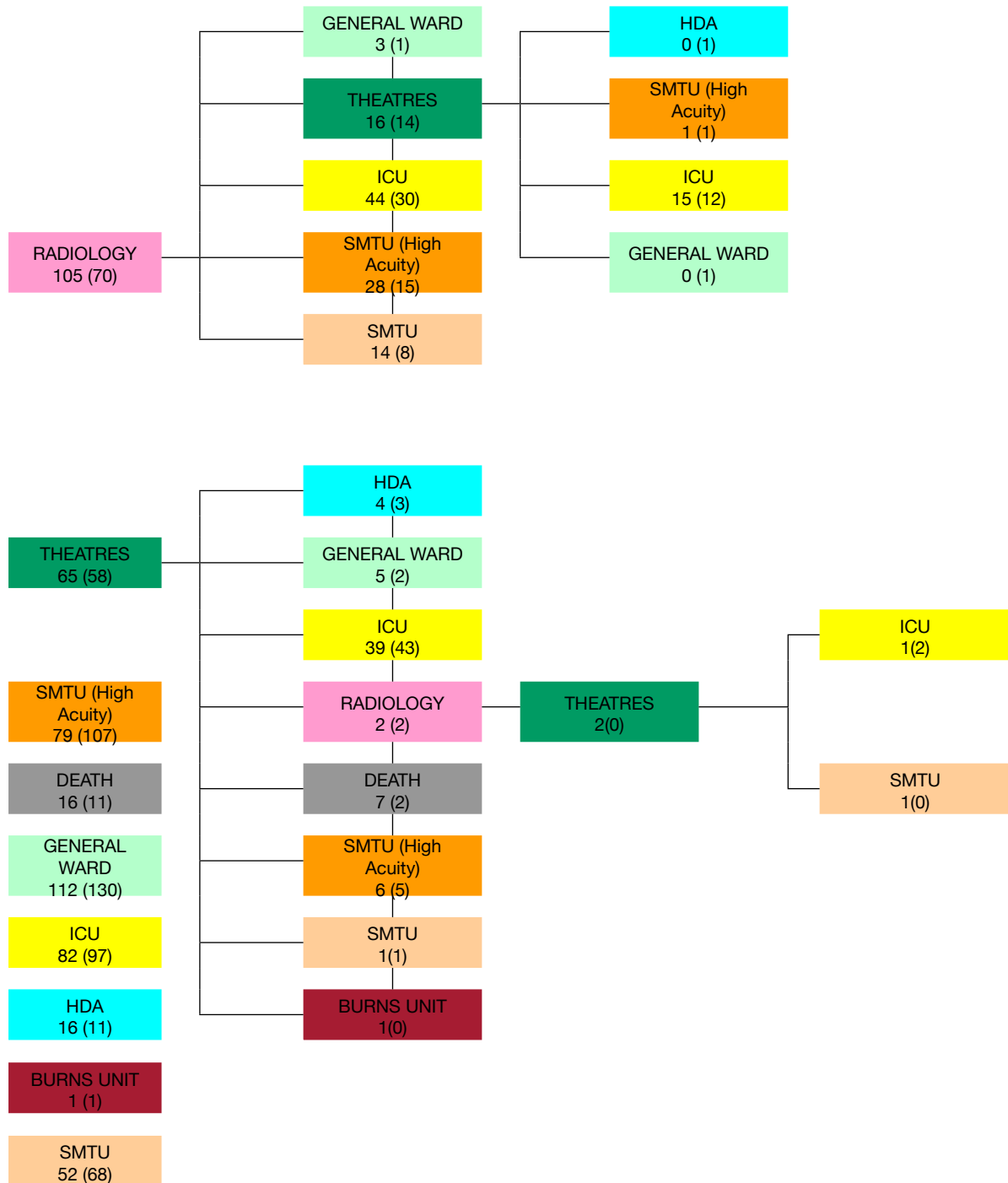


Figure 7 g Average Time in Emergency Department According to ISS (excluding Deaths)



## 7.5 Dispatch From Emergency Department

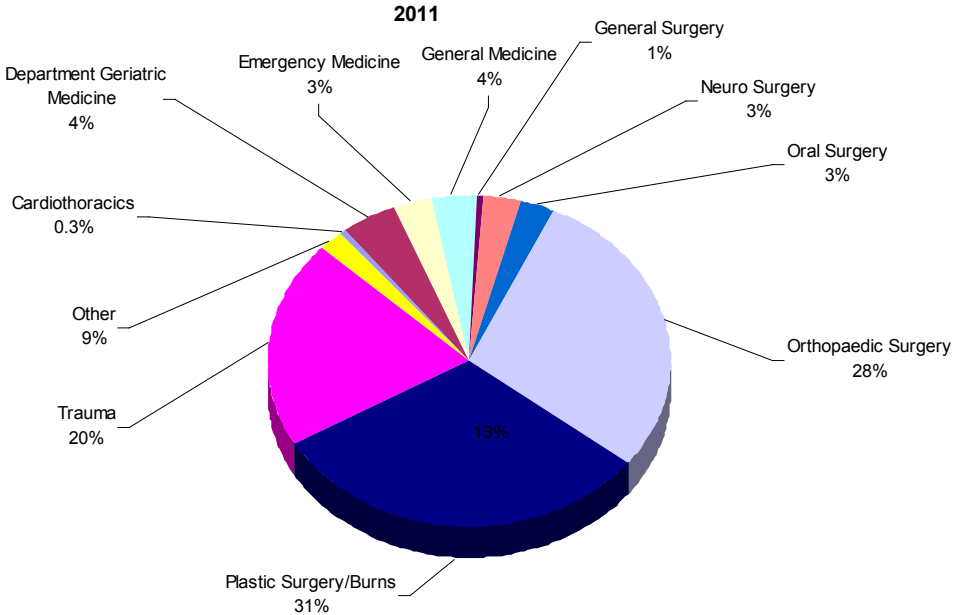
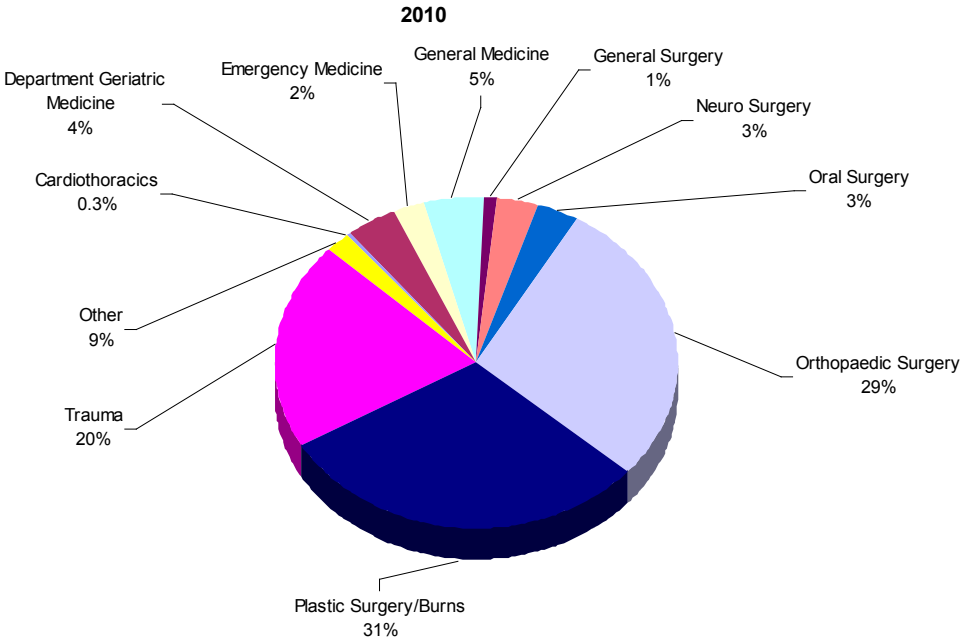
Figure 7 h Destination from Emergency Department (Major Trauma Admissions) 2010 (2011)



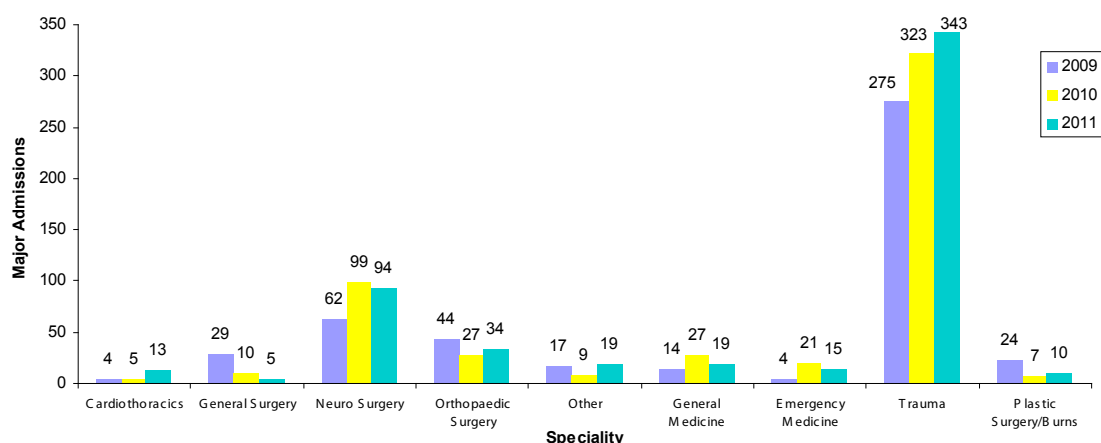
# 8. Royal Perth Hospital Treatment

## 8.1 Admitting Teams

Figure 8 a Admitting Specialty (Total Trauma Admissions)



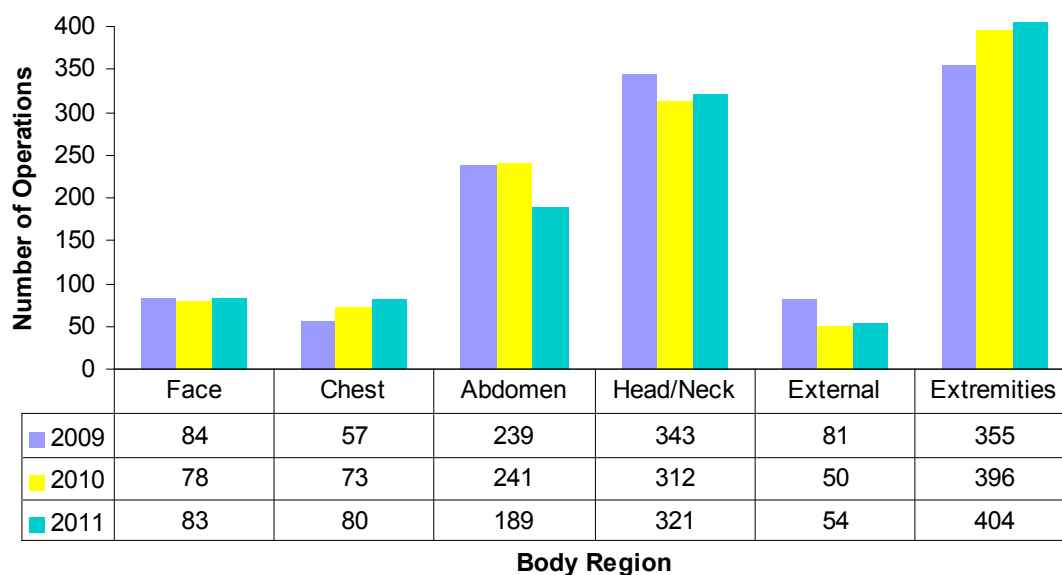
**Figure 8 b Admitting Specialty (Major Trauma Admissions)**



## 8.2 Operations at Royal Perth Hospital (Major Trauma Admissions)

|                                | <u>2009</u> | <u>2010</u> | <u>2011</u> |
|--------------------------------|-------------|-------------|-------------|
| Major Trauma Admissions:       | 473         | 528         | 552         |
| Patients Requiring Operations: | 319         | 314         | 333         |
| Percentage:                    | 67.4%       | 59.5%       | 60.3%       |

**Figure 8 c Operations Performed by Body Region at Royal Perth Hospital (Major Trauma ISS > 15)**



### 8.3 Intensive Care Admissions

**Table 8 a Major Trauma Patients (ISS >15) to Intensive Care Unit at any time during trauma admission at Royal Perth Hospital**

|      | Total Major Trauma Admissions | Number and % of Total Trauma Admissions | Median ISS (Range) of ICU Admissions | Proportion of Critical Admissions (ISS 41-75) | All ISS > 15 Average LOS ICU (Days*) | Median LOS (Days*) (Range) | ISS >15 (Ex Deaths) Average LOS ICU (Days*) | Median LOS (Ex Deaths) (Days*) (Range) |
|------|-------------------------------|---|--------------------------------------|---|--------------------------------------|----------------------------|---|--|
| 2001 | 330                           | 155 (46.9)                              | 26 (16 – 75)                         | 16.1%   | 7.58                                 | 4 (1 – 37)                 | 7.75  | 4 (1 – 32)                             |
| 2002 | 372                           | 163 (43.8)                              | 26 (16 – 75)                         | 15.3%   | 8.73                                 | 4 (1 – 56)                 | 8.70  | 5 (1 – 50)                             |
| 2003 | 347                           | 140 (40.3)                              | 27 (16 – 75)                         | 25%   | 7.74                                 | 4 (1 – 51)                 | 8.05  | 5 (1 – 33)                             |
| 2004 | 422                           | 160 (37.9)                              | 26 (16 – 75)                         | 21.2%   | 8.59                                 | 4 (1 – 56)                 | 8.94  | 5 (1 – 56)                             |
| 2005 | 412                           | 167 (40.5)                              | 29 (16 – 75)                         | 17.9%   | 7.50                                 | 5 (1 – 48)                 | 8.23  | 6 (1 – 48)                             |
| 2006 | 517                           | 204 (39.4)                              | 27 (16 – 75)                         | 17.6%   | 7.52                                 | 5 (1 – 48)                 | 7.48  | 5 (1 – 31)                             |
| 2007 | 391                           | 186 (47.5)                              | 26 (16 – 75)                         | 10.2%   | 7.40                                 | 5 (1 – 34)                 | 8.10  | 7 (1 – 34)                             |
| 2008 | 446                           | 206 (46.2)                              | 25 (16 – 75)                         | 8.2%  | 7.84                                 | 5 (1 – 56)                 | 8.62  | 6 (1 – 56)                             |
| 2009 | 473                           | 211 (44.6)                              | 26 (16 – 75)                         | 13.7%   | 10.34                                | 7 (1 – 100)                | 11.01                                       | 8 (1 – 100)                            |
| 2010 | 528                           | 214 (40.5)                              | 26 (16 – 75)                         | 7.9%  | 7.49                                 | 5 (1 – 59)                 | 8.17  | 6 (1 – 59)                             |
| 2011 | 552                           | 218 (39.4)                              | 26 (16 – 75)                         | 14.2%   | 7.37                                 | 5 (1 – 74)                 | 8.16  | 5 (1 – 74)                             |
|      |                               |   |                                      | **2009 minus 2 pts with LOS 100 days          | **9.48                               | **7 (1 – 52)               | **10.03                                     | **8 (1 – 52)                           |

\* Includes part of day

# 9. Discharge Details

## 9.1 Length Of Stay At Royal Perth Hospital

Figure 9 a Number of Days in Hospital (Excluding Deaths) Total Trauma Admissions

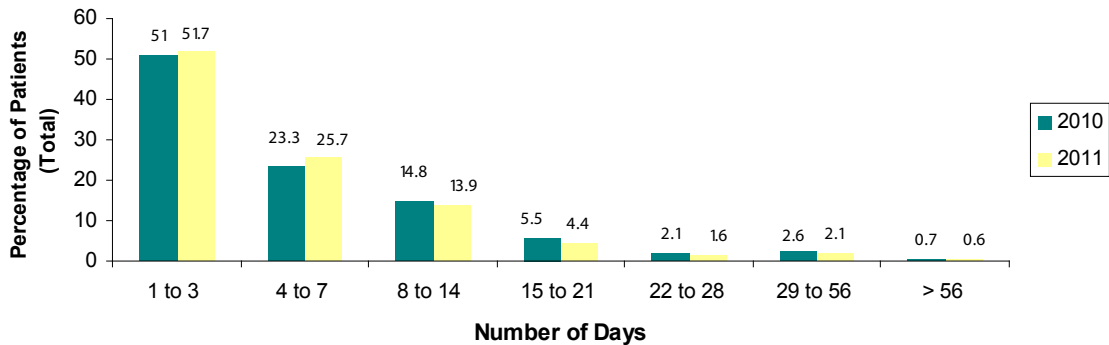


Figure 9 b Number of Days in Hospital (Excluding Deaths) Major Trauma Admissions

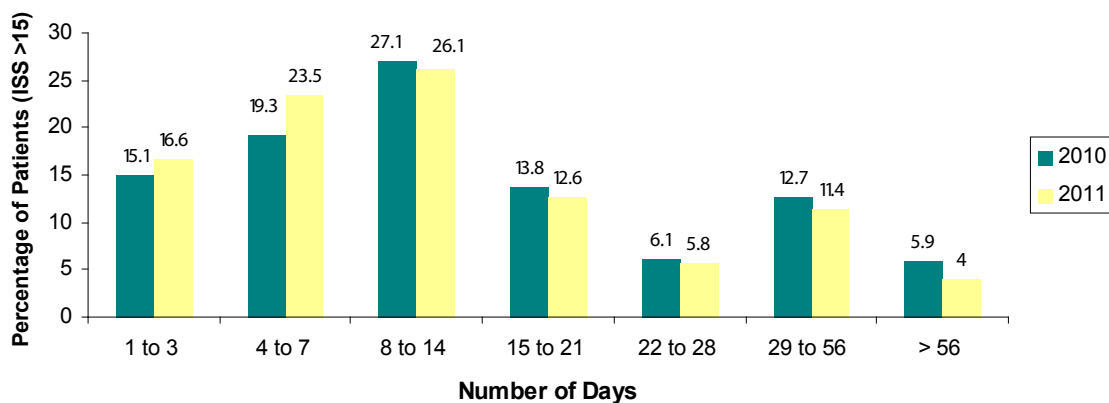
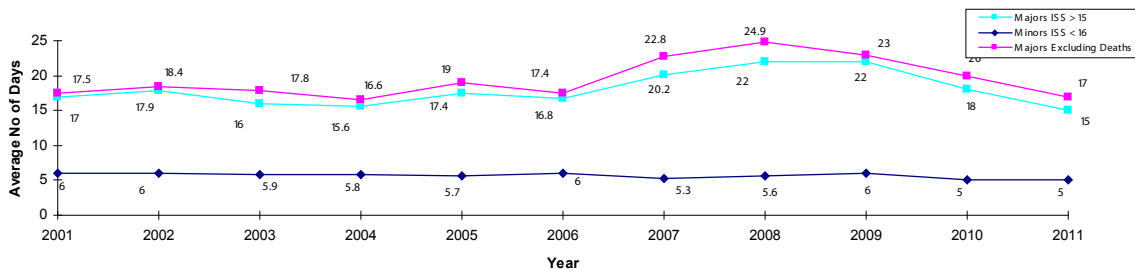
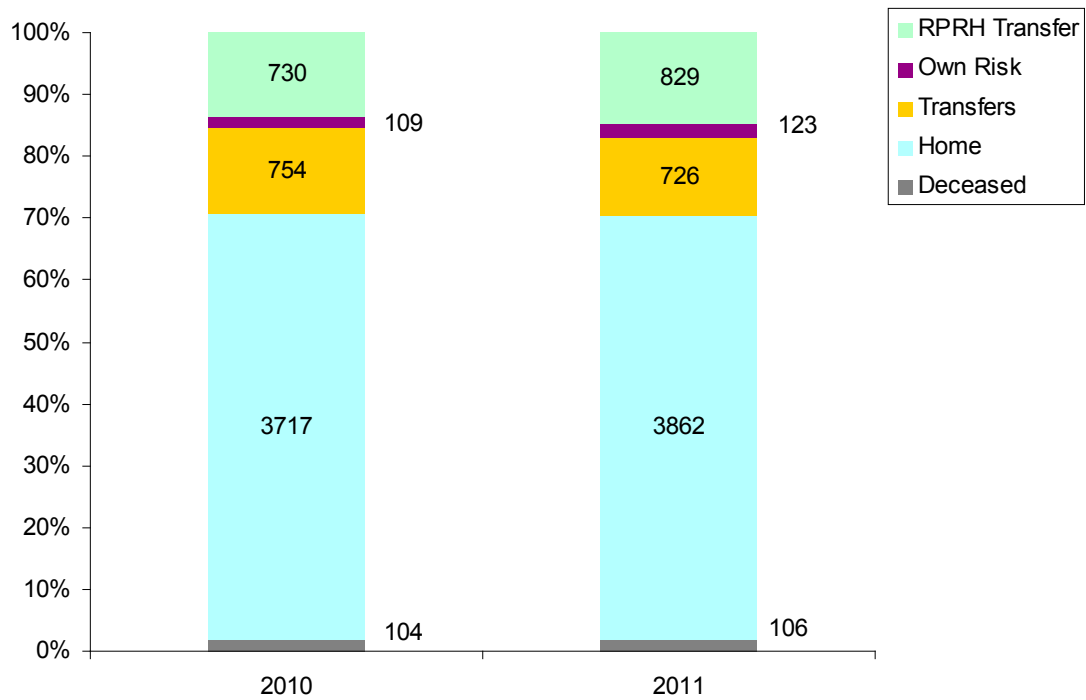


Figure 9c Average Length of Stay

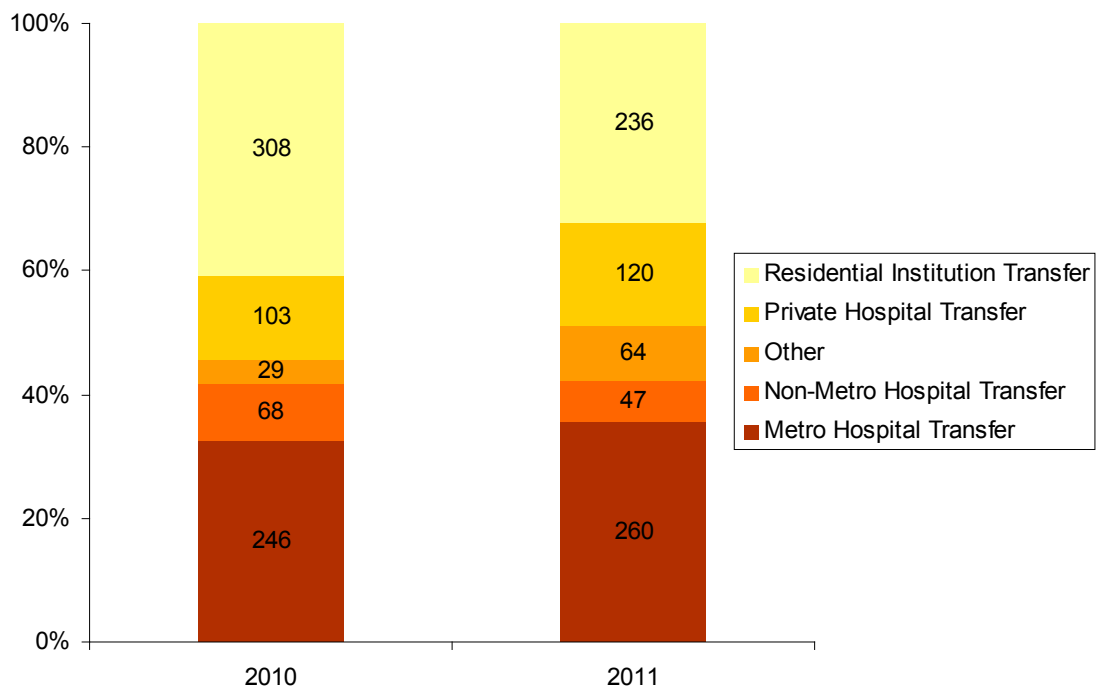


## 9.2 Discharge Destination

Figure 9 d Discharge Destination from Royal Perth Hospital (Total Trauma)



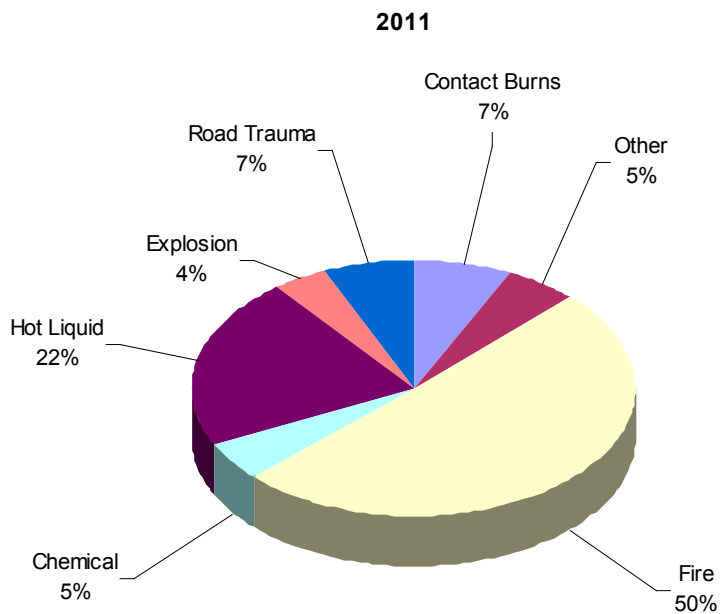
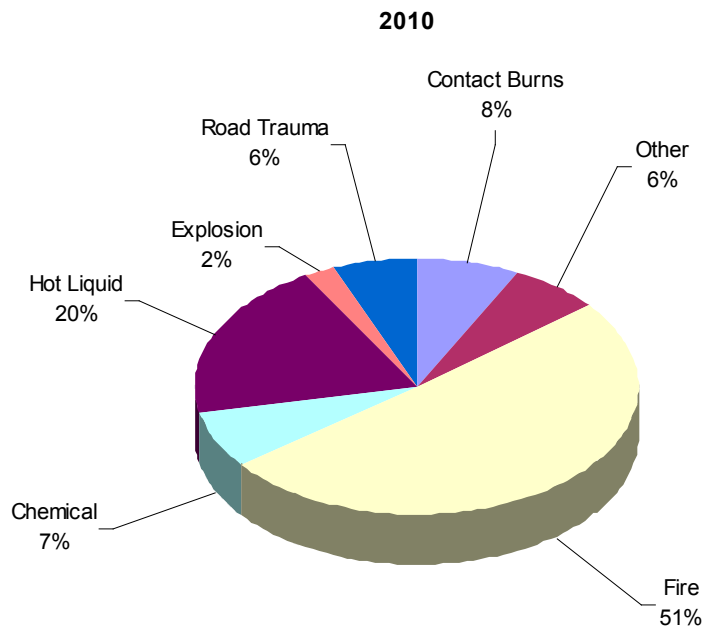
### Transfers:



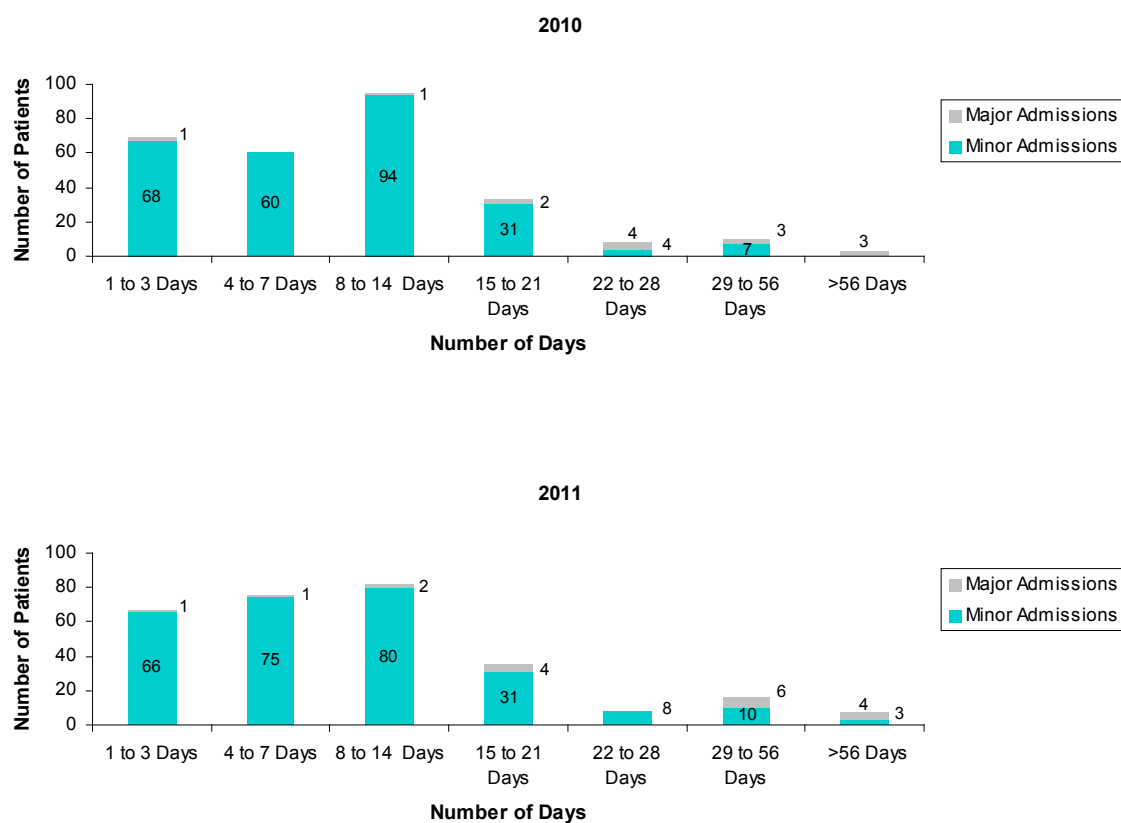


# 10. Burns Admissions

Figure 10 a Mechanism of Trauma for Total Burns Injuries Admissions



**Figure 10 b Length of Stay for Total Burns Admissions**



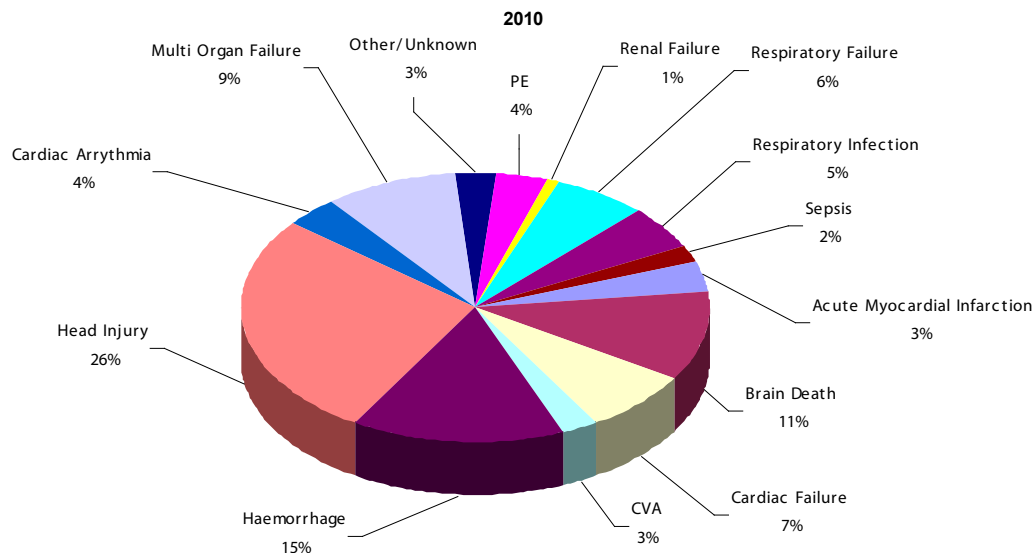
**Table 10 a Summary of Burns Injury Admissions**

| Year | Minor Admissions | Major Admissions | Total Admissions |
|------|------------------|------------------|------------------|
| 2006 | 160              | 19               | 179              |
| 2007 | 168              | 17               | 185              |
| 2008 | 161              | 11               | 172              |
| 2009 | 206              | 23               | 229              |
| 2010 | 264              | 14               | 278              |
| 2011 | 273              | 18               | 291              |

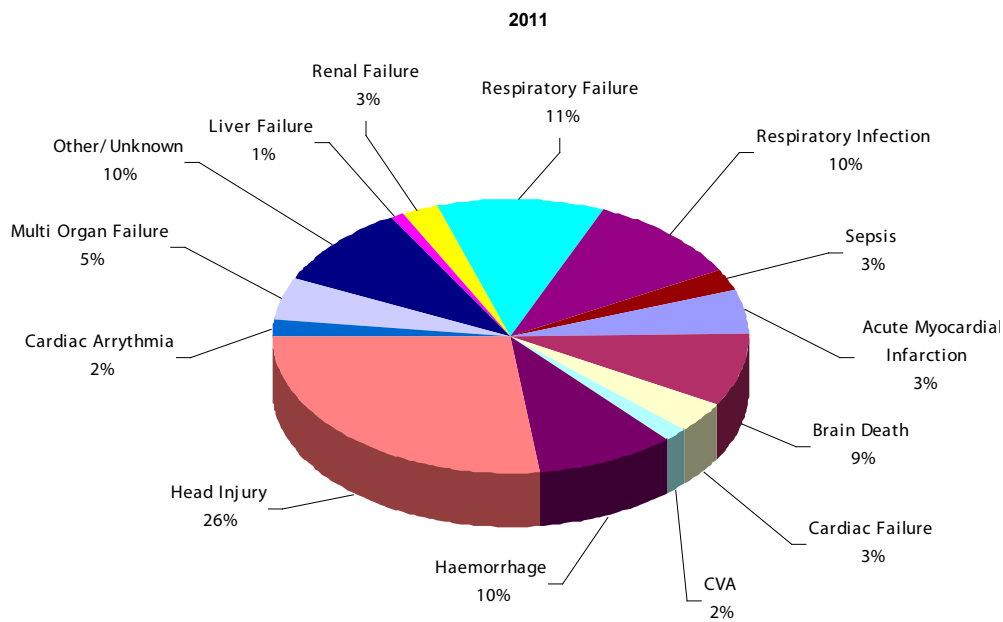
# 11. Patient Outcomes

## 11.1 Trauma Mortality

Figure 11 a Cause of Death



**N = 109**



**N = 115**

N.B Cause of death is subject to change following hospital Trauma Mortality Audit.

**Table 11 a Mortality Rate - Blunt vs. Penetrating Injuries**

| Year | Type Of Trauma | Major ISS > 15 |          |             | Minor ISS < 16 |          |             |
|------|----------------|----------------|----------|-------------|----------------|----------|-------------|
|      |                | Total          | Deceased | % Mortality | Total          | Deceased | % Mortality |
| 2009 | Blunt          | 457            | 43       | 9.4%        | 4041           | 47       | 1.1%        |
|      | Penetrating    | 16             | 2        | 12.5%       | 738            | 0        | 0%          |
| 2010 | Blunt          | 504            | 61       | 12.1%       | 4025           | 39       | 0.9%        |
|      | Penetrating    | 24             | 8        | 33.3%       | 861            | 1        | 0.1%        |
| 2011 | Blunt          | 529            | 68       | 12.8%       | 4126           | 44       | 1.1%        |
|      | Penetrating    | 23             | 3        | 13%         | 969            | 0        | 0%          |

**Table 11 b Mortality Rate within Each ISS Category**

| Year | ISS Category |      |         |      |         |       |         |       |
|------|--------------|------|---------|------|---------|-------|---------|-------|
|      | 1 – 15       | %    | 16 – 24 | %    | 25 – 40 | %     | 41 – 75 | %     |
| 2001 | 57/3166      | 1.8% | 8/165   | 4.8% | 22/133  | 16.5% | 19/32   | 59.4% |
| 2002 | 63/3173      | 2%   | 8/198   | 4.5% | 21/144  | 14.6% | 14/30   | 46.7% |
| 2003 | 53/2966      | 1.8% | 6/178   | 3.4% | 24/123  | 19.5% | 23/46   | 50%   |
| 2004 | 55/3207      | 1.7% | 9/228   | 3.9% | 18/148  | 12.1% | 13/46   | 28.3% |
| 2005 | 44/3409      | 1.3% | 8/207   | 3.9% | 18/167  | 10.8% | 14/38   | 36.8% |
| 2006 | 47/3564      | 1.3% | 13/251  | 5.2% | 31/217  | 14.3% | 18/49   | 36.7% |
| 2007 | 38/4099      | 0.9% | 11/186  | 5.9% | 34/179  | 19%   | 11/26   | 42.3% |
| 2008 | 49/4531      | 1.1% | 17/235  | 7.2% | 32/187  | 17.1% | 15/24   | 62.5% |
| 2009 | 47/4779      | 0.9% | 3/260   | 1.1% | 35/180  | 19.4% | 7/33    | 21.2% |
| 2010 | 40/4886      | 0.8% | 10/283  | 3.5% | 51/222  | 22.9% | 8/23    | 34.7% |
| 2011 | 44/5095      | 0.9% | 7/312   | 2.2% | 46/199  | 23.1% | 18/41   | 43.9% |

### 2010

- There were **109** deaths in 2010 (**2%** of total trauma admissions)
- There were **69** major trauma deaths (ISS > 15) (**13%** of major trauma admissions)
- \*There were of **71** trauma deaths ISS > 12 (**10.4%**)

### 2011

- There were **115** deaths in 2011 (**2%** of total trauma admissions)
- There were **71** major trauma deaths (ISS > 15) (**12.8%** of major trauma admissions)
- \*There were **72** trauma deaths ISS > 12 (**9.9%**)

\*Since the adoption of ASI 2005(2008 update), many Australian Major Trauma Centres have redefined Major Trauma as ISS >12. This will also be the cut off ISS for the new Australian Trauma Registry.

## 12. Injury Severity Scores

Figure 12 a ISS vs. Average Length of Stay in Royal Perth Hospital (Excluding Deaths)

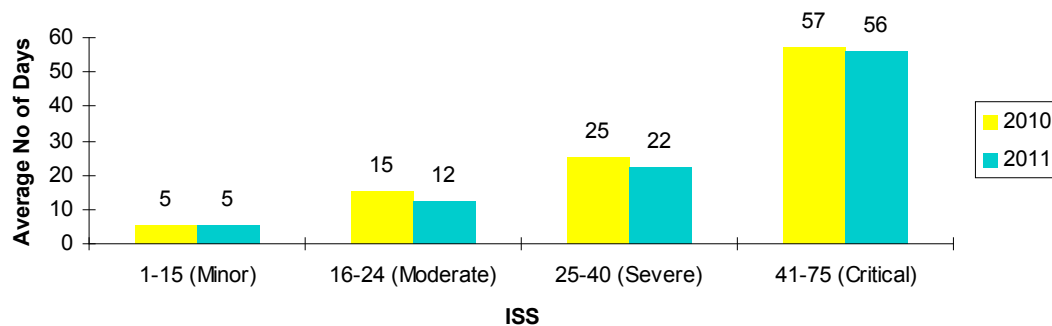


Figure 12 b Average Length of Stay for ISS Group 41 – 75

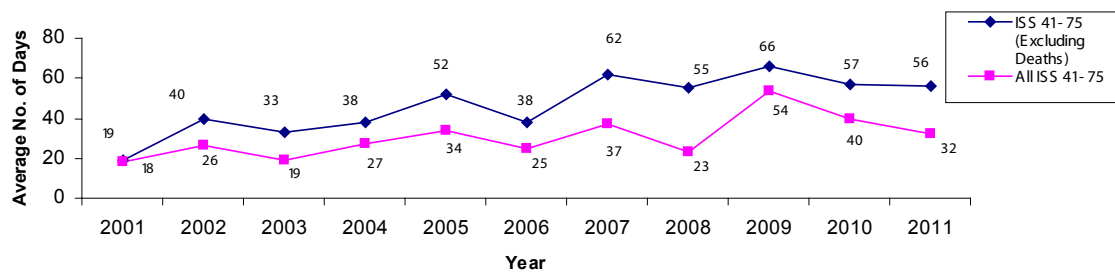
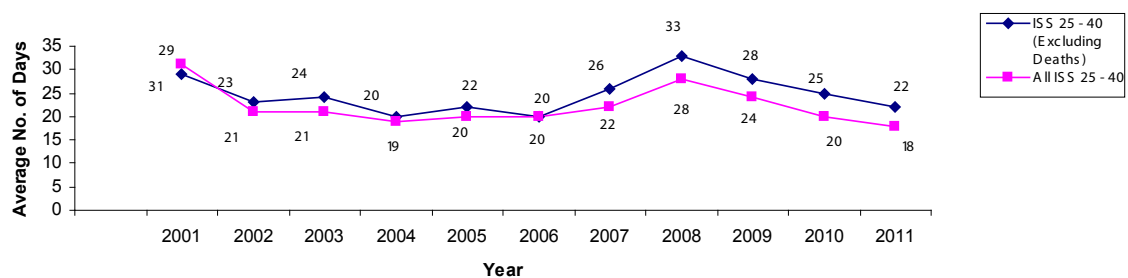
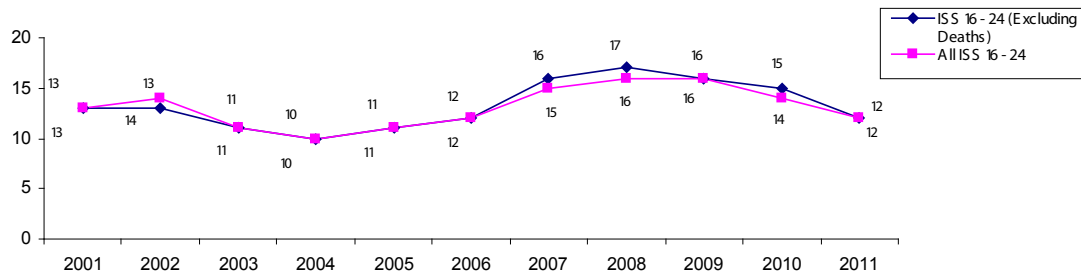


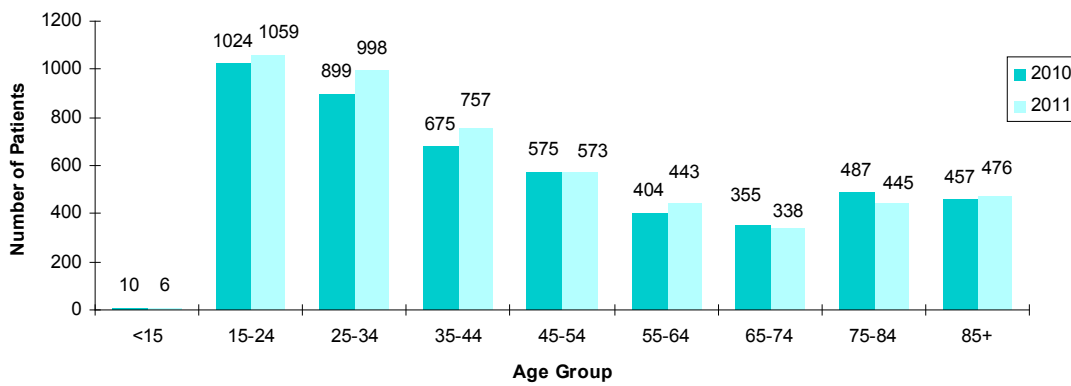
Figure 12 c Average Length of Stay for ISS Group 25 – 40



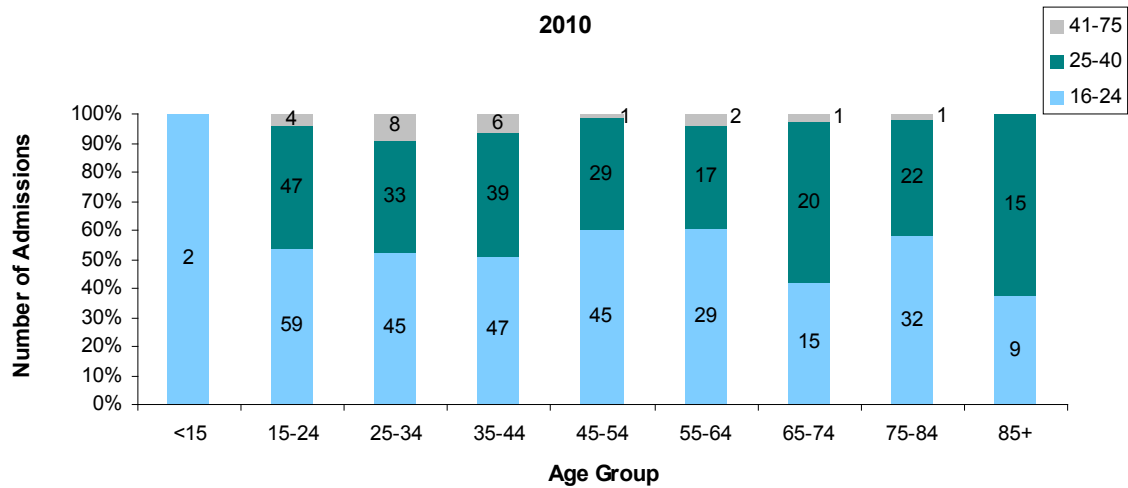
**Figure 12 d Average Length of Stay for ISS Group 16 – 24**

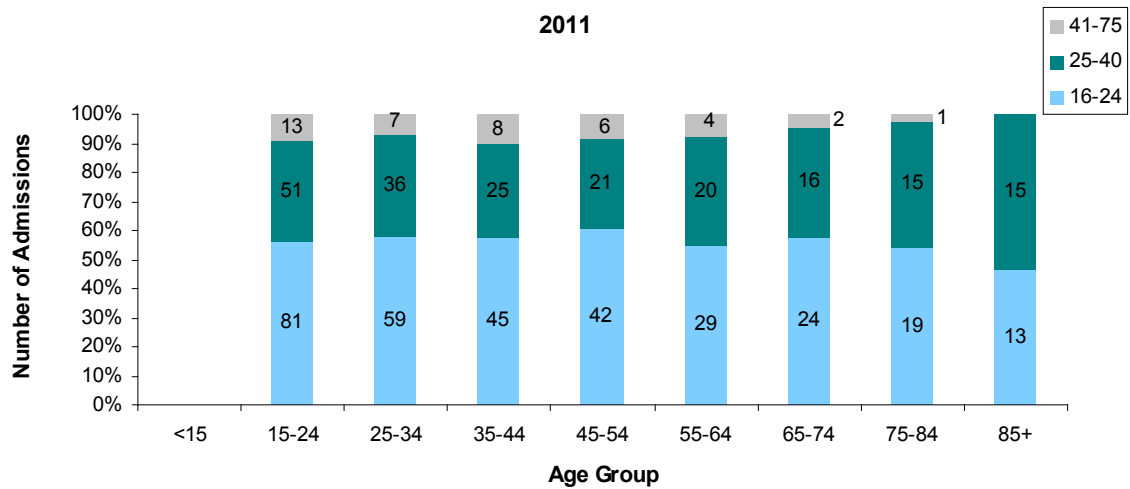


**Figure 12 e Minor Trauma Admissions (ISS < 16) by Age**

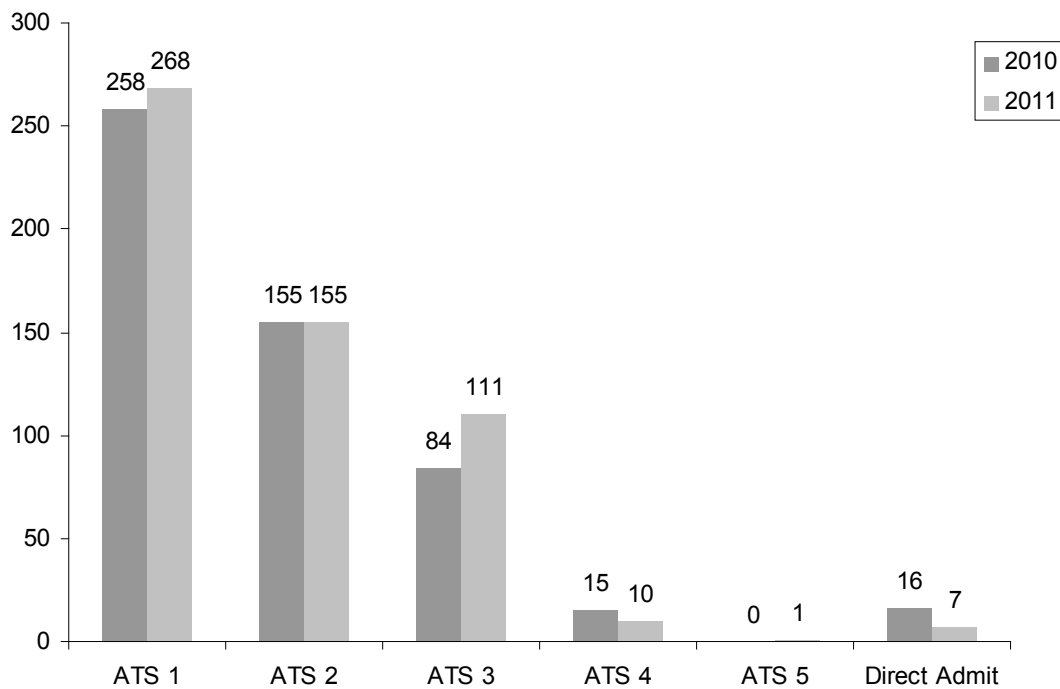


**Figure 12 f Major Trauma Admissions (ISS > 15) by Age**





**Figure 12 g Major Trauma Admissions (ISS > 15) by Triage Category**



The Injury Severity Score (ISS) has often been criticised on account of the lack of consideration of the impact of multiple injuries within one body region in its assessment.

In the following example of the ISS scoring process, the individual has significant injuries in three regions; the head, the abdominal region, and an extremity (lower leg). The three most severe scores (subdural haematoma in the head region) in each body region are applied, by rule. The ISS score adds to 41.

**Injury Severity Score Example**

|                                   | <i>AIS Score</i> |
|-----------------------------------|------------------|
| Small subdural hematoma           | 4                |
| Parietal lobe swelling            | 3                |
| Major liver laceration            | 4                |
| Upper tibial fracture (displaced) | 3                |

**$ISS = 4^2 + 4^3 + 3^2 = 41$**

A revised version of the ISS has been developed to address the issue of multiple injuries in the same body region. The New Injury Severity Score (NISS) is very similar to the ISS. However, it scores the three most severe AIS scores regardless of their body region location. Thus, multiple injuries within a body region can be considered in the NISS.

**ISS vs. NISS - an Example**

|                         | <i>AIS Score</i> | <i>Region</i> |
|-------------------------|------------------|---------------|
| Multiple abrasions      | 1                | External      |
| Deep laceration tongue  | 2                | Face          |
| Subarachnoid hemorrhage | 3                | Head/Neck     |
| Major kidney laceration | 4                | Abdomen       |
| Major liver laceration  | 4                | Abdomen       |

**$ISS = (4)^2 + (3)^2 + (2)^2 = 29$**

**$NISS = (4)^2 + (4)^2 + (3)^2 = 41$**

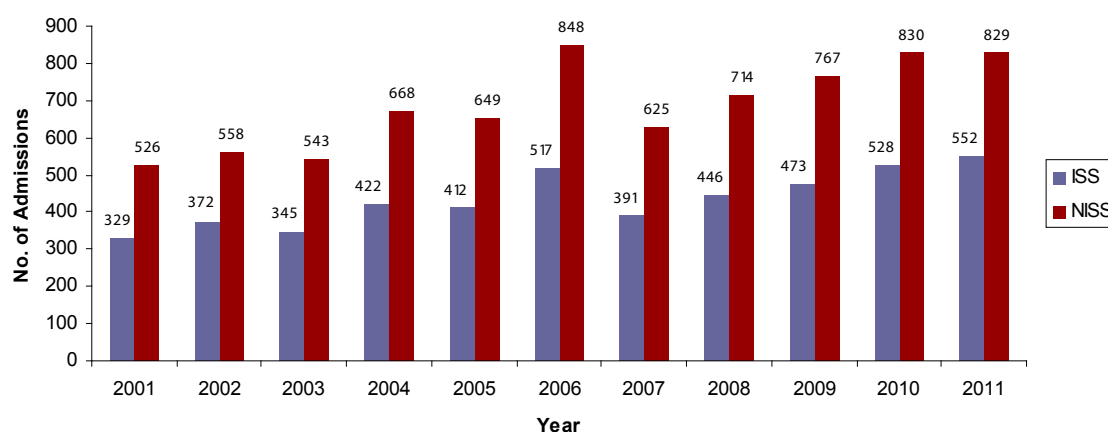
In this example, an individual has 5 significant injuries. The NISS differs from the ISS in that it includes both injuries in the abdomen (liver and kidney lacerations) because their levels of severity exceed those of the injuries in the other regions.

(Baker, 1997)

The recent upgrade to the Trauma Registry database has enabled the collection and recording of NISS. A comparison of NISS (>15) with ISS (>15) is shown in Figure 12h.



**Figure 12 h Comparison of ISS with NISS (Score > 15)**



The NISS score (>15) demonstrates a significantly higher number of “major” traumas admitted to Royal Perth Hospital and could reasonably be seen as an indication of inpatient workload and resource use.

**Table 12b Number of Patients according to Body Region and AIS Severity**

| Body Region | Count of Patients per Body Region and AIS Severity |      |       |      |       |      |       |      |       |      |       |      |
|-------------|--|------|-------|------|-------|------|-------|------|-------|------|-------|------|
|             | AIS 1  |      | AIS 2 |      | AIS 3 |      | AIS 4 |      | AIS 5 |      | AIS 6 |      |
|             | 2010   | 2011 | 2010  | 2011 | 2010  | 2011 | 2010  | 2011 | 2010  | 2011 | 2010  | 2011 |
| Head/Neck   | 138  | 157  | 841   | 975  | 866   | 791  | 193   | 202  | 152   | 172  | 2     | 6    |
| Face        | 704  | 643  | 461   | 396  | 8     | 12   | 1     | 0    | 0     | 0    | 0     | 0    |
| Chest       | 136  | 150  | 729   | 823  | 538   | 507  | 72    | 100  | 35    | 27   | 1     | 5    |
| Abdomen     | 69   | 75   | 5529  | 463  | 129   | 120  | 41    | 44   | 6     | 4    | 1     | 0    |
| Extremities | 1802   | 1948 | 3037  | 3237 | 874   | 850  | 23    | 35   | 9     | 6    | 2     | 1    |
| Skin        | 6036   | 6114 | 144   | 131  | 23    | 14   | 1     | 1    | 4     | 7    | 0     | 4    |

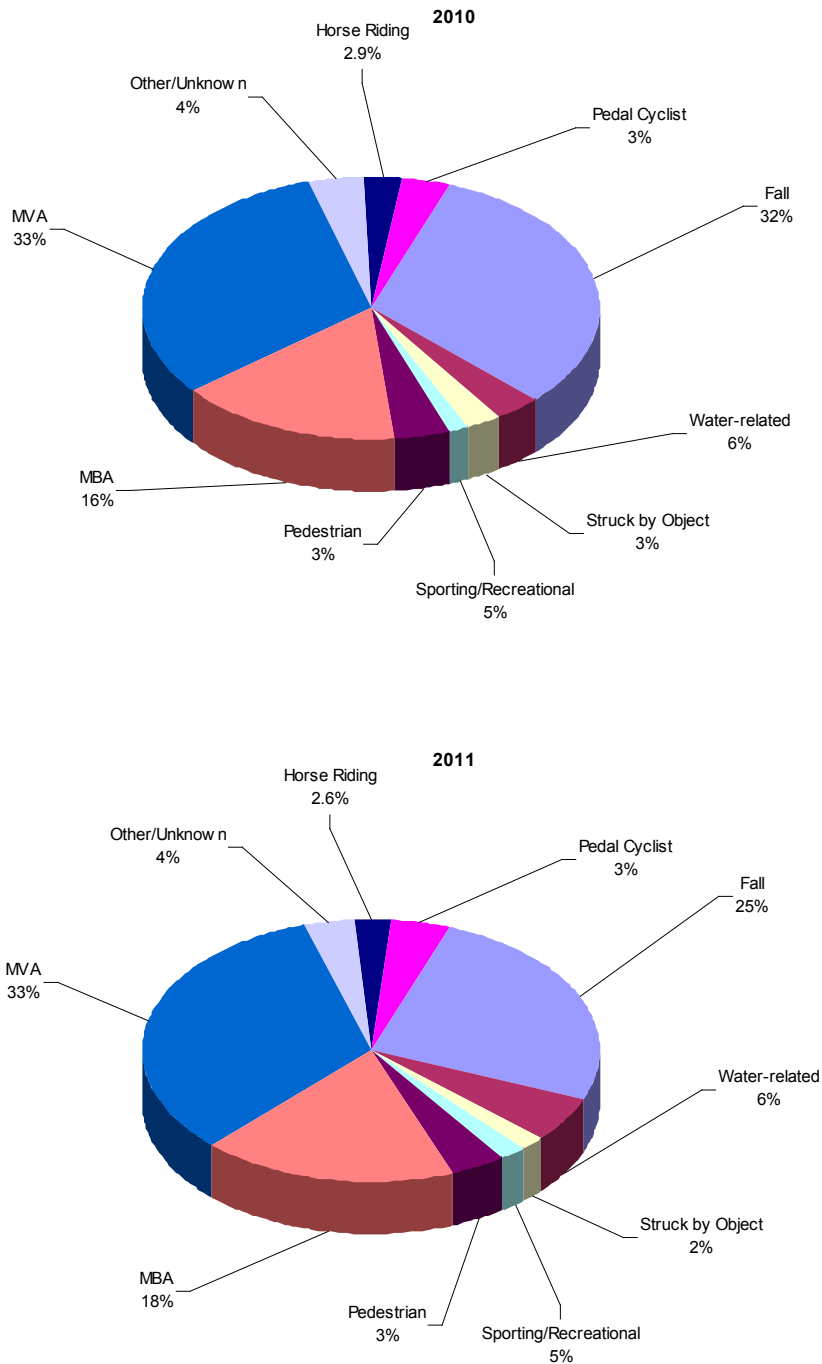
**Abbreviated Injury Scale (AIS) Legend:**

| AIS Severity Score | Description                     |
|--------------------|---------------------------------|
| 1                  | Minor                           |
| 2                  | Moderate                        |
| 3                  | Serious                         |
| 4                  | Severe                          |
| 5                  | Critical                        |
| 6                  | Maximal (generally untreatable) |

# 13. Spinal Injury Patients

## 13.1 Spinal Injury Patients

Figure 13 a Cause of Trauma for all Spinal Injury Patients



**Table 13 a Summary of Spinal Injury Admissions**

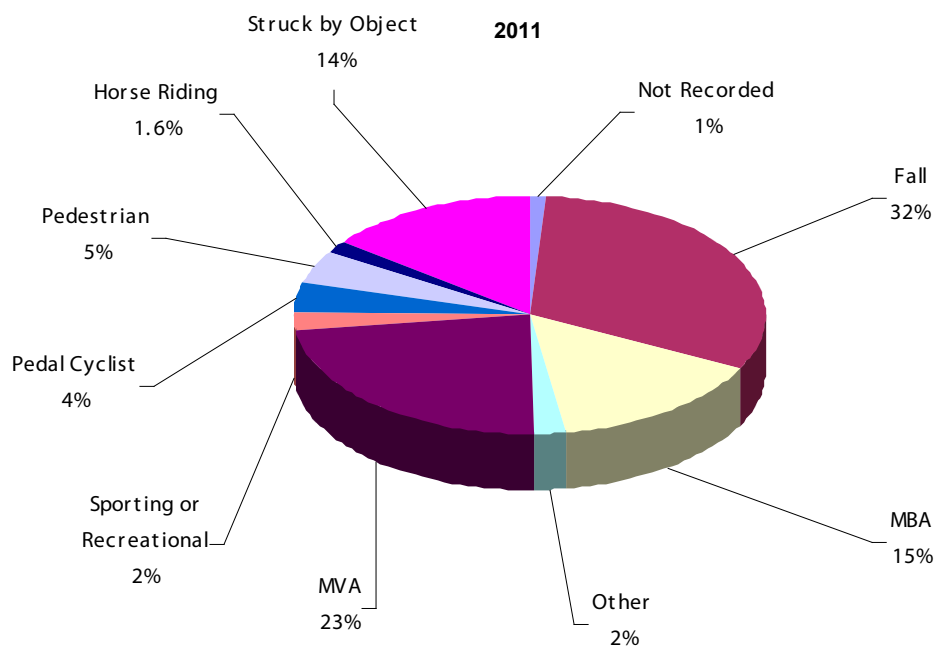
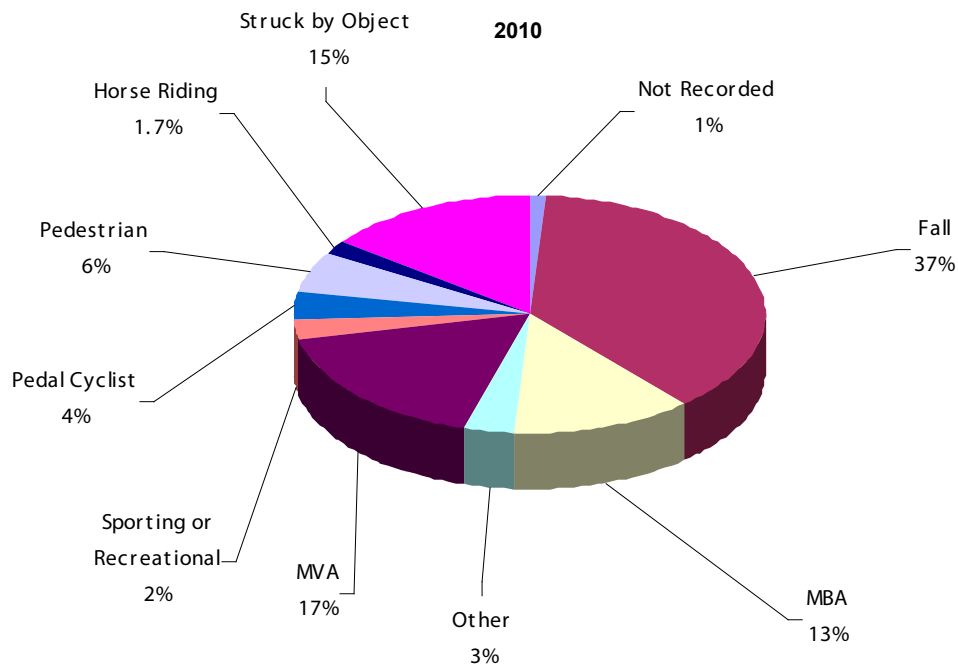
| Year | Minor Admissions (Iss<16) | Major Admissions (Iss>15) | Neuro Deficit * | Total Admissions | % Change |
|------|---------------------------|---------------------------|-----------------|------------------|----------|
| 2001 | 208                       | 92                        | 22              | 300              | 3.4%     |
| 2002 | 213                       | 96                        | 27              | 309              | 3%       |
| 2003 | 195                       | 107                       | 21              | 302              | -2.3%    |
| 2004 | 261                       | 128                       | 22              | 389              | 28.8%    |
| 2005 | 262                       | 148                       | 37              | 410              | 5.4%     |
| 2006 | 273                       | 180                       | 37              | 453              | 10.4%    |
| 2007 | 343                       | 140                       | 44              | 483              | 6.6%     |
| 2008 | 411                       | 169                       | 46              | 580              | 20.1%    |
| 2009 | 480                       | 189                       | 40              | 669              | 15.3%    |
| 2010 | 373                       | 184                       | 40              | 557              | -16.7%   |
| 2011 | 361                       | 208                       | 48              | 569              | 2.1%     |

\*This figure denotes those patients diagnosed with either incomplete or complete cord syndrome as a result of cord contusion or laceration, documented by x-ray, CT scan, MRI or autopsy.

# 14. Head Injury Patients

## 14.1 Head Injury Patients

Figure 14 a Cause of Trauma for Head Injury Patients



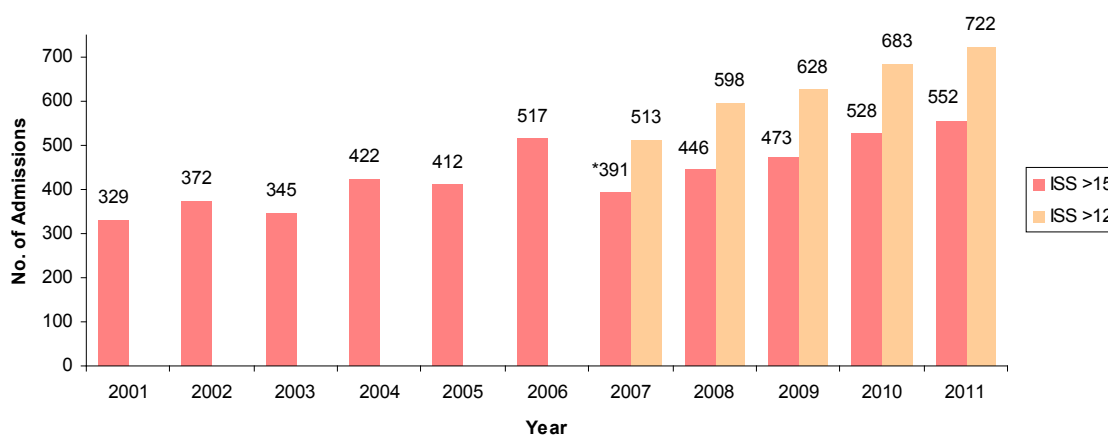
**Table 14 a Summary of Head Injury Admissions\* to Royal Perth Hospital**

| Year | Minor Admissions (Iss <16) | Major Admissions (Iss >15) | Minor Admissions to Rprh Wd 1 | Major Admissions To Rprh Wd 1 | Total Admissions | % Increase/Decrease |
|------|----------------------------|----------------------------|-------------------------------|-------------------------------|------------------|---------------------|
| 2001 | 281                        | 230                        | 5                             | 34                            | 511              | 21.3                |
| 2002 | 254                        | 271                        | 4                             | 42                            | 525              | 2.7                 |
| 2003 | 211                        | 228                        | 1                             | 36                            | 439              | -16.4               |
| 2004 | 211                        | 285                        | 1                             | 39                            | 496              | 12.9                |
| 2005 | 264                        | 275                        | 1                             | 31                            | 539              | 8.7                 |
| 2006 | 250                        | 352                        | 0                             | 42                            | 502              | -6.9                |
| 2007 | 226                        | 240                        | 5                             | 62                            | 466              | -7.2                |
| 2008 | 211                        | 275                        | 7                             | 49                            | 486              | 4.3                 |
| 2009 | 256                        | 271                        | 8                             | 43                            | 527              | 8.2                 |
| 2010 | 325                        | 326                        | 6                             | 39                            | 651              | 23.7                |
| 2011 | 380                        | 329                        | 11                            | 60                            | 709              | 8.9                 |

\* AIS ≥ 2

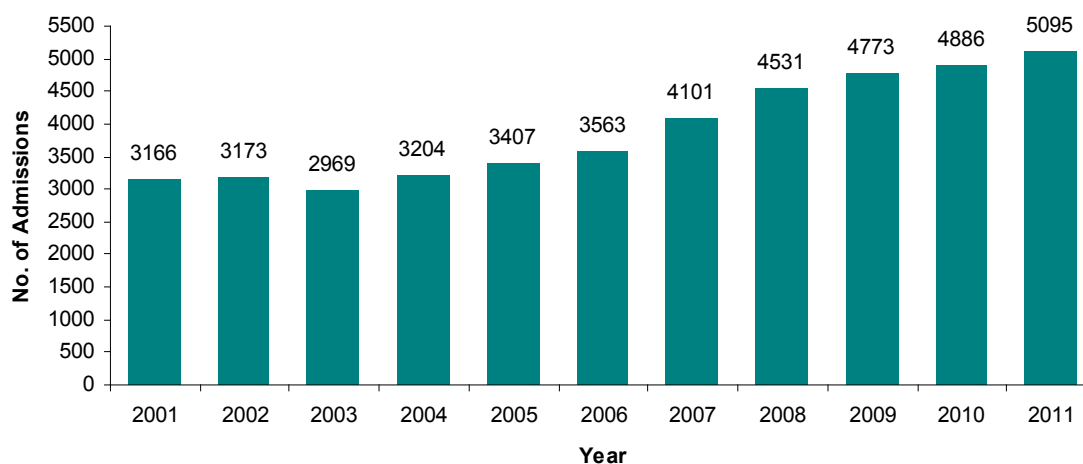
## 15. The Trauma Service at Royal Perth Hospital

Figure 15 a Major Trauma Admissions 2001 - 2011



\*Revised scoring system (AIS 2005) from January 2007

Figure 15 b Minor Trauma Admissions (ISS <16) 2001 - 2011



Since its inception in August 1994, the Trauma Registry at Royal Perth Hospital has seen an overall increase of **149%** in major trauma admissions (Injury Severity Score > 15), and an increase of **110%** in minor trauma admissions (Injury Severity Score <16). The overall increase in trauma admissions to Royal Perth Hospital has been **114%**.

Following Royal Perth Hospital's designation in 2004 as the State Adult Major Trauma Service, key developments in infrastructure and trauma personnel appointments have been established, as part of Royal Perth Hospital's commitment to the quality outcome of trauma patients.

Trauma patients may be admitted under a combination of teams depending on the nature of their injuries. The introduction of a designated "trauma" sub specialty for multiple injured patients facilitates a more coordinated approach to the multi-disciplinary problems faced by these patients.

The 30-bed State Major Trauma Unit (SMTU) was opened in February 2008. The transitional concept of this unit allows the consolidation of complex, multi-trauma patients into a single, dedicated area that facilitates improved coordination and management of these multi-specialty patients during the acute phase of their trauma care.

Key appointments in medical, nursing and Allied Health staff make up the components of the Trauma Service:

#### ***Director Trauma Services / Trauma Surgeon***

Responsible for the overall planning, directing and implementing of trauma systems at Royal Perth Hospital, to ensure optimum delivery of care to trauma patients.

#### ***Second Trauma Surgeon (0.2FTE)***

This position complements the existing Trauma Surgeon position and forms part of the Trauma on-call roster, ensuring 24-hour Consultant cover seven days a week. Involvement in Quality Improvement activities is also part of the scope for this position.

#### ***Trauma Fellows/Registrars (2FTE)***

Responsible for coordination of trauma patient care. Plays a major role in the initial resuscitation phase, planning patient care and liaising with other surgical specialties. Perform the tertiary surveys and monitor patients' progress and outcome. Support other roles within Royal Perth Hospital by teaching, supervising, researching and providing feedback.

#### ***Trauma Resident (Trauma Team)(1FTE)***

Together with the Trauma Fellows, this position participates in the day-to-day management and coordination of trauma patient care, particularly with reference to the multiple injured patients involving more than one medical specialty.

#### ***Trauma Resident (SMTU)(4FTE)***

In-house 24/7 Resident cover on the State Major Trauma Unit is provided by residents. Together with the Trauma Team, and in liaison with the relevant admitting specialty, the SMTU Trauma RMO is responsible for the day-to-day management

## 16. Research, Publications and Presentations

### Presentations/invited speaker

Burrell M. 2010. *P.A.R.T.Y: Does it work?* Trauma Services Annual Conference, Eden Park Auckland. (Invited speaker).

Burrell M. 2010. *How to Train Rural Trauma Care Providers – The WA Experience.* Trauma Services Annual Conference, Eden Park Auckland. (Invited speaker).

Cheah T, Monaghan R, Edgar D, Rea S, Fong J, Wood F. *Investigation of the relationship between pre-hospital management, transfer time and clinical outcomes in rural and remote burn patients.* Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Dissanayake S, Rea S, Wood F, Fear M. *The effect of non severe burn injury on cutaneous innervations.* Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Duke J, Wood F, Semmens J, Spilsbury K, Edgar D, Hendrie D, Rea S. *A 26-year population-based study of burn injury hospital admissions in Western Australia.* British Burns Association, 44th Annual Scientific Meeting, 22nd-25th March 2011 Odstock Burns Unit Salisbury, England

Duke J, Wood F, Semmens J, Edgar D, Spilsbury K, Willis A, Hendrie D, Rea S. *Rates of hospitalisations and mortality of older adults admitted with burn injuries in Western Australia from 1983 to 2008.* British Burns Association, 44th Annual Scientific Meeting, 22nd-25th March 2011 Odstock Burns Unit Salisbury, England

Duke J, Wood F, Semmens J, Spilsbury K, Edgar D, Hendrie D, Rea S. *A 26-year population-based study of burn injury hospital admissions in Western Australia.* Western Australia Injury & Trauma Network, Trauma Research Summit, 13 May 2011, University of Western Australia, Perth, WA

Duke J, Wood F, Semmens J, Spilsbury K, Edgar D, Hendrie D, Rea S. *Burn injury hospitalisations for children under five years of age in Western Australia, 1983 to 2008.* 6th World Congress on Paediatric Burns, 20-23 August 2011, Zurich, Switzerland.

Duke J, Wood F, Semmens J, Edgar D, Spilsbury K, Willis A, Hendrie D, Rea S. *Rates of hospitalisations and mortality of older adults admitted with burn injuries in Western Australia from 1983 to 2008.* Australasian Epidemiological Association Conference 20-21 Sept 2011, Perth, WA.

Duke J, Wood F, Semmens J, Spilsbury K, Edgar D, Hendrie D, Rea S. *A 26-year population-based study of burn injury hospital admissions in Western Australia.* McComb Research Foundation Seminar 9<sup>th</sup> November 2011, University of Western Australia, Perth, WA.

Duke J, Wood F, Semmens J, Edgar D, Rea S. *Paediatric burn hospitalisations and readmissions for injury.* Child and Adolescent Health Research Symposium 19th-21st October 2011, Princess Margaret Hospital, Perth, WA.



Duke J, Wood F, Semmens J, Edgar D, Spilsbury K, Willis A, Hendrie D, Rea S. *Rates of hospitalisations and mortality of older adults admitted with burn injuries in Western Australian from 1983 to 2008* Curtin Health Innovation Research Institute Conference 24<sup>th</sup> November 2011, Curtin University, Perth WA.

Edgar D, Gabbe B, Bi-NBR Adult Long term outcomes project working party. *Bi-National Burns Registry Adult long-Term Outcomes cohort study- An overview*. Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Edgar DW. *Recent developments and future directions in acute burn rehabilitation and exercise therapy*. European Burn Association Bi-Annual Scientific Meeting in The Hague, Netherlands, September 2011 (Invited Speaker)

Edgar DW. *State of Rehabilitation Australia and New Zealand*. International Society of Burn Injuries Biennial Congress in Istanbul, Turkey, July 2010 (Invited Speaker)

Edgar DW; Phillips M; Wood FM. *Can we measure the global burden of burn injury?* International Society of Burn Injuries Biennial Congress in Istanbul, Turkey, July 2010

Edgar DW; Rea S; Wood FM. *Early ambulation after lower limb skin grafting: Demonstration of a positive impact on post-burn outcomes*. International Society of Burn Injuries Biennial Congress in Istanbul, Turkey, July 2010

Fear M. *The effect of non-severe burn injury on skeletal muscle*. Australasian Society for Dermatological Research, Annual Scientific Meeting, Perth, Western Australia May 2011. (Invited speaker).

Fear M, JRodgers J, Stevenson A, Rea S, Wood F. *The role of ephrin A2 in normal skin development and repair after injury*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Fear M, Haustead D, Rea S, Wood F, Wallace H. *The effect of ageing on the skin temperature*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Fear M. *The effect of ageing on the skin transcriptome*. 8<sup>th</sup> National Conference of the Australian Wound Management Association, Perth, March, 2010 (Invited speaker)

Finlay V, D.Wicaksono, D. Ching, S. Plowman, M. Phillips, D. Hendrie, G. Allison, S. Rea, F.Wood. *The use of an outcome- based nomogram in the management of minor burns*. Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Finlay V, Phillips P, Edgar D, Wood F. *Is the BSHS-B an effective measure of outcome from minor burn?* Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Finlay V, Rowe S, Wood F, Edgar D. *How does time to healing influence scar outcome as measured by the VSS in moderate burns?* Australian and New Zealand Burns Association Scientific Meeting in October 2010 (Invited Speaker)

Finlay V, Phillips M, Edgar D, Wood F. *Is the BSHS-B an effective measure of outcome from minor burn?* Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Finlay V, Rowe S, Wood F, Edgar D. *How does time to healing influence scar outcome as measured by the VSS in moderate burns?* Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Fong J, Edgar D, Wallace H, Wood F. *Making a difference for burn patients in the Bir Hospital burn unit in Kathmandu.* Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Grisbrook TL, Fairclough TP, Wallman K, Elliott C, Edgar DW, Wood F, Reid SL. *Exercise rehabilitation for adults with long term functional impairments following burn injury.* European Burn Association Bi-Annual Scientific Meeting in The Hague, Netherlands, September 2011

Grisbrook T, Fairclough T, Wallaam K, Elliott C, Edgar D, Wood F, Rea S. *Outcome of exercising training for adults with burn injury: A pilot study.* Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Honeybul, S. *Current management of raised intracranial pressure: Does reducing the number matter.* ANNA WA Branch seminar (21<sup>st</sup> August 2010)

Honeybul, S. *Brain injuries.* Operating room nurses association of Western Australia 43<sup>rd</sup> Annual conference (25<sup>th</sup> March 2011)

Honeybul, S. *The future of Decompressive Craniectomy for severe traumatic brain injury.* ANNA Symposium Perth (6<sup>th</sup> October 2011)

Honeybul, S. *Decompressive craniectomy: Ethical considerations.* Queensland Trauma symposium (3-4<sup>th</sup> November 2011)

Honeybul, S. *Updated results from the DECRA study.* Royal Perth Hospital Trauma Symposium (5<sup>th</sup> November 2011)

Honeybul, S. *The future of Decompressive Craniectomy for severe TBI and: Ethical considerations: Life saving but non restorative surgery.* Alfred ICU Trauma Symposium (5<sup>th</sup> December 2011)

Honeybul, S. *Decompressive craniectomy for trauma: Ethical considerations when performing life saving but non restorative surgery.* 3<sup>rd</sup> Queensland Statewide Trauma symposium. November 2010 (Keynote Speaker)

Honeybul S, Ho KM, Lind CRP. *World Outcomes of unilateral and bilateral decompressive craniectomy for severe neurotrauma: A population based study.* (Abstract Published in *Internal Medicine Journal* 2010, 40 suppl 1: 23.) Congress of Internal Medicine: Melbourne Australia (20 – 25 March 2010)

Honeybul, S. (i) *Long term outcome following Decompressive craniectomy for severe head injury: A population based study*  
(ii) *Neurotrauma and the Rub: Where Tragedy meets ethics and science.* NT, WA & SA combined 2010 Annual scientific meeting, Darwin August 2010

Honeybul, S. (i) *Ethical considerations when performing life saving but none restorative surgery for sever traumatic brain injury*  
(ii) *Access to reliable outcome prediction data influences clinical decision making*  
(iii) *Long term complications of decompressive craniectomy for head injury*. The Joint EANS Annual meeting – 4<sup>th</sup> ICH conference 2011. Newcastle UK (2<sup>nd</sup> – 5<sup>th</sup> May 2011)

Honeybul, S. *Long term outcome following decompressive surgery for severe traumatic brain injury*. British Trauma society, Manchester UK (4-6<sup>th</sup> May 2011)

Honeybul, S. *Opinion amongst anaesthetists regarding informed consent for decompressive craniectomy following severe TBI*. Combined Scientific meeting, Hong Kong (14<sup>th</sup> – 17<sup>th</sup> May 2011)

Honeybul, S. (i) *Neurotrauma and the Rub: Where tragedy meets ethics and science*  
(ii) *Severe traumatic brain injury: Obtaining consent for life saving but non restorative decompressive surgery*  
(iii) *Neurotrauma and the rule of rescue*  
(iv) *Decompressive craniectomy for severe traumatic brain injury: When does surgical intervention become futile?* Australian Association of Bioethics and Health Law, Gold Coast (7<sup>th</sup> July 2011)

Kvannli L, Edgar D, Finlay V, Wu A, Wood F. *Using the Burn Specific Health Scale – Brief as a measure of quality of life after burn injury – What score should clinicians expect?* Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Kvannli L, Edgar D, Finlay V, Wu A, Wood F. *Using the Burn Specific Health Scale – Brief as a measure of quality of life after burn injury – What score should clinicians expect?* Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Martin L, Wood F, Rea S. *Changes in the microbiological profile of paediatric scalds*. Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Martin L, Rea S, Rawlings J, McWilliams T, Wood F. *Paediatric scald injury in Western Australia: Past, present and future*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Martin L, Rea S, Rawlings J, McWilliams T, Wood F. *A clinical trial to investigate Biobrane wound dressings with /without Recell in paediatric scald injuries*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

McWilliams T, Byrne P, Rea S, Wood F, Darcy P. *The Princess Margaret Hospital for Children Burns Telehealth Service: A six year retrospective cost saving analysis*. Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

McWilliams T, Fong J, Rea S, Wood F, Byrne P. *Towards the integration of statewide clinical and educational burn telehealth services in WA*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Morellini N, Giles N, Rea S, Dunlop S, Beazley L, West A, Fear M and Wood F. *Single administration of metallothionein enhances wound healing following burn injury*. 2<sup>nd</sup> Meeting of the Australasian Wound and Tissue Repair Society, Perth, March 2010

Nessler M, Puchala J, Wood F, Nessler K, Drukala J. *The profile of inflammatory molecules concentration in patients after reconstructive procedure with Integra DRT.* Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Nessler M, Puchala J, Drukala J, Nessler K, Wood F. *Plasma profile of inflammatory cytokines and growth factors in response to Integra dermal regeneration template use for reconstructive procedures.* Surgical Research Society Annual Scientific Meeting, Royal Australasian College of Surgeons (RACS), Adelaide, Australia, November 2011

O'Neill, T, Bakker T, Pinniger G, Rea S, Wood F, Fear M. *The effect of non-severe burn injury on skeletal muscle.* Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

O'Neill T, Bakker A, Pinniger G, Viola H, Parkinson L, Stevenson A, Rea S, Wood F, Hool L and Fear M. *The Effect of Localised Burn Injury on Skeletal Muscle in a Mouse Model.* American Burn Association 43<sup>rd</sup> Annual Meeting, March 2011

Parkinson L, Poinern G, Rea s, Wood F, Fear M. *The effect of nano-porous architecture on skin cell behaviours and wound healing following a burn injury.* 2<sup>nd</sup> Meeting of the Australasian Wound and Tissue Repair Society, Perth, March 2010

Rawlings J, Wood F, Rea S. *Methamphetamine laboratory burn injuries.* Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Rawlings J, Rea S, Wood F. *Management of complex chemical burns following a mass casualty chemical plant.* Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Rogers SJ, Browne AL, Honeybul S. *Long Term Functional Outcomes of Traumatically Brain Injured Patients after Decompressive Craniectomy – Validation of a Predictive Model.* International Brain Injury Association World Congress Annual Scientific Meeting, Washington DC, United States. (2010)

Rogers SJ, Browne AL, Honeybul S. (2010). *Measuring Outcomes Following Decompressive Craniectomy after Traumatic Brain Injury: A Review of Existing Challenges and Identification of Future Targets.* Royal Australasian College of Surgeons Annual Scientific Congress, Perth, Western Australia (2010)

Tan A, Lum C, Lim J, Wood F. *Impact of surgery and pressure garment therapy on sensory and muscle function of burns.* Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Tuck J., Jonescu S. *A Trauma patient's nutritional requirements: overlooked, underestimated?.* Royal Perth Hospital Trauma Symposium; 5 November 2011; Perth, Western Australia.

Wallace H, Martin L, Rea S, Wood F. *Genetic markers of susceptibility to poor scar outcomes after burn injury.* Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Wallace H. *Genetic associations with venous ulceration & healing*. 79<sup>h</sup> Annual Scientific Congress of the Royal Australasian College of Surgeons, Perth, May, 2010 (Invited speaker)

Wicaksono D, Ching D, Finlay V. *Validation of an Outcome Based Nomogram to Predict Recovery from Burn Injury*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Wicaksono D, Ching D, Finlay V. *Validation of an Outcome Based Nomogram to Predict Recovery from Burn Injury*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Willis CE, Grisbrook TL, Elliott C, Wood F, Wallman KE, Reid SL. *Pulmonary function, exercise capacity and physical activity participation in adults following burn injury*. European Burn Association Bi-Annual Scientific Meeting in The Hague, Netherlands, September 2011

Willis A, Wood F, Carr S. *Prevention of burns in the elderly- Developing a framework for an education package*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Wood F. *Cell based therapies in burn wound healing*. Australian and New Zealand Burn Association Annual Scientific Meeting in Brisbane, October 2011

Wood, F. *Tissue engineering of skin past present and future*. European Paediatric Burns Club in Zurich in September 2011

Wood F. *The systemic response to skin injury*. 2<sup>nd</sup> Meeting of the Australasian Wound and Tissue Repair Society, Perth, March 2010 (Invited speaker)

Wood F. *The challenges of ensuring research is clinically relevant*. 8<sup>th</sup> National Conference of the Australian Wound Management Association, Perth, March, 2010 (Invited speaker)

Zellweger, René. *Pelvic Fractures*. Trauma Management Course. Royal Perth Hospital, Perth, 02 December 2011 (invited speaker)

Zellweger, René. *Upper Limb injuries*. Orthopedic Nurses Association. Shenton Park Campus, Perth, 18 November 2011 (invited speaker)

Zellweger, René. *Musculoskeletal Workshop*. WA State Trauma Symposium University of Western Australia, Perth, 05 November 2011 (invited speaker)

Zellweger, René. *Traumatic Limb Injuries: To amputate or not to amputate*. Australian College of Critical Care Nurses, 12<sup>th</sup> Annual Meeting, Pan Pacific Hotel, Perth, 22 May 2011 (invited speaker)

Zellweger, René. *Pelvic C-Clamp*. AO Course, Sydney, 18 – 19 March 2011 (invited speaker)

Zellweger, René. *How to read x-rays*. AO Course, Sydney, 18 – 19 March 2011 (invited speaker)

Zellweger, René. *Polytrauma – life-threatening situation*. Trauma Management Course. Royal Perth Hospital, Perth, 26 November 2010 (invited speaker)



Zellweger, René. *Trauma Training: our future workforce – have we got it right?* Interactive discussion panel. WA State Trauma Symposium. University of Western Australia, Perth, 06 November 2010 (invited speaker)

Zellweger, René. *Pelvic fractures*. Cambodian Society of Traumatology and Orthopedics, Annual Conference. Phnom Penh, Cambodia, 27 October 2010 (invited speaker)

Zellweger, René. *Traction*. Traction study morning. Royal Perth Hospital, Perth, 09 July 2010 (invited speaker)

Zellweger, René. *External Fixation*. Orthopaedic Nurses Association Study Day Shenton Park Campus Hospital, Perth, 21 May 2010 (invited speaker)

Zellweger, René. *Severe Pelvic Injuries - Application of a C-Clamp*. Royal Australasian College of Surgeons Annual Scientific Meeting. Convention Centre, Perth, 3 May 2010 (invited speaker)

Zellweger, René. *Fasciotomy*. Cutting Edge Advanced Procedures. University of Western Australia, Perth, 29 March 2010 (invited speaker)

## Publications

Agrawal N, Rao S, Rudd J. Reno-colic arterial fistula due to penetrating abdominal trauma. *ANZ Journal of Surgery*. 81; 5:400. May 2011

Agrawal N, Rao S, Ghanim K. Blunt trauma to horseshoe kidney. *ANZ Journal of Surgery*. 81; 1-2:103. January/February 2011 (Letter)

Agrawal N, Rao S, Robinson H. Forgotten presentation of extraperitoneal bladder rupture. *ANZ Journal of Surgery* 81;12:949-950. Dec 2011

Anderson JR, Fear MW, Phillips JK, Dawson LF, Wallace H, Wood FM, Rea SM. A preliminary investigation of the reinnervation and return of sensory function in burn patients treated with INTEGRA®. *Burns*. 2011 Nov;37(7):1101-8. Epub 2011 May 4.

Anderson JR, Zorbas J, Phillips JK, Harrison J, Dawson LF, Bolt S, Rea SM, Klatte JE, Paus R, Zhu B, Giles NL, Drummond PD, Wood FM, Fear MW. Systemic Decreases In Cutaneous Innervation After Burn Injury. 2010 *Invest Dermatol*. Jul;130(7):1948-51

Andrews RM, Browne AB, Wood FM, Schug SA. Predictors of patient satisfaction with pain management and improvement three months after burn injury. *Burns* 2011

Andrews RM, Browne AL, Drummond PD, Wood FM. The impact of personality and coping on the development of depressive symptoms in adult burn survivors. *Burns* 2010, 36 (1): 29-37.

Andrews RM, Browne AL, Drummond PD, Wood FM. The impact of personality and coping on the development of depressive symptoms in adult burns survivors. *Burns* 36 (2009) February

Baschera D, Sebunya J, Zellweger R (2011). Wer ist verantwortlich für die Entfernung von V.-cava-Filtern. *Unfallchirurg*, in press. Impact Factor: 0.56

Baschera D, Sebunya J, Walter C, Zellweger R (2010). Vena-Cava-Filter bei unfallchirurgischen Patienten. *Unfallchirurg*, 113:764-769 Impact Factor: 0.56

Baschera D, Sebunya JK, Zellweger R (2010). Inferior Vena cava filters in trauma patients: who is responsible for their removal? *Med J Australia*, 193(4), 245

Bauer S, Isenegger P, Gautschi O, Ho K, Yates P, Zellweger R (2010). Cemented Thompson versus cemented bipolar prostheses for femoral neck fractures. *Journal of Orthopaedic Surgery* 18(2):166-171

Broeze CL, Falder S, Rea S, Wood F. Burn disasters--an audit of the literature. *Prehosp Disaster Med*. 2010 Nov-Dec;25(6):555-9.

Burlinson CE, Wood FM, Rea SM. Patterns of burn injury in the preambulatory infant. *Burns* 2009 Feb;35(1):118-22.

Burston J, Isenegger P, Zellweger R (2010). Open total talus dislocation: clinical and functional outcomes: a case series. *J Trauma*, 68(6):1453-1458. Impact Factor: 2.342

Cadosch D, Thyer M, Gautschi O, Lochnit G, Frey S, Zellweger R, Filgueira L, Skirving A (2010)  
Functional and proteomic analysis of serum and cerebrospinal fluid derived from patients with traumatic brain injury: a pilot study. *ANZ J Surg*, 80(7-8):542-547. Impact Factor: 1.0

Cadosch D, Toffoli A, Gautschi O, Frey S, Zellweger R, Skirving A, Filgueira L (2010)  
Serum after traumatic brain injury increases proliferation and supports expression of osteoblast markers in muscle cells. *Journal of Bone and Joint Surgery*, 92(3):645-653. Impact Factor: 2.444

Corcoran TB, Mas E, Barden A, Durand T, Galano JM, Roberts LJ, Philips M, Ho KM, Mori TA. Are isofurans and neuroprostanes increased after subarachnoid hemorrhage and traumatic brain injury? *Antioxidants & Redox Signaling* 2011;15:2663-7.

Duke J, Wood F, Semmens J, Edgar DW, Spilsbury K, Hendrie D, Rea S. A study of burn hospitalizations for children younger than 5 years of age: 1983-2008. *Paediatrics*. 2011 Apr;127(4):e971-7. Epub 2011 Mar 7.

Duke J, Wood F, Semmens J, Spilsbury K, Edgar D, Hendrie D, Rea S. A 26-year population-based study of burn injury hospital admissions in Western Australia. *Journal of Burn Care & Research*, 2011; 32:379-386

Duke J, Wood F, Semmens J, Edgar D, Rea S. Trends in sunburn hospitalisations in Western Australia, 1983 to 2008. *Asia-Pacific Journal of Public Health*, 2011 doi: 10.1177/1010539511413459

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## Collaborative Studies

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## Case Reports

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## Awards

Awarded Best Poster Prize R Zellweger at the Singapore Trauma Conference 2011:  
Baschera D, Collopy D, Zellweger R. *Do patients receiving internal fixation of acetabular fractures need a prophylaxis against heterotopic ossification?*

## Posters

Berghuber A, Fong J, Edgar D, Wood F. *Development and implementation of paperless records for burn patients: A clinical and research tool*. Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

Chapman B, McWilliams T, Wood F. *Burn nurses learning needs analysis*. Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

Chapman B, McWilliams T, Wood F. *Retrospective audit of burn wound assessment documentation*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Edgar D, Rea S, Wood F. *Assessment of outcomes after mass casualty incidents: Can we shift the paradigm?* Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

Fong J, Wood F. *Measuring the adequacy of early burn management: A decade's difference*. Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

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Fong J, Wood F, McWilliams T, Rea S, Edgar D. *The Western Australian Wounds West Burns Module: an interactive resources for clinicians*. 2010 International Society for Burn injuries international Congress in Turkey, June 2010

Friend F, Rao S, Sieunarine K. *Vascular Trauma in Western Australia: An Epidemiological Study*. Singapore Trauma 2012 Conference

Grisbrook T, Stearne S, Reid S, Elliott C, Wood F. *Demonstration of the use of the ICF framework in detailing complex functional deficits post burn injury*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Rea S, Wood F, Giles N, Stevenson A, Fear M. *The role of bone marrow derived cells in the burn injury response- defining what happens to exogenously applied mesenchymal stem cells (MSCs)*. Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

Rawlings J, Rowe S, Wood F. *Does a burn injury represent a tetanus prone wound? Results from a national study*. Australian and New Zealand Burns Association Scientific Meeting in Darwin, October 2010

Rowe S. *Development of an information package to assist the transition of adolescents burnt as children to the adult health system*. Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

Rowe S, Kendell R, Harris R. *Nylon elastic tattoo arm sleeves-a cosmetic modification to improve compliance with wearing pressure garments*. Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

Wallace H, Thapa B, Bhatta R, Shresta M, Fong J, Edgar D, Wood F. *Collecting the burn data in Nepal: hospital and community data*. Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

Willis A, Wood F. *Do graduate nurses see burns nursing as a career pathway?* Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

Willis A, Wood F. *Collaboration between the Fire and Emergency Services of Western Australia and the State Adult Burn Unit in the improvement of Juvenile Fire Education Programs*. Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

Wood F, Giles N, Stevenson A, Rea S, Fear M. *Characterisation of the cell suspension harvested using ReCell kit*. Australian and New Zealand Burn Association annual Scientific Meeting in Brisbane, October 2011

### Submitted/Accepted for publication

Duke J, Wood F, Semmens J, Edgar D, Rea S. Repeat injury admissions experienced by a cohort of children younger than 15 years of age hospitalised for burn injury in Western Australia, 1983-2008. (submitted *World Journal of Paediatrics*, Dec 2011)

Duke J, Rea S, Semmens J, Edgar D, Wood, F. Long-term follow-up of the impacts on obstetric complications of trunk burn injuries sustained during childhood. *In Press*, accepted 14<sup>th</sup> Dec 2011, *Journal of Burn Care & Research*

Agrawal N, Rao S. A case of adrenal gland pseudoaneurysm in blunt abdominal trauma. Accepted for publication by *Indian Journal of Surgery* 2012

Agrawal N. Delayed presentation of left diaphragmatic hernia in a left thoraco-abdominal stab. Accepted for publication by *Indian Journal of Surgery* 2012

Agrawal N, Rao S. A Death associated with possible Propofol infusion syndrome. Accepted for publication in *Indian Journal of Surgery*. 2012

### Current studies

- Myocardial Contusion study (Nikhil Agrawal)
- Radiation exposure in major trauma patients RPH 2011 (James Flynn)
- Role of decho and thalium scans in myocardial contusions following blunt chest trauma, prospective study (Nikhil Agrawal)
- Retrospective analysis of diaphragmatic injuries, in a tertiary trauma centre (Nikhil Agrawal)
- Feasibility study to see if the Cosmed RMR Indirect calorimeter is an appropriate machine to use for a future pilot study (Jacqui Tuck/Sheryl Jonescu)

### Teaching

Burns Teams RPH and PMH. Burn Management for St. Johns Ambulance Orientation and Inservice

Honeybul, S. *Emergency Rural Surgery – Edith Cowan University (19 – 20<sup>th</sup> March 2011)*  
Emergency management of head injury and ethical considerations

Honeybul, S. *Emergency Rural Surgery – Edith Cowan University (27 – 28<sup>th</sup> February 2010)*  
Emergency management of head injury

Mead, H. *Trauma - An overview: Life behind the glass door*. Pharmacists, Royal Perth Hospital. 14 February 2012

Tuck J., *Dietetics and Trauma*. Curtin University Post Graduate in Dietetics Course; 15 March 2011, Perth, Western Australia (Also 2009/2010)



Tuck J., *Dietetics and Trauma*. Edith Cowan University Masters in Dietetics Course; 10 August 2011, Perth, Western Australia (Also in 2009/2010)

Tuck J. *Trauma Nutrition*. State Major Trauma Unit; 7 October 2011, Perth, Western Australia

Tuck J. *Traumatic Brain Injury and Nutrition*. Royal Perth Hospital Neurosurgery Ward; 14 November 2011 (multiple times 2009/2010)

Wood F Biotherapeutics Lecture: skin reconstruction and dermal equivalents

Wood F, Edgar D and Fong J. Bi-National Burns Registry -formulation of data base and ongoing contribution

Wood F and Rea S. (Keynote speakers). Bombs, Bullets and Blasts Courses held by Health Dept. WA

Wood F, Rea S, Edgar D, Fong J. Burn Management Programme for Regional, rural and remote WA Burn Education via Telehealth Video conference

Fong J. Clinical Stakeholders Forum, Dept of Health and Ageing

Wood F. Emergency Management of Severe Burns Courses held in Perth twice yearly

Burns Team. Emergency Nurses Course Sir Charles Gairdner Hospital

Fong J (Invited Speaker). Essentials of Burn Care Course

Fong J and the Burn Team. General burn management to industries and other health facilities as requested

Burn Team. Global Health short courses at UWA.

Wood F. International Society for Burns International database-contribution to database

Fong J, Wood J, Edgar D. Joanna Briggs Institute for Research Evidenced Based Practices for burns

Wood F, Edgar D, Fong J. RACS CCRISP course

Wood F, Rea S. Burns management at Trauma Nursing Course, RPH

Willis, A. Wound Management for Medical Students Annual Camp

Fong J (Invited speaker). Wound Management Course, Fremantle Hospital

Zellweger, René. Organisation of 3<sup>rd</sup> Internal Fixation Course. University of Health Science. Phnom Penh, Cambodia, 22 November 2011

Zellweger, René. Instructor CCRISP course. Flinders Medical Centre, Bedford, Adelaide, SA, 26 – 28 August 2011

Zellweger, René. Instructor AO Course. Sydney, 18 – 19 March 2011

Zellweger, René. Organisation of 2<sup>nd</sup> Internal Fixation Course. University of Health Science. Phnom Penh, Cambodia, 26 October 2010

Zellweger, René. Instructor CCrISP course. Flinders Medical Centre, Bedford, Adelaide, SA, 10 – 12 September 2010

## Projects

Tuck J., Hunter C. *Young Adult Hospital Menu*. Development of new food choices to improve acceptance of hospital food among young (15-40 year old) trauma patients;



## 17. Appendices

### Appendix i Monthly Quality Improvement Database Queries

| QI Query                                    | No of Fields | Patient Number Calculated                     |
|---|--------------|---|
| Abdo region not 4 or 6                      | 2            | Abdo region not 4 or 6 (count)                |
| Ambulance applicable but date/time no       | 4            | Ambulance applicable but date/time no (count) |
| Ambulance not applicable but date/time yes  | 4            | Number of patients data complete/month        |
| Blunt cause of trauma                       | 2            | Number of patients data complete/month        |
| C-spine region not 1                        | 2            | C-spine region not 1 (count)                  |
| Dialysis out date null                      | 2            | Dialysis out date null (count)                |
| Dispatch from ED is null                    | 2            | Number of patients data complete/month        |
| Ed Dispatch to ICU – LOS is null (minors)   | 4            | ED Dispatch to ICU (count)                    |
| Ed Dispatch to SMTUA – LOS is null (minors) | 4            | ED dispatch to SMTUA is null (count)          |
| External region not 6 (Abdo)                | 2            | External region not 6 (Abdo) - (count)        |
| External region not 6 (Burns)               | 2            | External region not 6 (Burns) - (count)       |
| External region not 6 (Chest)               | 2            | External region not 6 (Chest) _ (count)       |
| External region not 6 (Face)                | 2            | External region not 6 (Face) - (count)        |
| External region not 6 (Lower limb)          | 2            | External region not 6 (Lower limb) - (count)  |
| External region not 6 (Neck)                | 2            | External region not 6 (Neck) - (count)        |
| External region not 6 (Scalp)               | 2            | External region not 6 (Scalp) - (count)       |
| External region not 6 (Upper limb)          | 2            | External region not 6 (Upper limb) - (count)  |
| Extremities region not 5                    | 2            | Extremities region not 5 (count)              |
| FCI is null                                 | 1            | FCI is null                                   |
| L-spine region not 4                        | 2            | L-spine region not 4 (count)                  |
| Minors ISS > 15                             | 1            | Number of majors data complete on ISS (count) |

|                                    |   |  |
|------------------------------------|---|--|
| Mode of arrival                    | 2 | Number of majors data complete (count)     |
| Neck AIS not region 1 or 6         | 2 | Neck AIS not region 1 or 6 (count)         |
| Null ISS                           | 1 | Number of patients data complete           |
| Null values in trauma details      | 5 | Number of patients data complete           |
| Occupation code is null            | 1 | Number of patients data complete           |
| Penetrating cause of trauma        | 2 | Number of patients data complete           |
| Post ED null values                | 3 | Number of patients data complete           |
| Provider null values               | 6 | Provider null values (count)               |
| RPH ED null values (majors/minors) | 7 | RPH ED null values (majors/minors) (count) |
| Residential institution trauma     | 1 | Residential institution trauma (count)     |
| RPRH null values                   | 6 | RPRH null values (count)                   |
| Ready date and time                | 2 | Ready date and time (count)                |
| Safety device is null for MBA/MVA  | 1 | Safety device is null for MBA/MVA (count)  |
| Scoring null values                | 2 | Number of patients data complete           |
| Specialist area date/time null     | 4 | Specialist area date / time is null        |
| Specialist ED                      | 3 | Number of majors data complete (count)     |
| T-spine region not 3               | 2 | T-spine region not 3 (count)               |
| Vehicular cause details null       | 5 | Vehicle cause details null (count)         |
| Ventilation out date null          | 2 | Ventilation out date null (count)          |

*Appendix ii Health Regions of Western Australia (Department of Health – Government of Western Australia, 2007)*

**Metropolitan Hospital Services**

***North Metropolitan Area Health Service***

Sir Charles Gairdner Hospital  
Osborne Park Hospital  
Joondalup Hospital  
Swan Kalamunda Health Service  
King Edward Memorial Hospital for Women  
Graylands Selby-Lemnos and Special Care Health Service

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***South Metropolitan Area Health Service***

RPH / RPRH  
Armadale - Kelmscott Memorial Hospital  
Bentley Hospital  
Fremantle Hospital  
Peel Health Campus  
Murray District Hospital  
Rockingham General Hospital

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***Metropolitan Other***

Princess Margaret Children's Hospital

Metropolitan Private Hospitals

**Non Metropolitan Hospital Services**

***South West***

Augusta Hospital  
Boyup Brook Soldiers Memorial Hospital  
Bridgetown Hospital  
South West Health Campus (Bunbury Hospital)  
Busselton Hospital  
Collie Hospital  
Donnybrook Hospital  
Harvey Hospital  
Warren Hospital  
Margaret River Hospital  
Nannup Hospital  
Northcliffe Nursing Post  
Pemberton Hospital  
Yarloop Hospital

***Goldfields***

Coolgardie Health Centre  
Esperance District Hospital  
Kalgoorlie Regional Hospital  
Kambalda Health Centre  
Laverton District Hospital  
Leonora District Hospital  
Menzies Health Centre  
Norseman District Hospital  
Ravensthorpe District Hospital  
Varley Nursing Post

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***Kimberley***

Kununurra District Hospital  
Wyndham District Hospital  
Broome Hospital  
Derby Hospital  
Fitzroy Crossing Hospital  
Halls Creek Hospital

## Non-Metropolitan Hospital Services Cont'd

### *Wheatbelt*

Beverley Hospital  
Bruce Rock Memorial Hospital  
Boddington Hospital  
Cervantes Nursing Post  
Corrigin Hospital  
Cunderdin Hospital  
Dalwallinu Hospital  
Dumbleyung Memorial Hospital  
Goomalling Hospital  
Kellerberrin Memorial Hospital  
Kununoppin Health Service  
Kondinin Districts Health Service  
Kukerin Health Centre  
Lake Grace Hospital  
Merredin Health Service  
Moora Hospital  
Mukinbudin Nursing Post  
Narembeen Memorial Hospital  
Narrogin Hospital  
Northam Hospital  
Pingelly Hospital  
Quairading Hospital  
Southern Cross Hospital  
Wagin Hospital  
Wickepin Nursing Post  
Williams Nursing Post  
Wongan Hills Hospital  
Wyalkatchem-Koorda and Districts  
Hospital  
York Hospital

### *Great Southern*

Albany Regional Hospital  
Bremer Bay Health Centre  
Denmark District Hospital  
Gnowangerup District Hospital  
Jerramungup Health Centre  
Katanning District Hospital  
Kojonup District Hospital  
Plantagenet District Hospital  
Tambellup Nursing Post

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### *Pilbara*

Marble Bar Nursing Post  
Newman Hospital  
Nickol Bay Hospital  
Nullagine Community Health Service  
Onslow Hospital  
Paraburdoo Hospital  
Port Hedland Hospital  
Roebourne District Hospital  
Tom Price District Hospital  
Wickham Health Centre

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### *Midwest*

Carnarvon Hospital  
Coral bay Nursing Post  
Cue Health Centre  
Dongara Eneabba Mingenew Health  
Service  
Exmouth Hospital  
Geraldton Hospital  
Meekatharra Hospital  
Morawa Health Service  
Mount Magnet Health Centre  
Mullewa health service  
Northampton Kalbarri Health Service  
North Midlands Health Service  
Sandstone Nursing Post  
Yalgoo Health Service

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### *Non-Metropolitan Private Hospital*

### *Non-Metropolitan Other*

### *Interstate / Overseas*

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### **Appendix iii Injury and Abbreviated Injury Scale**

The Injury Severity Score (ISS) is a method of describing patients with multiple injuries and for evaluating emergency care. Developed by Baker et al., (1974), ISS provided “a valid description of the overall severity of injury in persons who have sustained injury to more than one area of the body”.

The ISS utilises Abbreviated Injury Scale (AIS) codes. These codes were developed by the American Association for Automotive Medicine and have been revised to produce the AIS-2005. The AIS assigns a 6-digit code to every injury. This code is based on the anatomical site, the nature, and severity of the injury. The last digit of the AIS code indicates the severity of the injury as listed below.

#### **Ais Severity**

1. Minor
2. Moderate
3. Serious, not life threatening
4. Severe, life threatening
5. Critical, survival uncertain
6. Maximum, fatal

NB: an additional code of 9 is utilised if the severity is unknown

The ISS is best described as the sum of the squares of the highest AIS code in each of the 3 most severely injured ISS regions.

#### **ISS Regions**

1. Head or neck (includes C-spine)
2. Face (includes eyes, mouth, nose and facial bones)
3. Chest (includes T-spine, diaphragm)
4. Abdominal or pelvic contents (includes L-spine)
5. Extremities or pelvic girdle (includes sprains, #, etc.)
6. External (includes lacerations, abrasions, burns etc.)

## Appendix iv Trauma Clinical Indicators and Audits

| 1.                 | Major Trauma Patients (ISS >15) Who Spend >3 Hours at a Referring Metropolitan Hospital Prior to Transfer to RPH  |
|--------------------|---|
| <b>Rationale</b>   | Major trauma patients (ISS>15) who require inter-hospital transfer to a Major Trauma Service should be transferred without delay. This indicator measures the length of time patients spend in the referring hospital (whether more than 3 hours)<br>The results of this PI will contribute to the measurement of the effectiveness of the development of a State Adult Major Trauma Service, in terms of the designated authority to coordinate and manage all major trauma referrals. |
| <b>Methodology</b> | <i>Numerator:</i> No. of major trauma patients (ISS >15) who spend > 3hrs at a referring metropolitan hospital x 100<br><br><i>Denominator:</i> No. of major trauma patients (ISS > 15) who are referred to RPH via a metropolitan hospital<br>Trauma Registry Database Query: <i>Clinical Indicator: Time Spent at Referring Metro Hosp &gt; 3hrs</i>  |
| <b>Definitions</b> | ISS : Injury Severity Score   |
| <b>Target</b>      | 20 %  |
| <b>Aim</b>         | Lower   |
| <b>Data Source</b> | RPH Trauma Registry Database  |

### Results:

| Year | CI Compliance Rate |
|------|--------------------|
| 2009 | 53/95 (55.8%)      |
| 2010 | 63/102 (61.8%)     |
| 2011 | 60/97 (61.8%)      |

NB Patients spending >24 hours at the referring Metropolitan Hospital, or where Time In or Time Out is Unknown (99:99), have been excluded from this indicator.

### Metropolitan Hospitals:

Armadale/Kelmscott Memorial Hospital  
 Fremantle Hospital  
 Joondalup Health Campus  
 Metropolitan Private Hospital  
 Peel Health Campus  
 Rockingham/Kwinana District Hospital  
 Sir Charles Gairdner Hospital  
 Swan District Hospital

## Appendix v Data Usage 2010 and 2011

| Topic  | Purpose  | Request From   | Date       |
|--|--|--|------------|
| Spinal Cord Injuries on Western Australian Beaches   | Ministerial  | Health Minister  | 02/03/2010 |
| Penetrating Neck Injuries  | Trauma Grand Round   | Dr Rahul Tipnis, Trauma Registrar  | 10/03/2010 |
| TBI Information  | Trauma Clinical Psychology SHRAC project   | Melanie Newton   | 21/04/2010 |
| List of major trauma presentations (ISS>15) week beginning 07/06/2010  | Confirmation of Major Trauma Presentations in relation to Critical Illness Study   | Ellen McDonald, ED Research Coordinator  | 24/06/2010 |
| Road trauma figures 2007-2009 inclusive  | Injury Prevention Initiative for the reduction of serious injury in relation to road trauma  | John Doak, Event and Project Consultant, Office of Road Safety                       | 14/05/2010 |
| Major Trauma Admissions August 1994 to December 2008 inclusive – WA Data Linkage Project 201006.01                   | Validation of the existing injury severity measuring instruments for the major trauma population admitted to RPH                       | Professor Ian Jacobs et al, School of Primary, Aboriginal and Rural Health Care, UWA | 06/07/2010 |
| Thoracotomy in ED and Theatre – 1998-2008  | Trauma Grand Round Presentation Fremantle Hospital   | Dr Anthony Mattick, Emergency Department Physician, Fremantle Hospital               | 14/07/2010 |
| Liver Injuries at Royal Perth Hospital for 2004 to 2008  | Trauma Grand Round Presentation Royal Perth Hospital   | Dr Rahul Tipnis, Trauma Registrar, Royal Perth Hospital                              | 15/07/2010 |
| Liver and Spleen Injuries  | Presentation at PSA meeting, Broom   | Dr Rahul Tipnis, Surgical Registrar Kalgoorlie Hospital                              | 30/07/10   |
| Metropolitan Traumatic Brain Injured patients (AIS ≥3) who arrived to RPH via Ambulance January 2004 to January 2009 | The Effectiveness of Airway Management in the Pre Hospital Treatment of Traumatic Brain Injury. (Masters Project)                      | Joe Cuthbertson Clinical Team Leader St John Ambulance Service                       | 09/08/2010 |
| Whole of database 1999 - 2008  | The Epidemiology, healthcare, utilisation, treatment pathways and patient outcomes for burn injuries in Western Australia, 1999 - 2008 | Prof Fiona Wood, Director, Burn Service of WA  | 10/08/2010 |
| Electrical Burns – whole of database   | Trauma Grand Round Presentation Royal Perth Hospital   | Dr Yen Teoh  | 12/08/2010 |
| Injuries to Carotid Artery comparing those with and without C-Spine Injury   | Internal Audit   | Dr Hemant Garg Trauma RMO  | 07/09/10   |
| Country trauma   | Presentation to SJA Officers   | Mr. S. Rao, Director of Trauma Services RPH  | 16/08/10   |
| Pedal cyclists   | Preliminary Report to investigate potential injury prevention recommendations  | Angela McDowall, Injury Prevention Research Nurse, RPH                               | 27/07/10   |
| Age of patients admitted to State Major Trauma Unit  | Dietary requirements of Trauma Patients  | Ms J. Tuck, Senior Dietician Trauma and Neurosurgery, RPH                            | 23/08/10   |

| Topic  | Purpose   | Request From   | Date       |
|--|---|--|------------|
| Splenic Injuries and Procedures before and during admission to RPH   | Trauma Grand Round Presentation Royal Perth Hospital  | Dr Amanda Foster, Surgical Registrar   | 25/08/10   |
| Number of stabbings 2009   | Internal haematology presentation   | Linda Campbell, Transfusion Audit Nurse  | 23/08/10   |
| Aortic injuries and associated info  | Internal audit of treatment of aortic injuries  | Dr Arwen Boyle, Cardiothoracic Surgery   | 4/8/10     |
| Number of spinal cord injuries 2008  | Part of poster presentation ANZICS/ACCCN conference   | Ms Maria Hopkinson ICU CNS   | 26/8/10    |
| Liver lacerations and contusions   | Post grad studies assignment  | Sing Hau Chih, RN, STU   | 26/08/10   |
| Chart review of trauma cases involving rectal trauma and see how this is being treated at Royal Perth Hospital, in view of formulating a treatment algorithm | Presenting as a poster or presentation and Annual Scientific Conference organised by Royal Australasian College of Surgeons in May 2011 | Dr Cecilia Wee, Surgical Registrar   |            |
| Trauma figures for 2003 to 2008  | Submission to Health Department for funding for PARTY program   | Ms A. McDowell, Co-ordinator PARTY program, RPH                                | 09/09/10   |
| Pre RPH providers for metropolitan major trauma  | Monitoring the trauma bypass for the State Trauma System  | Mr S. Rao, State Director of Trauma & Ms E. Plummer, Project Officer           | 09/09/10   |
| Vehicular trauma in the Indigenous population  | Presentation at RPH Trauma Symposium  | Ms. F. Coll  | 14/10/10   |
| Trauma Report Request  | Patient 11068657  | Glynis Porter, Trauma Registry Coordinator, Joondalup Health Campus            | 3/11/2010  |
| Trauma Report Request  | Patient 11066530, 11067123, 11067143  | Glynis Porter, Trauma Registry Coordinator, Joondalup Health Campus            | 5/11/2010  |
| Chest injuries 2008 – 2009   | Presentation at RPH Trauma Course   | Ms J. Storer, A/CNS Cardiothoracic & Vascular Surgery RPH                      | 04/11/2010 |
| Spinal injuries in those aged > 65 years   | Presentation at RPH Trauma Symposium  | Ms T. Douglas CNS Trauma Ward RPH & Ms S. Jenaway, CNS Orthopaedic Surgery RPH | 04/11/2010 |
| Trauma Report Request  | Patient 11066475  | Glynis Porter, Trauma Registry Coordinator, Joondalup Health Campus            | 22/11/2010 |
| Media Request  | 2009 Report data  | Awanews.com.au   | 16/12/2010 |
| Water related injuries   | Media release   | Ms. A. McDowall, PARTY Coordinator & Injury Prevention Research Nurse          | 13/01/11   |
| Trauma Admissions November 2010  | Emergency Department Documentation Audit  | Dr Cem Kibar, Emergency Department Specialist                                  | 17/01/2011 |
| Head injuries in vehicular trauma  | Potential research project  | Prof. R. Zellweger, Orthopaedic Consultant                                     | 03/02/11   |
| Splenic Trauma   | Presentation at Conference  | Dr Duncan Ramsay, Radiologist  | 03/02/2011 |



| Topic   | Purpose   | Request From  | Date       |
|---|---|---|------------|
| Pelvic & Renal trauma   | Presentation at Conference  | Dr Martin Marshall,<br>Consultant Radiologist,<br>RPH                                 | 14/02/11   |
| Bladder and Ureter Trauma                                     | Presentation at Conference  | Dr Martin Marshall,<br>Consultant Radiologist,<br>RPH                                 | 28/02/11   |
| Non-head injury admissions                                    | Paper   | Dr Allyson Browne   | 04/03/2011 |
| Ed Thoracotomy  | Presentation at Tongariro<br>Cardiac meeting in<br>Queenstown (25-27 March,<br>2011)  | Dr Pankaj Saxena,<br>Cardiothoracic<br>Surgery, Dunedin<br>Hospital, New Zealand      | 28/02/2011 |
| Quad bikes  | Media Release   | Maxine Burrell, Trauma<br>Programme Manager,<br>Jodie Pudney, RPH<br>Public Relations | 15/03/11   |
| 2009 Trauma Stats   | Anaesthetic Registrar<br>Presentation   | Dr Yvette Gainey,<br>Anaesthetic Registrar  | 15/03/11   |
| Patients with a pneumothorax<br>admitted to State Trauma Unit | Post Graduate Nursing<br>Studies assignment   | Ms Sally Hasson,<br>Clinical Nurse, State<br>Trauma Unit                              | 25/03/11   |
| Mediastinal Injuries  | Review of CT Thorax   | Dr Sudhakar Rao<br>Director Trauma<br>RPH   | 25/03/2011 |
| Major Trauma Patients admitted<br>January 2011                | Audit of radiation doses<br>in major trauma patients<br>presenting to RPH   | Dr James Flynn<br>Emergency Medicine<br>Specialist, RPH                               | 28/03/2011 |
| Minor Occupational Injuries                                   | Occupational Health & Safety<br>Lecture Chevron Engineers   | Dr Lynda Vine<br>ED Specialists, SCGH   | 04/04/2011 |
| ED Thoracotomies  | Trauma Grand Round<br>presentation  | Dr Thomas Redfern   | 06/04/2011 |
| Pedal Cyclist details   | Internal presentation within<br>Police Service  | Police Officer Dave<br>Carey  | 7/04/2011  |
| Patients with injuries from Quad bike<br>accidents            | Conference presentation   | Ms E. Herde, Australian<br>Centre for Agricultural<br>Health & Safety                 | 11/04/11   |
| Major haemorrhage in trauma – ISS<br>and operative data       | Conference Presentation:<br>“Haemostatic Resuscitation<br>in the Emergency<br>Department: How does<br>the introduction of a major<br>haemorrhage protocol<br>influence transfusion practice<br>for haemorrhagic shock?”<br>British Trauma Society,<br>Manchester, UK. May | Dr Johanna Wall<br>ED Consultant<br>Cardiff, UK                                       | 15/04/11   |
| Trauma details and ISS  | Audit of Major Haemorrhage<br>guidelines  | Ms A. Le Viellez,<br>Medical Scientist in<br>Charge, Transfusion<br>Medicine, RPH     | 20/04/11   |
| Patients with a pneumothorax<br>admitted to State Trauma Unit | Post Graduate Nursing<br>Studies assignment   | Ms J. Casan, Clinical<br>Nurse, State Trauma<br>Unit                                  | 21/04/11   |
| Water related injuries  | Journal article   | Dr H. Garg, Trauma<br>RMO, RPH  | 19/04/11   |
| Number of patients with Codman’s<br>and lowest GCS            | Update Traumatic Brain<br>Injury protocol for RPH ICU   | Dr Cyrus Edibam   | 03/05/11   |
| Spinal cord injuries  | Presentation to ACCCN<br>conference   | Ms Sheryl Jonescu,<br>Trauma Case Manager   | 04/05/11   |

| Topic  | Purpose   | Request From   | Date       |
|--|---|--|------------|
| Trauma Admissions (Major/ Minor) for 2010 who had consumed drugs/ ETOH around time of trauma; number admitted to ICU | Presentation at ACCCN Institute of Continuing Education Conference  | Ms Tracey Sinclair, CNC, RPH ICU   | 16/5/2011  |
| Annual Paraplegic and Quadriplegic trauma numbers  | Clarification of "catastrophic injury" for ICWA   | Neil Morfitt, Insurance Commission of WA   | 19/05/2011 |
| Head injuries & coagulopathy   | Trauma Grand Round  | Dr V. Riegler, ED Registrar, RPH   | 20/05/11   |
| Quad Bike Accidents  | Injury Prevention Media Release   | Ishani Hewage, Public Relations, RPH   | 14/06/2011 |
| All admissions 1996 to 2010 inclusive  | Demographic Exploration of Aboriginal Patients' Use of Trauma Services  | Dylan Galloghly, Clinical Psychologist, RPH  | 30/06/2011 |
| Head Injury Admissions 2011  | Emergency Department Neurotrauma Project  | Ellen MacDonald, Research Coordinator CCREM, RPH   | 11/07/2011 |
| # NOF Admissions 2008 – 2010   | Business Case, Clinical Services, RPH   | Sam Sng, Business Analyst, Surgical Division, RPH  | 12/07/2011 |
| Splenic injuries   | Audit   | Dr N. Agrawal  | 18/08/11   |
| Crush injuries and Rhabdomyolysis  | University assignment   | Ms S. Hasson, Clinical Nurse, Trauma Unit, RPH   | 09/08/11   |
| Concussion and DAI   | Trauma Grand Round  | Dr S. Sharpe, ED Registrar, RPH  | 19/08/11   |
| Vehicular trauma impact  | Office of Road Safety Data Quality Group – Road safety initiatives  | Claire Thompson, Chairperson, Data Quality Group, ORS  | 14/09/2011 |
| Daily Road trauma 2005 – August 2011   | Daily comparison with Police data definition for major crashes  | Matthew Legg, Office of Road Safety  | 05/10/2011 |
| Coagulopathy in ICU Trauma Patients  | University assignment   | Ms Robina Jenkionson   | 14/09/2011 |
| Quad bike injuries   | RPH "Surgical Spirit" newsletter article  | Ms A. McDowall, Injury Prevention Research Nurse, RPH Trauma Service                                 | 15/09/11   |
| Severe Acquired Brain Injury patients (AIS >2)   | Estimating numbers of cases of non-compensable Acquired Brain Injury using linkage between Third Party Insurance and Trauma records | Ms Di Rosman, Data Linkage Unit, DoH   | 23/09/2011 |
| Paediatric Trauma  | Australian overview of paediatric trauma for conference presentation in Toulouse, France  | Ella Scott, Co-Lead/ Manager Kim Oates Paediatric Simulation Centre, NSW                             | 06/10/2011 |
| Abdominal Crush Injuries   | Trauma Grand Round on Abdominal Compartment Syndrome  | Dr Claire Trythall, ED Registrar   | 07/10/2011 |
| Off Road injuries in the Lancelin area   | Examination of patterns and development of injury prevention strategies accordingly   | Jessamine Godsell, Senior Health Promotion Officer – Injury Prevention, Wheatbelt Public Health Unit | 04/11/2011 |
| Vascular Injuries - update   | Vascular trauma epidemiology in the last decade in WA (EC 2011/095)   | Dr Jikol Friend Vascular Surgery RPH   | 24/11/2011 |

| Topic   | Purpose  | Request From   | Date     |
|---|--|--|----------|
| Cause of trauma over Christmas period 2010                        | Presentation at Mining Company on safety at Christmas. | Mr. D. Jones, Senior Health Advisor, Rio Tinto Iron Ore                  | 25/11/11 |
| Machinery related injuries  | Surgical Division newsletter                           | Ms T. Montgomery, Injury Prevention Research Nurse, Trauma Services, RPH | 07/12/11 |
| Liver and splenic injuries complications and operative management | Policy development                                     | Dr Roshan Nair, Trauma Registrar, RPH                                    | 25/11/11 |
| Diaphragmatic Injuries  | Update presentation                                    | Dr Nikhil Agrawal  | 25/11/11 |
| Water-related injuries and water-related spinal injuries          | Media release  | Ms T. Montgomery, Injury Prevention Research Nurse, Trauma Services, RPH | 13/12/11 |
| Spinal injuries and MVA's / MBA's                                 | Media release  | Ms T. Montgomery, Injury Prevention Research Nurse, Trauma Services, RPH | 15/12/11 |
| Thoracic aorta injuries and vascular surgical requirements        | Presentation to Vascular Surgeons meeting              | Prof Mwiipetayi  | 05/12/11 |

