Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital

2012 Trauma Report

Alberta Trauma Registry

Alberta Health Services

Stollery Children's Hospital

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DIRECTORS MESSAGE

Attached please find the Edmonton Trauma Program's 2012 report regarding the 1490 severely injured patients treated within Edmonton. Edmonton provides trauma services for not only Northern Alberta, but parts of Northern BC, Northern Saskatchewan and the NWT.

Management of severely injured patients is a true testament to medical multidisciplinary and interdisciplinary working, not only within but between hospitals. These patients challenge our system in all aspects from the prehospital world, smaller regional centres, larger tertiary care centres, through to rehab facilities. Over the years the organized and collaborative workings in management of our severely injured throughout Northern Alberta has only gotten stronger. Ultimately we wish to see Alberta's injury burden diminish. Alberta's Provincial Trauma Committee, through strong connections with the Alberta Centre for Injury Control & Research, is working towards such. ACICR is realizing positive steps in promoting ATV safety, booster seat safety for children, amongst other initiatives.

This report provides just a small snapshot of the rich information available from the Alberta Trauma Registry. Requests for further information are welcome.

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1.0 EXECUTIVE SUMMARY

The Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital 2012 Trauma Report includes information on the epidemiology, process of care, and outcomes of major traumatic injuries (Injury Severity Score ≥12) for the patients admitted to a trauma centre in the Edmonton Zone.

This report focuses on the 1490 major trauma patients treated at the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospitals' as Alberta Health Services' trauma centres during the January 1, 2012 – December 31, 2012 calendar year. Unless otherwise stated, the following information is specific to the 2012 calendar year:

There were 1490 major trauma cases (ISS ≥12) admitted to these three trauma centres in the Edmonton Zone.

Of these major trauma patients, 53.5% (n=798) were injured within the Edmonton zone.

- The three leading mechanisms of injury for major trauma were, Transportation Related (46.6%, n= 694), Falls (30.7%,n= 458), and Interpersonal Violence (12.3%, n=184). **pg 20, 26 & 27 respectively**
- Overall, males accounted for 73.9% (n=1101) of the major trauma cases. **pg 13**
- The busiest months for major trauma admissions were August and September (n=152, and n= 162, respectively). **pg 14**
- The highest number of injuries occurred between the hours of 1600 hr and 1959hr (n= 314). **pg 16**
- Most major trauma, 43.3% (n=645), occurred on the street, while 24.8% (n=370), occurred at home. **pg 17-19**
- The leading cause of major trauma was 'transport related incidents', encompassing 46.6% (n=694) of all cases. **pg 20**
- Roughly 37.4% (n=139) of the occupants of passenger vehicles involved in motor vehicle traffic incidents (E-codes 810-819.9) were not using a safety restraint device at the time of injury. **pg 22**
- The number of major trauma cases admitted due to injuries caused by 'motor vehicle non-traffic incidents' (E-codes 820-825.9) was 124 cases (8.3%). **pg 22**
- Among riders of all-terrain vehicles (ATV), 57.7% (n= 41/71) of the persons injured were not wearing a helmet. **pg 25**
- Motorcyclists had the highest helmet use with 88.4% (n= 69/78) of patients wearing a helmet. **pg 25**
- Of the 1434 major trauma patients(over the age of 10), 72.0% (n=1032) were tested for alcohol levels upon arrival at an Alberta Health Services Edmonton Zone trauma centre, of these 1032, 35.1% (n=362) tested positive. **pg 29**
- Work-related injuries comprise 9.9% (n=148) of the total injuries admitted to Alberta Health Services Edmonton Zone trauma centre. **pg 29**
- The leading causes of work related injuries are falls n= 58 (39.2%), followed by transportation related incidents n= 37 (25.0%). **pg 29**
- Of the 893 major trauma patients with a head injury, 71.1% (n=635) of these were classified as severe (AIS ≥ 4). **pg 32**
- Fifty two percent, 52.8%, (n=787) of the major trauma patients were admitted directly to an Alberta Health Services Edmonton Zone trauma centre from the scene of injury while 47.2% (n=703) were transferred from another facility. **pg 32,33 & 34**

- After leaving the Emergency Department, 66.5% (n=961) of the major trauma patients were admitted as inpatients to a hospital ward (i.e. trauma unit, orthopedic units, general surgical unit), 16.0% (n=232) were admitted directly to an Intensive Care Unit (ICU), 13.5% (n=195) went directly to the operating room and 1.1% (n=16) went to the Burn Unit. **pg 35**
- The average length of stay in the Emergency Department varies according to severity of injury, type of injury and post Emergency Department destination. The median Emergency Department length of stay for all patients was 6 hrs and 28 minutes. **pg 36**
- At some time during their treatment, 27.6% (n=412) of the major trauma patients required specialized care in an intensive care unit. **pg 37**
- The median ICU length of stay (all ICU admissions) was 5 days, the range was 1-118 days. **pg 37**
- Of the 1490 trauma patients 44.9% (n=669) required at least one visit to the operating room. **pg 38**
- The median Trauma Centre length of stay was 6 days; the range was 0-407 days. **pg 38**
- Of the 1490 major trauma patients admitted to an Alberta Health Services Edmonton Zone trauma centre, 11.1% (n=166) died. **pg 39**
- More than half, 68.2% (n=903) of the major trauma cases were discharged home, 14.5% (n=216) were discharged to another acute care facility and 8.1% (n=120) were referred to a rehabilitation facility. **pg 39**

2.0 GOALS OF THIS REPORT

- To examine the epidemiology of major (ISS $\geq$12) traumatic injuries treated at the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital
- To disseminate information about major trauma admissions at the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital
- To facilitate provincial and regional comparisons
- Support and evaluate injury and prevention/control programs
- To facilitate legislative changes in support for healthy public policy
- Increase awareness of injury as a major public health problem

3.0 METHODOLOGICAL NOTES

Data Source

The Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital 2012 Trauma Report consists of information on patients hospitalized with major trauma in the calendar year January 1st to December 31st, 2012.

A major trauma case is included in this report if and only if it fulfills the following criteria:

- Has an Injury Severity Score (ISS) $\geq$12.
- Has an International Classification of Disease External Cause of Injury Code (E-Code) that meets the definition of trauma. The E-code system allows the classification and analysis of environmental events, circumstances, and

conditions as the cause of injury. Trauma is defined as an injury resulting from the transfer of energy, e.g. kinetic, thermal.

Population of the Report

As of April 1, 1995, the Alberta Trauma Registry has entered and analyzed information on severely injured patients seen at a trauma centre. It is essential, however, to consider that this data set represents only a portion of the injured people treated in the Edmonton Zone.

The data set includes trauma patients treated at the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital, in Edmonton, Alberta.

This data set does not include the following:

- People admitted to a trauma centre with an Injury Severity Score (ISS) <12
- People who die at the scene of injury
- People with injuries treated anywhere other than a trauma centre

4.0 DEFINITIONS

Abbreviated Injury Scale or Abbreviated Injury Score (AIS): A numerical scale ranging from 1 (minor injury) to 6 (virtually un-survivable injury). Scores are subjective assessments of the severity of injury, assigned to specific anatomical diagnosis by trauma experts.

Blunt Injury Type: Refers to the type of injury reflecting the cause of injury (i.e. a motor vehicle collision, a blow to the head). Blunt injury may include deep lacerations but does not include any injury in which a missile such as a knife or bullet enters the body.

Collector: Specialized software from Digital Innovation, Inc., used by all participating trauma registries to collect pre-hospital demographics, nature, and cause of injury, and follow up information on severely injured patients.

External Cause of Injury Codes (E-codes): Based on the International Classification of Diseases (ICD-9th revision). These codes allow for the classification and analysis of environmental events, circumstances, and conditions as the cause of injury. All reports are based on the first recorded E-code, unless otherwise specified.

ICD (International Classification of Diseases): The International Classification of Diseases is a World Health Organization's (WHO) publication that classifies morbidity and mortality information for statistical purposes, and for the indexing of hospital records by disease and operations, for data storage and retrieval. ICD manuals may be found in hospital Health Record Departments or in public libraries.

In-Hospital Death: An admitted patient, who dies during their hospital stay after admission. This includes those patients who are dead on arrival (DOA) or who die in the Emergency Department (DIE).

Injury Severity Scale or Injury Severity Score (ISS): The Injury Severity Score is an internationally recognized scoring system developed to assign a level of severity to an injury. As an extension of the Abbreviated Injury Scale (AIS); it is the sum of squares of

the highest AIS score in each of the three most severely injured body regions. The ISS is scored 1 (minor) to 75 (major) with a higher score indicating increased severity and mortality.

Length of Stay (LOS): Total number of hospital days as calculated from the date of admission through to the date of discharge or death.

Major Trauma Patient: A person admitted to a trauma centre for treatment of an injury with an ISS ≥12.

Median: A measure of central tendency of a set of observations; it is the 50th percentile (the point above and below which 50% of the data fall).

Motor Vehicle: Any mechanical or electronically powered device, not operated on rails which any person or property may be transported or drawn, operating on a public roadway or highway.

Motor Vehicle Non-Traffic Incident: Any motor vehicle incident that occurs entirely in any place other than public highway or roadway.

Motor Vehicle Traffic Incident: Any motor vehicle incident that occurs entirely on a public highway or roadway.

Other Road Vehicle Incident: Any incident involving a transportation device, other than a motor vehicle, which can transport a person or property on a public roadway or highway (example: animal-drawn vehicles; animals carrying a person; pedal cycles, etc.)

Pedal Cycle Incident: An incident that involves a pedal cycle, but not a motor vehicle.

Penetrating Injury Type: Refers to an injury caused by a missile entering the body. Missiles include bullets, knives, and items such as pieces of sharp glass or metal.

Trauma: Injury resulting from the transfer of energy further defined in accordance to the Canadian National Trauma Registry parameters as blunt or penetrating injuries and burns included in the International Classification of Diseases (ICD 9-CM), external cause of injury codes (E-codes) 800-998.
Note: Poisonings, certain types of immersion, thermal, and exposure injuries are not included in this report as they fall outside the National Trauma Registry parameters for trauma.

Transport Incident: Any incident (E800-E848) involving a device designed primarily for, or being used at the time primarily for, conveying persons or goods from one place to another. In classifying incidents which involve more than one kind of transport, the following order of precedence of transport incidents should be used: aircraft and spacecraft, watercraft, motor vehicle, railway, other road vehicles.

Trauma Centre: Institution that is equipped and committed to providing specialized care to trauma patients. The Alberta Health Services Edmonton Zone trauma centres included in this report are:

- Royal Alexandra Hospital, Edmonton
- University of Alberta Hospital, Edmonton
- Stollery Children's Hospital, Edmonton

5.0 MAJOR TRAUMA CASES

From January 1, 2012 to December 31, 2012, there were 1490 patients who were seriously injured and treated at an Alberta Health Services Edmonton Zone Trauma Centre. 53.5% (n= 798) were from the Edmonton zone, while 41.3% (n=615) were transferred from another zone within Alberta, and 5.2% (n=77) were transferred from outside Alberta.

5.1 HEALTH ZONE OF INJURY IN 2012

Table 1: Health Zone of Injury in 2012

North Zone = (n= 401) 27.0%
(Zone 5)

Edmonton Zone = (n 798=) 53.5%
(Zone 4)

Central Zone = (n= 212) 14.2%
(Zone 3)

Calgary Zone = (n= 2) 0.1%
(Zone 2)

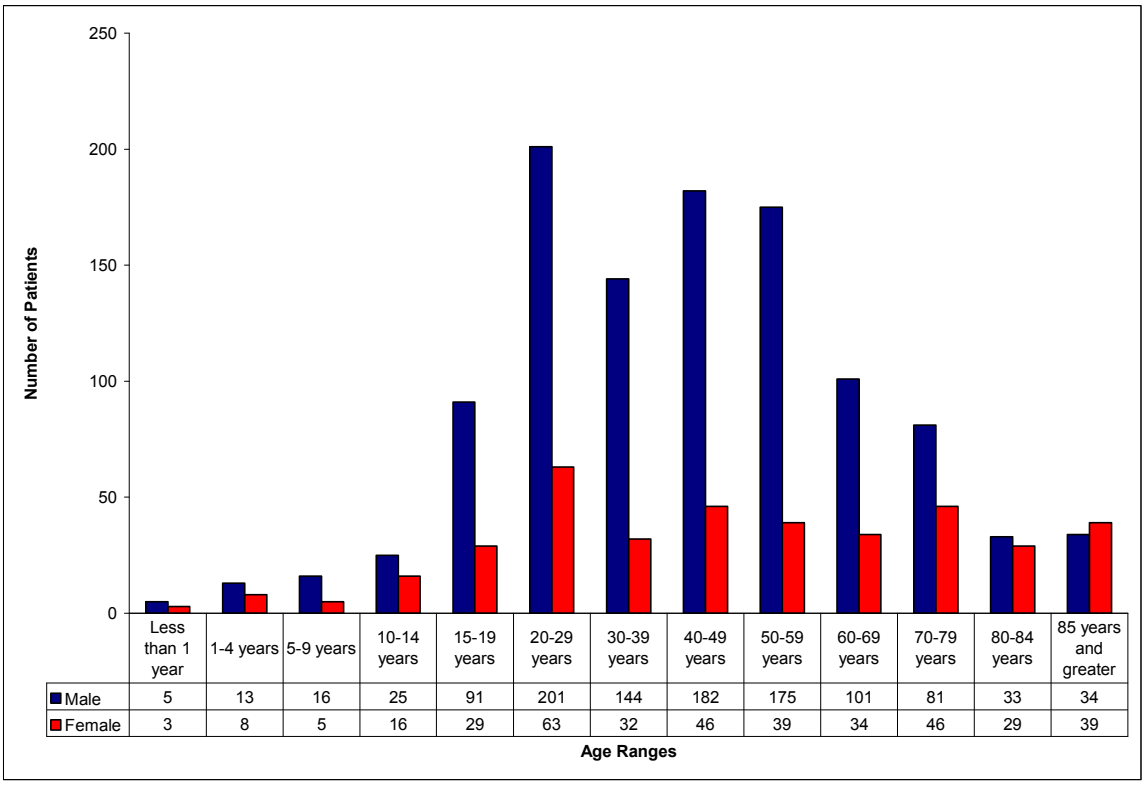
South Zone = (n=0) 0%
(Zone 1)

Out of Province = (n= 77) 5.2%

5.2 AGE AND GENDER

Figure 1 displays the age and gender distribution of major trauma admissions to the Alberta Health Services Edmonton Zone Trauma Centres during 2012. Males accounted for 73.9% (n= 1101) of the major trauma cases. Males ages 20-29 years old had the largest incidents of major trauma with, 13.5% (n= 201).

Figure 1: Trauma by Age and Gender



	Less than 1 year	1-4 years	5-9 years	10-14 years	15-19 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80-84 years	85 years and greater
Male	5	13	16	25	91	201	144	182	175	101	81	33	34
Female	3	8	5	16	29	63	32	46	39	34	46	29	39

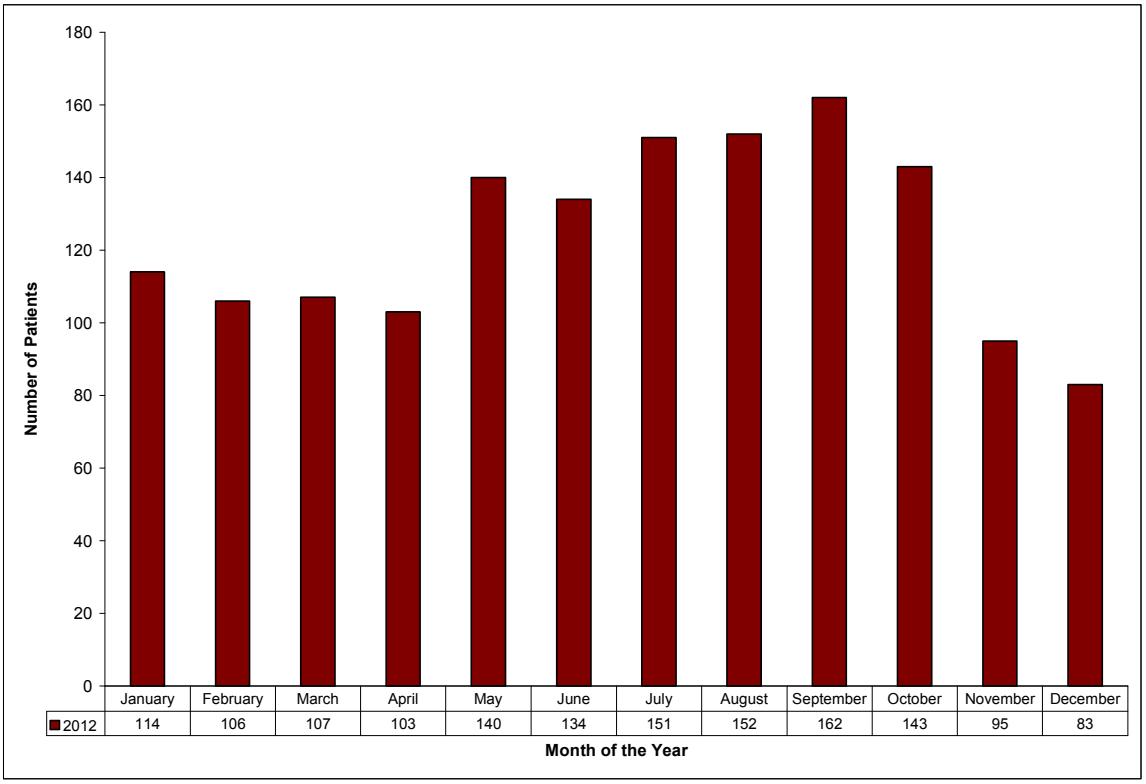
5.3 MAJOR TRAUMA BY TRAUMA CENTRE

Major trauma patients are treated at one of the three trauma centres within the Edmonton Zone. Children, 16 years of age and under, who experience major trauma, are treated at the Stollery Children's Hospital (Stollery). Patients aged 17 years and over are treated at either the Royal Alexandra Hospital (RAH) or the University of Alberta Hospital (UAH). In 2012, 57.3% (N=854) of adult trauma patients were treated at the University of Alberta Hospital while 34.7% (N=517) were treated at the Royal Alexandra Hospital. Pediatrics accounted for 8.0% (N=119) of major trauma and they were all treated at the Stollery Children's Hospital.

5.4 TRAUMA CASES BY MONTH OF YEAR

Figure 2 shows the distribution of major trauma by month. During the 2012 calendar year, September had the highest incidents of major trauma, with 10.9% *(*n=162*)* of the total year's trauma. This was followed by August with 10.2% (n= 152) and July with 10.1% (n= 151).

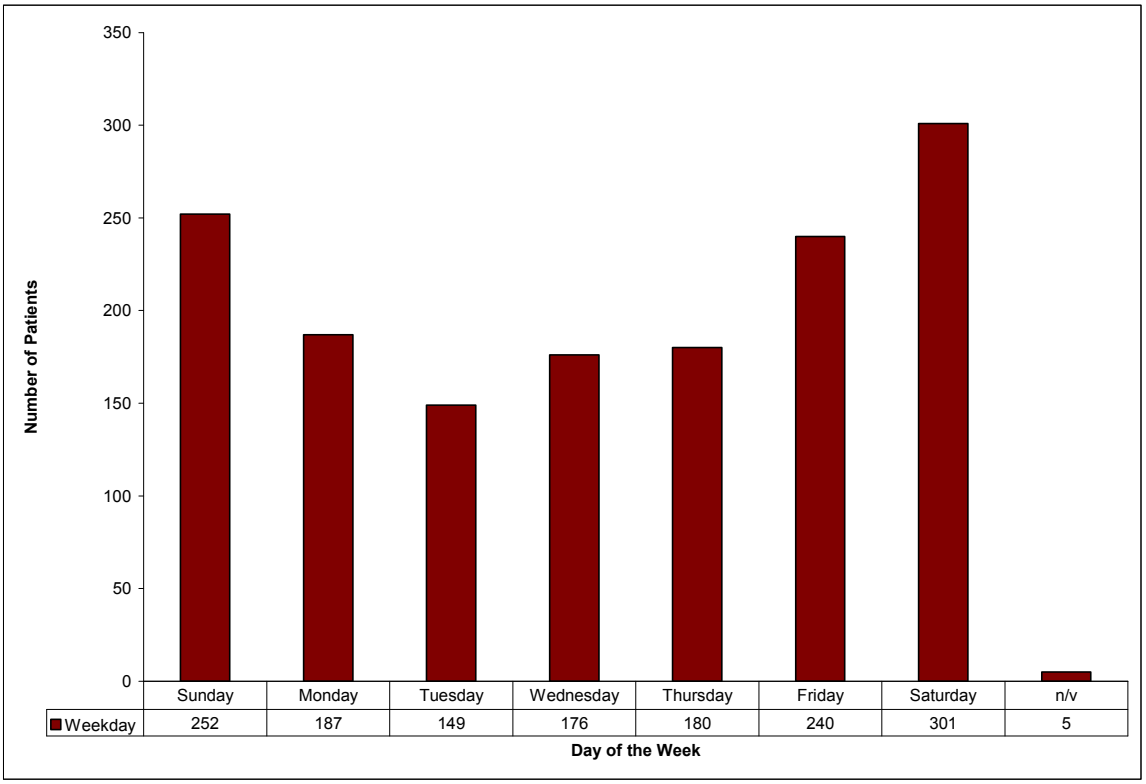
Figure 2: Major Trauma Cases by Month



5.5 TRAUMA CASES BY DAY OF THE WEEK

Figure 3 shows during the 2012 calendar year, 20.2% (n=301) of the major trauma cases occurred on a Saturday, followed by Sunday with 16.9% (n=252) of all cases.

Figure 3: Major Trauma by Day of the Week

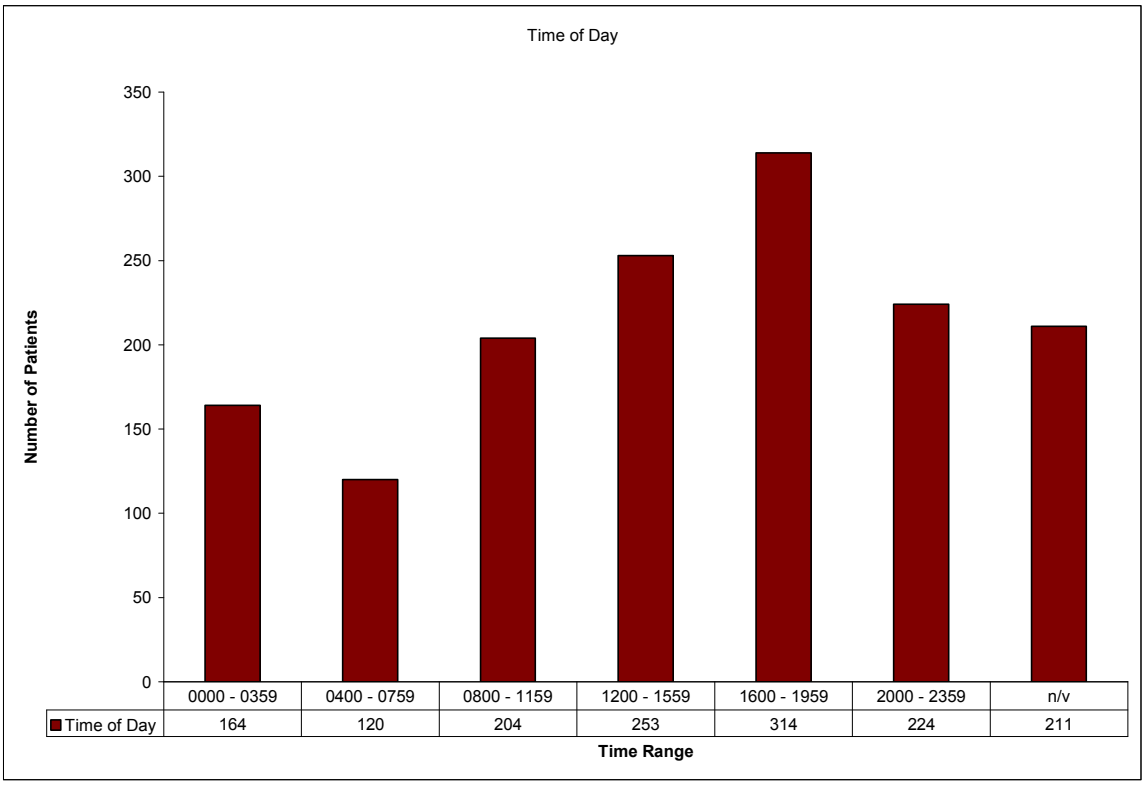


**Note: for 5 patients the day of the week of injury was unknown

5.6 TRAUMA CASES BY TIME OF DAY

For the 2012 calendar year, most major trauma injuries (21.1%) occurred between 1600h-1959h (n=314) followed by 1200-1559h with 17.0% (n=253). **Figure 4** shows the distribution of injury events by the time of day.

Figure 4: Major Trauma Cases by Time of Day



**Note: for 211 patients the time of injury was unknown

6.0 PLACE OF INJURY E-849X CODE

The street was the most common place for a major trauma to occur with 43.3% (n=645) of all injuries. This was followed by home, with 24.8% (n=370). **Table 2** shows the distribution of major traumas according to the place of injury (E-849 X Code).

Table 2: Cause and Place of Injury E-849X Code in 2012

	Home	Farm	Mine	Industry	Recreational	Street	Public Building	Residential Institution	Other	Unspecified	**Total**
Railway Accident **(800 – 807.9)**	0	0	0	0	0	0	0	0	4	0	**4**
Motor Vehicle Traffic **(810 – 819.9)**	2	0	0	0	0	503	3	0	5	0	**513**
Motor Vehicle Non-traffic **(820 – 825.9)**	1	4	0	0	14	17	0	0	88	0	**124**
Pedal Cycle **(826 – 826.9)**	1	0	0	0	1	23	0	0	3	0	**28**
Other Road Vehicle **(827 – 829.9)**	1	10	0	0	7	1	0	0	10	0	**29**
Water Transport **(830 – 838.9)**	0	0	0	0	0	0	0	0	1	0	**1**
Air & Space Transport **(840 – 845)**	0	0	0	1	0	0	0	0	4	0	**5**
Vehicle Accident NEC **(846 – 848)**	0	0	0	0	0	0	0	0	0	0	**0**
Falls **(880 – 888.9)**	241	6	0	46	16	37	35	47	23	7	**458**
Fire & Flame **(890 – 899)**	8	0	0	5	0	1	0	0	0	0	**14**
Natural or Environmental Factors **(900 – 909.9)**	0	6	0	2	0	0	1	0	1	0	**10**

	Home	Farm	Mine	Industry	Recreational	Street	Public Building	Residential Institution	Other	Unspecified	**Total**
Drowning & Suffocation **(910 – 913.9)**	2	0	0	0	2	0	0	0	1	0	**5**
Foreign Body **(915)**	1	0	0	0	0	0	0	0	0	0	**1**
Struck /Caught in/by Object /Overexertion **(916- 918,927)**	11	4	0	13	14	1	3	0	5	0	**51**
Caused by Machinery **(919 – 919.9)**	1	2	0	8	0	0	0	0	0	0	**11**
Cutting/Piercing **(920-920.9)**	0	0	0	0	0	0	0	0	0	0	**0**
Explosives/Firearms **(921 – 923.9)**	0	0	0	5	0	0	0	0	0	0	**5**
Hot Substance/Object or Electric Current **(924 – 925.9)**	2	0	0	1	0	0	0	0	0	0	**3**
Suicide/Self Inflicted **(950-959**)	27	0	0	0	1	3	2	1	0	0	**34**
Homicide & Assault **(960-969.9)**	70	1	0	0	2	55	31	2	15	8	**184**
Legal Intervention **(970 – 978)**	1	0	0	0	0	2	1	0	0	1	**5**
Undetermined if accidental or Self Inflicted **(980 – 989)**	1	0	0	0	0	2	2	0	0	0	**5**

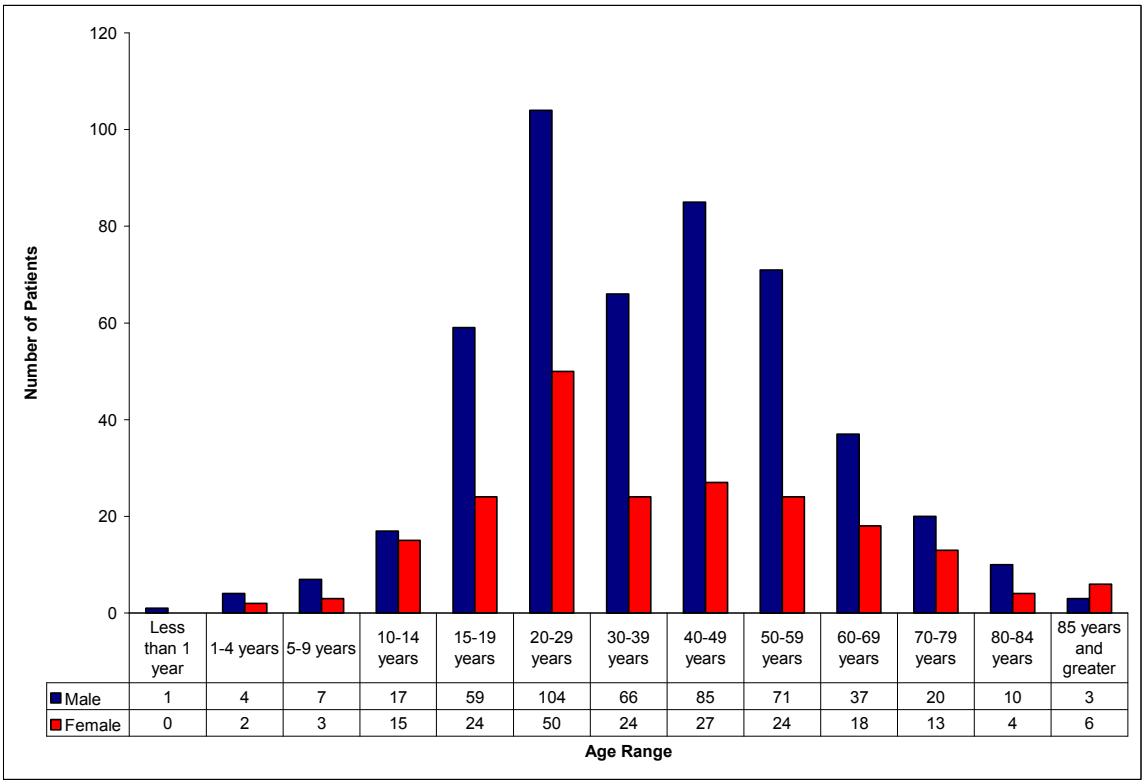
	Home	Farm	Mine	Industry	Recreational	Street	Public Building	Residential Institution	Other	Unspecified	**Total**
Operations of war **(990 – 999)**	0	0	0	0	0	0	0	0	0	0	**0**
Not Valued	0	0	0	0	0	0	0	0	0	0	**0**
Totals	370	33	0	81	57	645	78	50	160	16	**1490**

These numbers are included in the Top 3 causes of major trauma at the Alberta Health Services Edmonton Zone Trauma Centres.

7.0 TRANSPORTATION INCIDENTS: E-CODE 810 – 829.9

For major trauma treated at Alberta Health Services Edmonton Zone trauma centres, the primary mechanism of injury was transportation related. Transportation incidents are defined as involving any device designed primarily for, or being used primarily for conveying persons or goods from one place to another. For 2012, 46.6 % (n=694) of all major trauma cases were due to this cause. Males accounted for 69.7% (n=484) of the major trauma cases due to transportation incidents, while Females accounted for 30.3% (n=210).

Figure 5: Transportation Incidents by Age Group and Gender



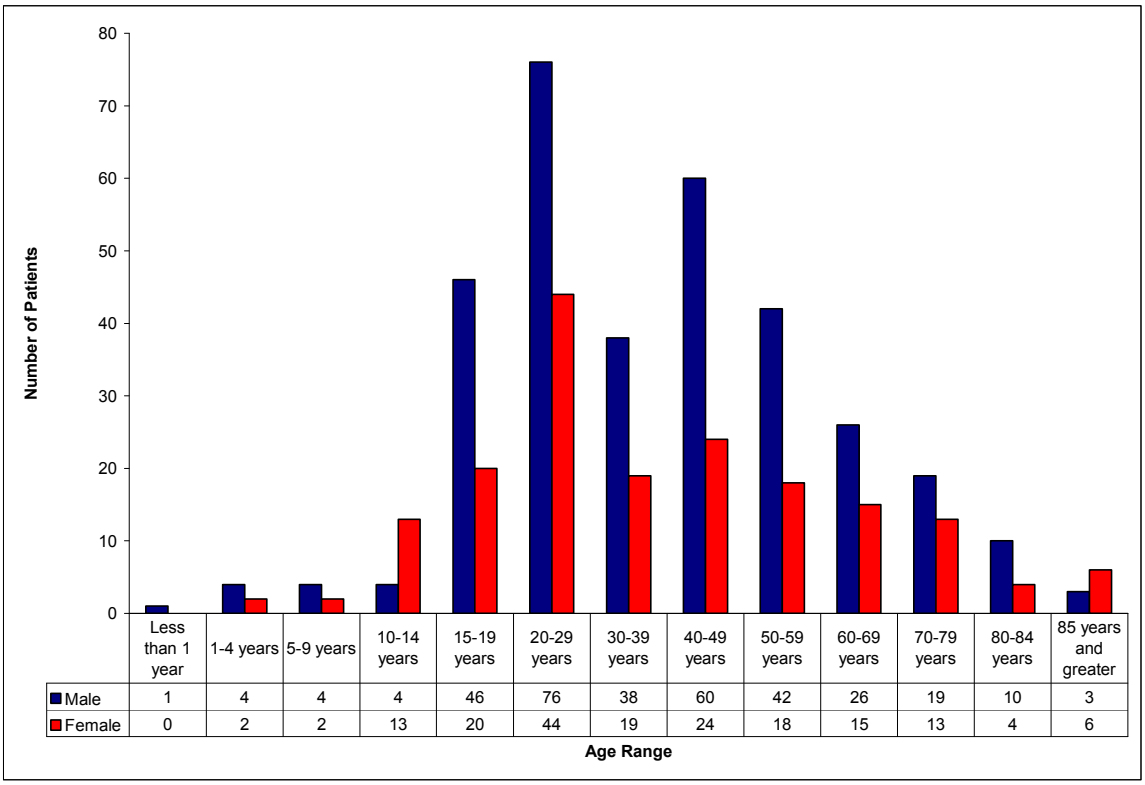
	Less than 1 year	1-4 years	5-9 years	10-14 years	15-19 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80-84 years	85 years and greater
Male	1	4	7	17	59	104	66	85	71	37	20	10	3
Female	0	2	3	15	24	50	24	27	24	18	13	4	6

8.0 MOTOR VEHICLE TRAFFIC INCIDENTS: E-CODE 810-819.9

Motor vehicle traffic incidents that occurred entirely on public highways or roads, accounted for 34.4% (n=513) of the major traumas admitted to an Alberta Health Services Edmonton zone Trauma Centre in 2012.

Males accounted for 64.9% (n=333) of motor vehicle traffic incidents. The 20 – 29 year age range accounted for the highest incident in both males and females at 22.8% (n=76) and 24.4% (n=44) respectively. **Figure 6** demonstrates Motor Vehicle Traffic Incidents by age and gender.

Figure 6: Motor Vehicle Traffic Incident by Age and Gender 2012



	Less than 1 year	1-4 years	5-9 years	10-14 years	15-19 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80-84 years	85 years and greater
Male	1	4	4	4	46	76	38	60	42	26	19	10	3
Female	0	2	2	13	20	44	19	24	18	15	13	4	6

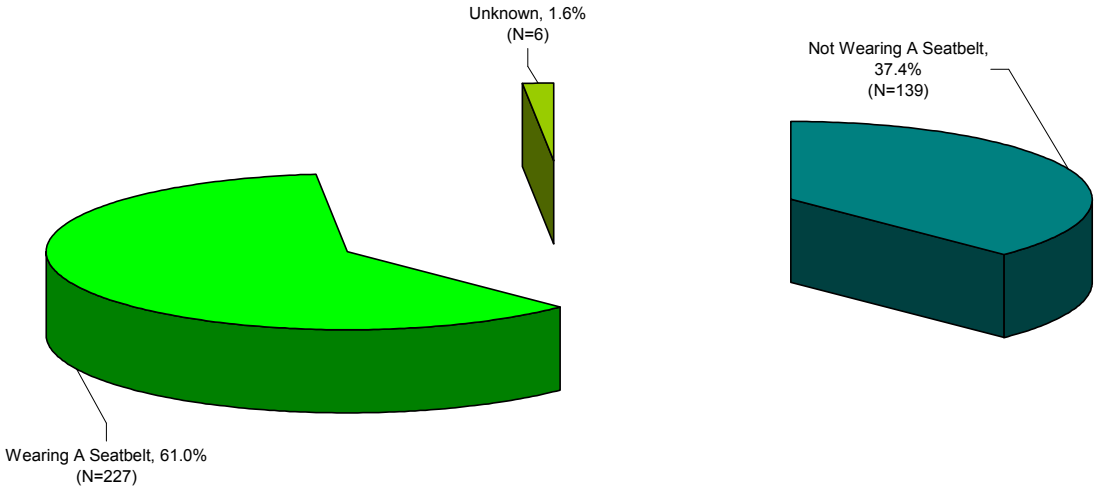
Table 3: Characteristics of Motor Vehicle Traffic Incidents

Characteristic	Number of Cases n= 513	Percentage of Total
Driver	251	48.9%
Passenger	135	26.3%
Pedestrian	61	12.0%
Motorcyclist	53	10.3%
Bicyclist	11	2.1%
Hanging on to Vehicle/Other*	2	0.4%

*Other-Fell off "Rollbar" on Jeep; Standing on step of semi & struck by another semi

Passenger vehicles such as cars, trucks (including light trucks & heavy trucks; excluding transport trucks), minivans, and SUVs account for 72.5% (n=372) of the motor vehicle traffic incidents. Of these, 61.0% (n=227) were wearing a seatbelt and 37.4% (n=139) were not, for 1.6% (n=6) the use of a seatbelt was unknown, as shown in **Figure 7**.

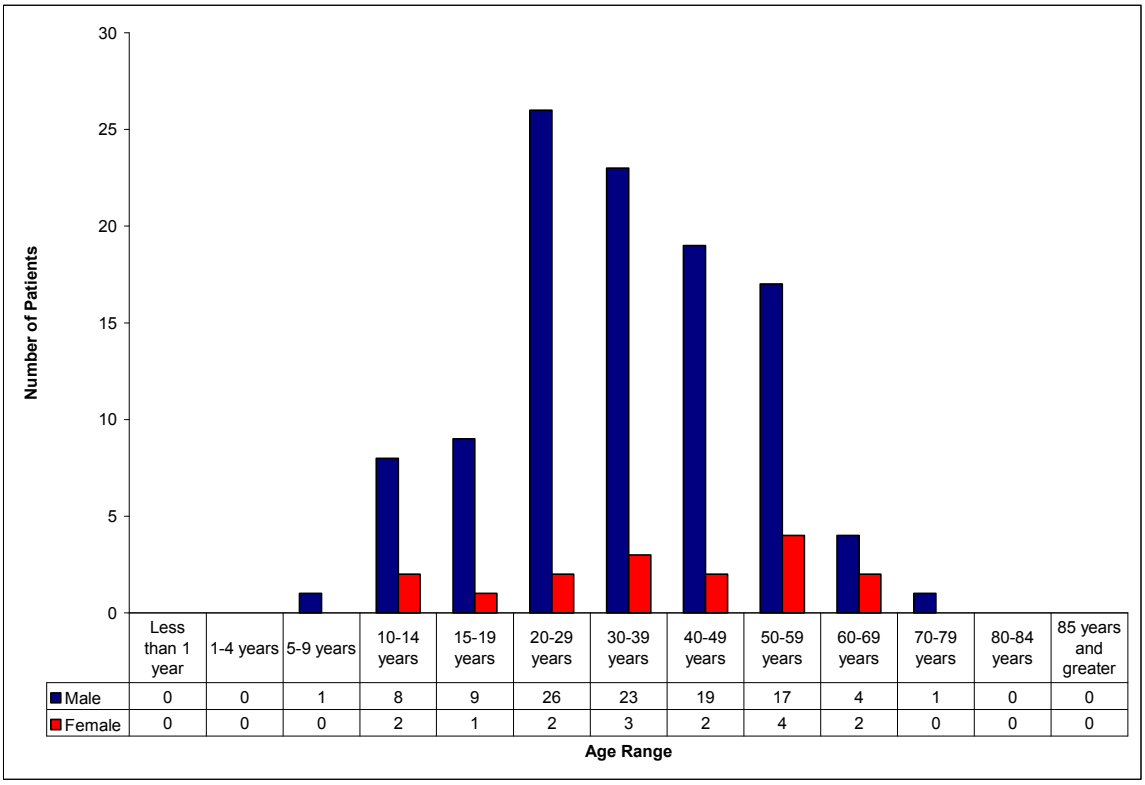
Figure 7: Seatbelt Use for Major Trauma Involving Passenger Vehicles



8.1 MOTOR VEHICLE NON-TRAFFIC INCIDENTS: E-CODE 820 – 825.9

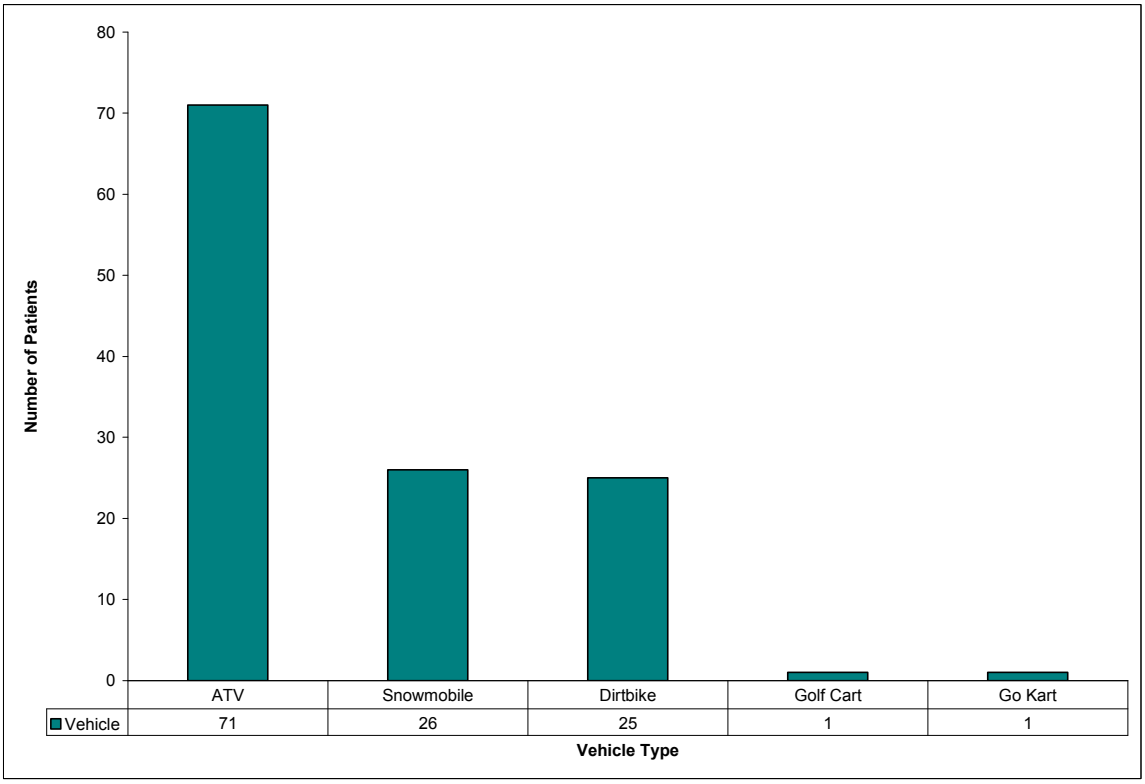
Motor vehicle non-traffic incidents occurring any place other than public highways or roads accounted for 8.3% (n=124) of the major trauma admitted to Alberta Health Services Edmonton Zone Trauma Centres in 2012. Males accounted for 87.1% (n=108) of the motor vehicle non-traffic incidents with the most occurring in the 20-29 year age range. While females accounted for 12.9% (n=16) with the most occurring in the 50-59 year age range. **Figure 8** demonstrates motor vehicle non-traffic incidents by age and gender and **Figure 9** shows the vehicle type involved in the motor vehicle non-traffic incidents.

Figure 8: Motor Vehicle Non-Traffic Incidents by Age and Gender



	Less than 1 year	1-4 years	5-9 years	10-14 years	15-19 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80-84 years	85 years and greater
Male	0	0	1	8	9	26	23	19	17	4	1	0	0
Female	0	0	0	2	1	2	3	2	4	2	0	0	0

Figure 9: Motor Vehicle Non-Traffic Incident by Vehicle Type



	ATV	Snowmobile	Dirtbike	Golf Cart	Go Kart
Vehicle	71	26	25	1	1

8.2 PEDAL CYCLE INCIDENTS: E-CODE 826-826.9

Pedal cycle incidents*, trauma occurring while riding a pedal cycle or in a carrier attached to such a vehicle, accounted for 1.9% (n=28) of the major trauma admitted to an Alberta Health Services Edmonton Zone trauma centre in 2012.

*Does not include pedal cycle involved in a motor vehicle collision (struck by vehicle).

8.3 OTHER ROAD VEHICLE INCIDENTS: E-CODE 827-829.9

Other road vehicles include any vehicles, except motor vehicles in, on, or by which any person or property may be transported. This category includes animals carrying persons and animal drawn vehicles.

Other road vehicle incidents accounted for 2.0% (n= 29) of the major trauma cases admitted to an Alberta Health Services Edmonton Zone trauma centre.
25 cases (86.2%) occurred under the E-Code 828.2 involving "horse" being ridden;
3 cases (10.4%) involved animal drawn vehicles; 1 case (0.4%) involved a "bull" rider.

8.4 USE OF PROTECTIVE HELMETS – TRANSPORTATION INCIDENTS

The use of protective helmets continues to vary. Of the 78, motorcycle and dirtbike related trauma, 69 (88.5%) were wearing a helmet. There were 71 ATV related trauma incidents, of these only 29 (40.8%) were wearing a helmet. Of the 26 snowmobile incidents, 13 (50.0%) were wearing a helmet. For the 39 bicyclists injured 35.9% (n=14) injured were wearing a helmet.

Figure 10: Use of Protective Helmets and Mechanisms of Injury

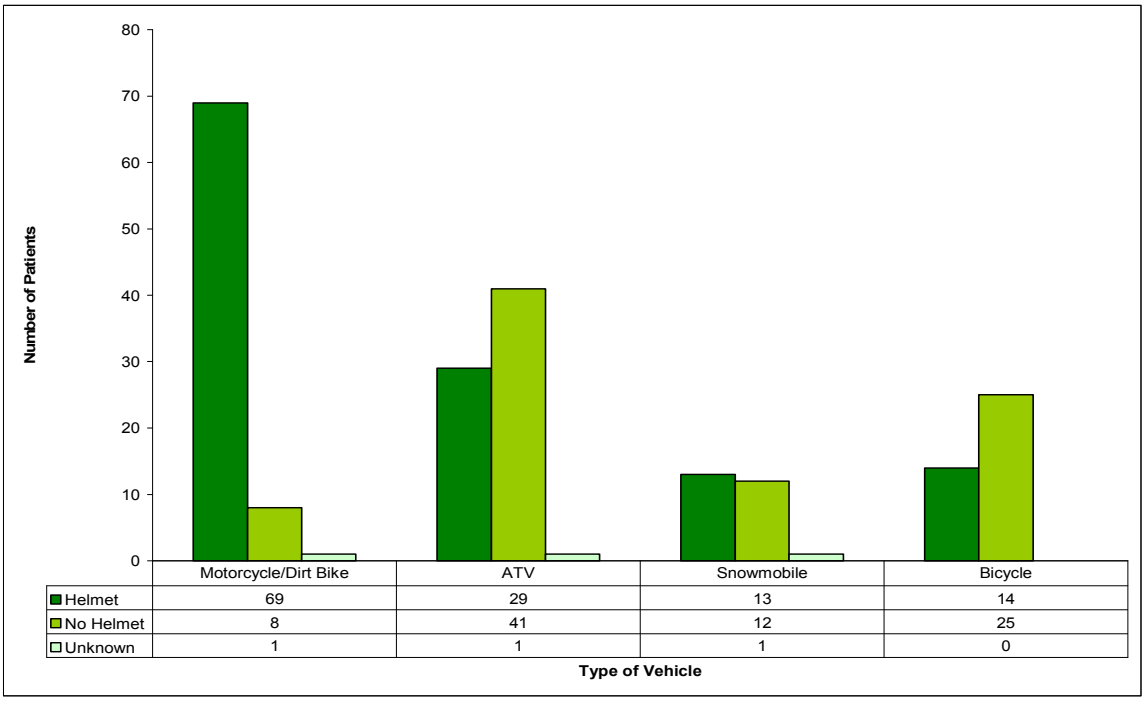


Table 4: Incidents of Head Injuries

	Motorcycle (N=78)	ATV (N=71)	Snowmobile (N=26)	Bicycle (N=39)
% Wearing Helmet	88.5% (69)	40.8% (29)	50.0% (13)	35.9% (14)
% With Head Injury	44.9% (35)	50.7% (36)	27.0% (7)	64.1% (25)
% With Severe Head Injury (AIS>=4)	17.9% (14)	22.5% (16)	19.2% (5)	48.7% (19)
% No Helmet with Head Injury	87.0% (7)	65.9% (27)	41.7% (5)	72.0% (18)
% Wearing Helmet With Head Injury	40.6% (28)	31.0% (9)	15.4% (2)	50.0% (7)

* Head Injuries are considered severe if they have an AIS code of 4 or greater

9.0 FALL RELATED INCIDENTS: E-CODE 880-888.9

During 2012, the second leading cause of injury for major trauma cases admitted to an Alberta Health Services Edmonton Zone trauma centre was fall related trauma. This mechanism of injury accounted for 30.7% (n=458) of the major trauma cases.

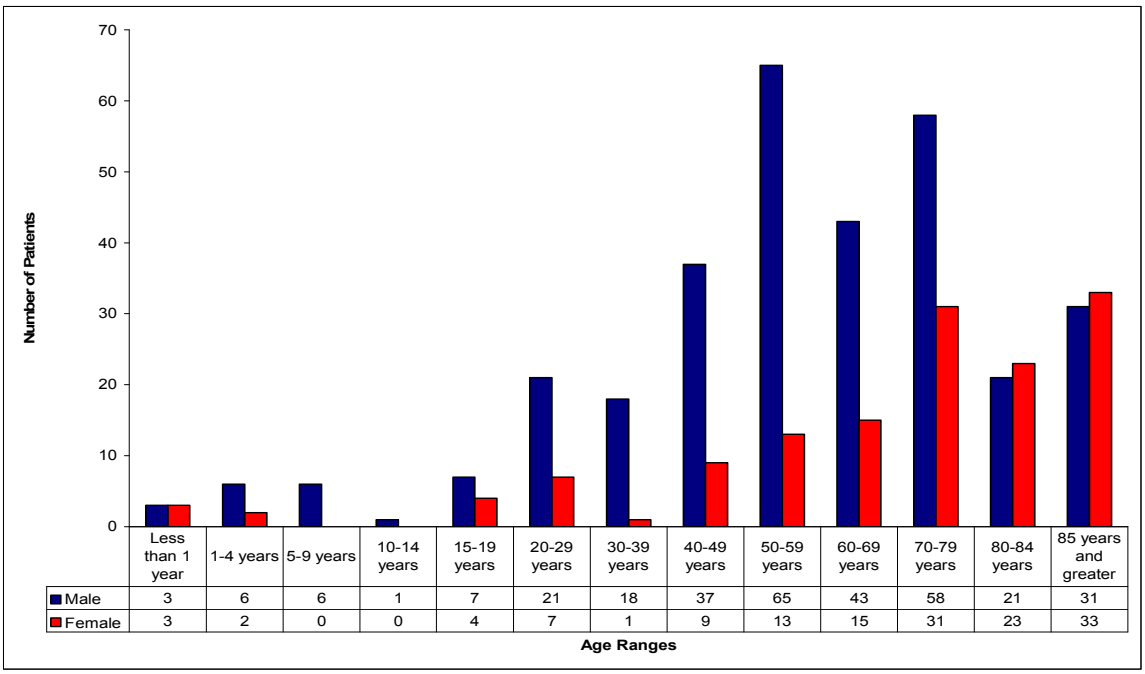
For major trauma cases, the most common mechanism of falling was 'same level' falls caused by slipping, tripping, or stumbling.
Table 5 lists the number and type of falls for 2012 by E-Code category.

Table 5: Types of Falls

E-Code	Description	Total Number n= 458	Percent
880.0-9	Fall on or From Stairs/Steps	80	17.5%
881.0-9	Fall on or From Ladder/Scaffolding	38	8.3%
882	Fall From or Out of Building/Other Structure	42	9.2%
883.0-9	Fall into Hole or Other Opening in Surface	1	0.2%
884.0-9	Multi-Level Fall	66	14.4%
885.0-9	Fall on Same Level	219	47.8%
888.0-9	Other and Unspecified Falls	12	2.6%

Males accounted for 69.2% (n=317) of the major trauma cases due to this mechanism of injury. **Figure 11** shows the distribution of fall related trauma by age and gender.

Figure 11: Falls by Age and Gender



10.0 INTERPERSONAL VIOLENCE INCIDENTS: E-CODE 960-969.9

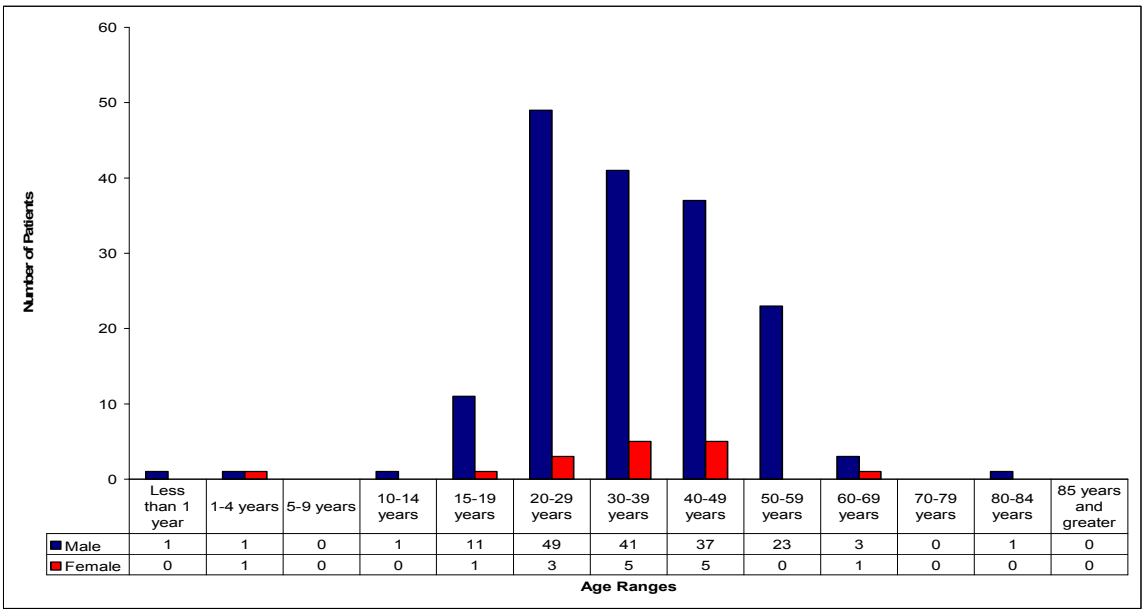
The third leading cause of major trauma admissions to an Alberta Health Services Edmonton Zone trauma centre was interpersonal violence-related incidents. Interpersonal violent acts are defined as injuries purposely inflicted by another person. These types of injuries accounted for 12.3% (n= 184) of all the major trauma admissions to an Alberta Health Services Edmonton Zone trauma facility. The most frequent cause of interpersonal violence injuries were assaults by unarmed Fight/Brawl/Rape. **Table 6** lists the number and type of interpersonal violence incidents for 2012 by E-Code category.

Table 6: Types of Interpersonal Violence

E-Code	Description	Number of Patients n=184	Percentage
960.0-9	Fight/Brawl/Rape-Unarmed	80	43.5%
963.0	Assault by Hanging/Strangulation	1	0.5%
965.0-9	Assault by Firearms-Handgun,Hunting Rifle	12	6.5%
966.0	Assault by Stabbings	48	26.1%
967.0-9	Child Abuse	3	1.7%
968.0-9	Assault by Other Unspecified Means-Striking with Blunt Object, Vehicular	40	21.7%

Males accounted for 91.3% (n=168) of the major trauma cases due to this mechanism of injury. Of these males, 29.2% (n= 49) were between the ages of 20 and 29 years as represented in **Figure 12**.

Figure 12: Interpersonal Violence by Age and Gender



11.0 MECHANISM OF INJURY: OTHER CAUSES

Other mechanisms of injury, such as struck by object or persons in sports, machinery, hot substance or object, fire/flames, self-inflicted and other accidents accounted for the remaining major trauma cases in 2012. **Table 7** displays the other causes of trauma that occurred in 2012.

Table 7: Other Causes by Primary ICD 9 E-Code

Other Mechanism of Injury 2012			
Cause of Injury (E-Code)		**Total Number n=154**	
800-807.9	Railway Accident	4	2.6%
830-838.9	Water Transport	1	0.7%
840-845	Air & Space Transport	5	3.2%
890-899	Fire and Flames	14	9.1%
900-909.9	Natural or Environmental Causes	10	6.5%
910-913.9	Drowning & Suffocation	5	3.2%
915	Foreign Body	1	0.7%
916-917.9,927	Struck by Object or Person in Sports	51	33.2%
919-919.9	Caused by Machinery	11	7.1%
921-923.9	Explosives/Firearms	5	3.2%
924-925.9	Hot Substance or Object/Electric Current	3	2.0%
950-959	Suicide / Self-Inflicted *	34	22.1%
970-978	Legal Intervention	5	3.2%
980-989	Undetermined if Accidental or Self Inflicted	5	3.2%
990-999	Operations of War	0	0%

* ATR does not capture all suicides-includes only patients with ISS >=12 who have arrived to hospital

12.0 ALCOHOL RELATED TRAUMA

Among the 1490 patients who were injured and treated at the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital's trauma centres, BAC should have been routinely collected on 1434 patients (over the age of 10). 72.0 % (n=1032) (age 10 and over) were tested for alcohol use.

Of these, 1032 patients 35.1% (n=362) tested positive for alcohol use. For those who tested positive, the median blood alcohol level was 37.0 mmol/L (range 2.0 mmol/L – 98.0 mmol/L) which is more than twice the legal level of 17.0 mmol/L. Blood alcohol legal level changed in Sept 2012 to 11.0 mmol/L.

Of the 362 patients who tested positive for alcohol 46.7% (n=169) were injured in a transportation incident including bicycles, 30.4% (n=110) were injured in a violent altercation and 16.6% (n=60) were injured by a fall.

6.3% (n=23) people had injuries caused by other means, such as, fire and flames, drowning or suffocation, self-inflicted or legal interventions. This is indicated in **Table 8**

Table 8: Trauma and Blood Alcohol Level

Blood alcohol > 2mmol/L	n=362	Percentage of n=362
Transportation Related	169	46.7%
Interpersonal Violence	110	30.4%
Falls	60	16.6%
Other	23	6.4%

13.0 WORK RELATED TRAUMA

Work related injuries comprise 9.9% (n=148) of all major injuries treated in the Alberta Health Services Edmonton Zone trauma centres. The most common mechanism for work related injuries were Falls, with 39.2% (n=58) due to this cause. The second most common mechanism of injury was due to transportation 25.0% (n=37).
Table 9 displays these mechanisms of injury.

Table 9: Work Related Trauma

Mechanism of Injury	n= 148	Percentage of n= 148
Falls	58	39.2%
Transportation	37	25.0%
Struck by Object/Tires Exploding	22	14.9%
Caused by Machinery/Hot Substance/Fire and Flame	15	10.1%
Caused by Animal-(Horse, Cow , Bull)	8	5.4%
Homicide & Assault	4	2.7%
Air & Space Transport	4	2.7%

14.0 TYPE OF INJURY

Injuries can be grouped by the type of force that causes the trauma. Most injuries seen at an Alberta Health Services' Edmonton Zone trauma centre are caused by blunt trauma, (**Figure 13)**. It should be noted that due to the way ISS rates the severity of traumatic injury, the number of cases of injuries caused by penetrating trauma (stabbings, gunshot wounds, etc.) may be under-reported **(Figure 13)**. Although penetrating injuries can be very serious, these injuries often do not score an ISS of 12 or greater.

Figure 13: Proportion of Major Trauma Cases by Injury Type

Blunt n= 1394	Penetrating n= 77	Burns n= 19

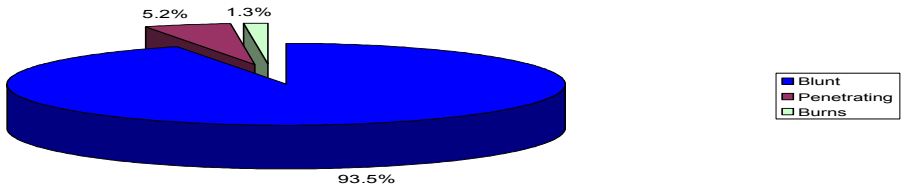


Figure 14: Proportion of Blunt Trauma Cases by Hospital Site

UAH n= 797	Stollery n= 114	RAH n= 483

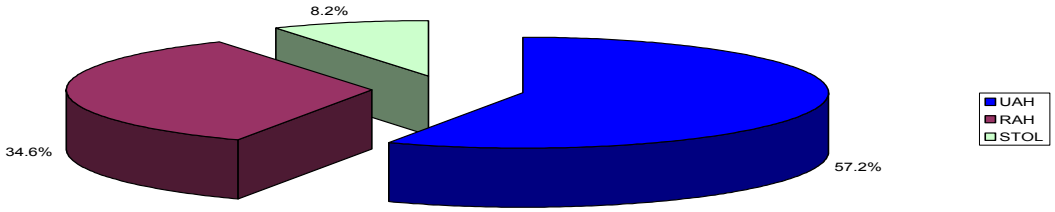


Figure 15: Proportion of Penetrating Trauma Cases by Hospital Site

UAH n= 39	Stollery n= 4	RAH n= 34

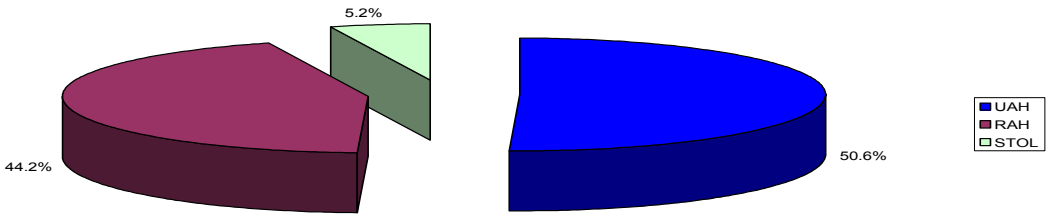
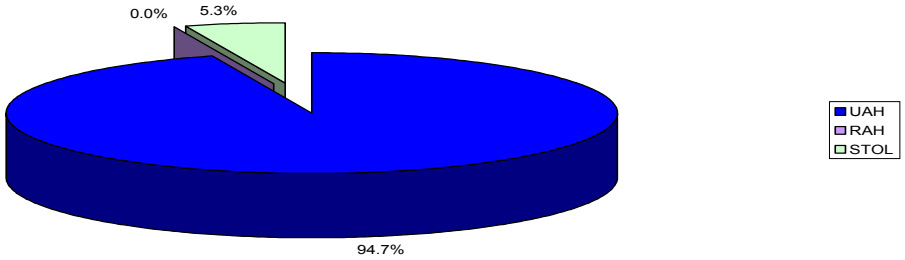


Figure 16: Proportion of Burn Cases by Hospital Site

UAH n= 18	Stollery n= 1	RAH n= 0



15.0 BODY REGION INJURED

The most frequent place of injury according to body region is the head. In 2012, there were 893 head injuries; 635 (71.1%) of which were classified as severe (AIS≥4). **Table 10** displays the number of injuries by body region. In 2012 there were a total of 3476 injuries sustained across 1490 patients.

Table 10 Body Region Injured

Body Region	Number of Injuries n = 3476	Percent of Patients with an injury in this region n = 1490
Head/ C spine	941	63.2%
Chest/ T spine	741	49.7%
Extremities/Pelvis	581	39.0%
External (Burns/Abrasions/Contusions/lacerations)	556	37.3%
Abdomen/ L spine	395	26.5%
Face	262	17.6%

. *Note: The total number of injuries will not add up to the 1490 patients. This is due to the fact that one patient may have sustained more than one injury per body region as well multiple injuries to multiple body regions.

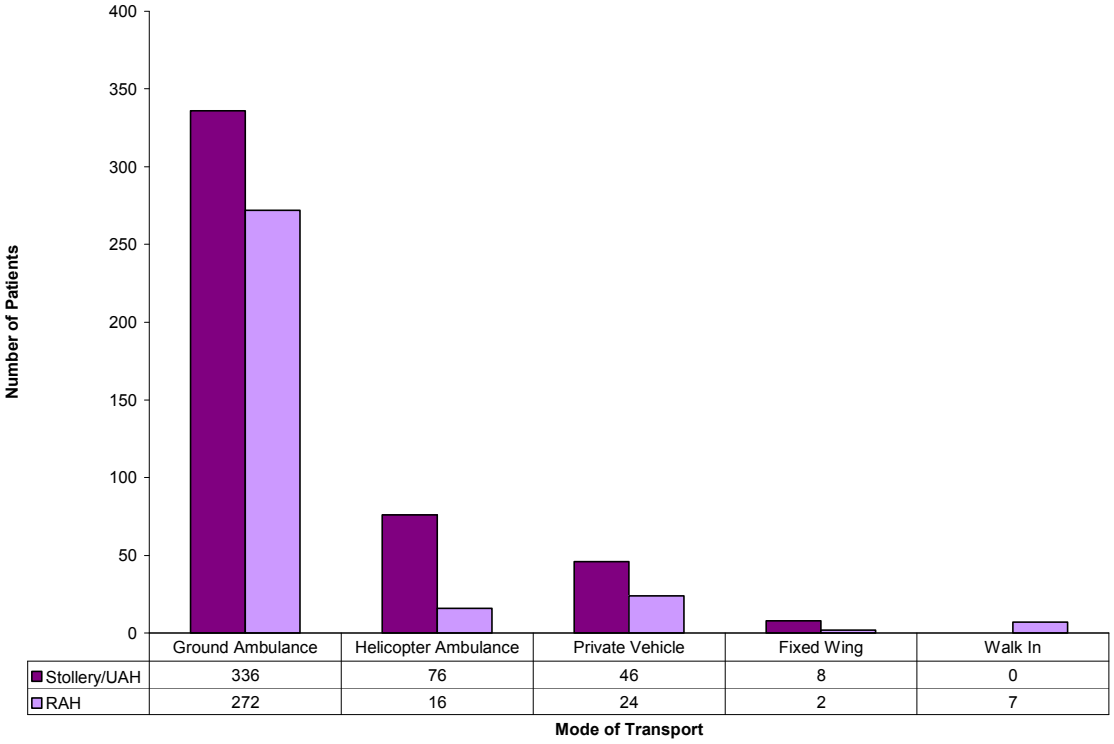
16.0 PROCESS OF CARE

The following section reflects the treatment course for major trauma patients admitted to an Alberta Health Services Edmonton Zone trauma centre, for the 2012 calendar year.

16.1 PLACE OF INJURY TO TRAUMA CENTRE

During the 2012 calendar year, 52.8% (n=787) of the injured major trauma patients were transported directly from the place of their injury to the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital. Of these 787 injured patients, 77.3% (n=608) were transported to a trauma centre by ground ambulance. Helicopter ambulances were the second most common mode of transportation, accounting for 11.7% (n= 92) of the total transports from place of injury to a trauma centre.

Figure 17: Mode of Transport from Scene to Trauma Centre



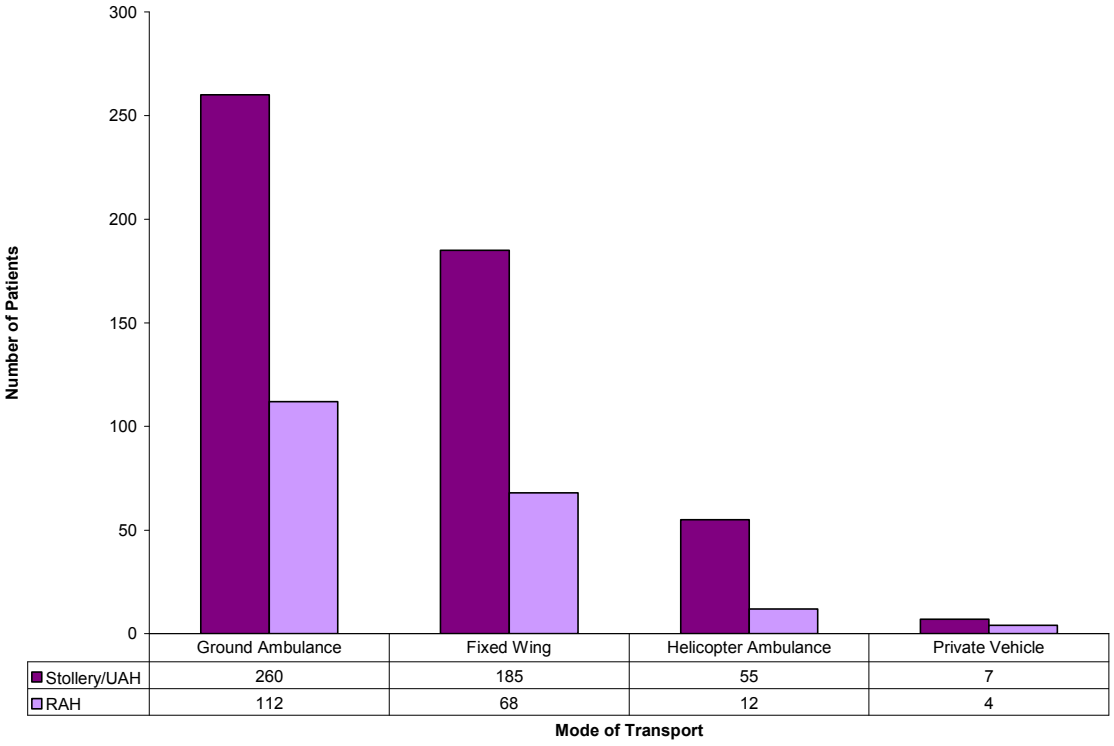
	Ground Ambulance	Helicopter Ambulance	Private Vehicle	Fixed Wing	Walk In
Stollery/UAH	336	76	46	8	0
RAH	272	16	24	2	7

16.2 TRANSFERS

Transfers from another health care facility to Alberta Health Services Edmonton Zone trauma centres accounted for 47.2% (n=703) of the major trauma admissions.

Of the 703 patients who were transferred from another health care facility, 52.9% (n=372) were transported from a first or second hospital to a trauma centre by ground ambulance, 36.0% (n=253) by fixed wing ambulance, 9.5% (n=67) by helicopter ambulance and 1.6% (n=11) by private vehicle. These numbers account for only the final transfer method to the tertiary trauma centre and does not account for transport methods involving periphery hospitals.

Figure 18: Final Mode of Transport from Transfer Hospital to Trauma Centre



17.0 TRAUMA CENTRE CARE

This section refers to care provided to major trauma patients at one of the three trauma centres in the Edmonton Zone for the 2012 calendar year.

17.1 EMERGENCY DEPARTMENT

Of the 1490 major trauma patients who were admitted to Alberta Health Services Edmonton Zone trauma centres in 2012, 97.0% (n=1446) had their acute care begin in the Emergency Department (ED). The remaining 3.0% (n=44) were admitted directly to a specific patient care service such as the operating room, Critical Care, Neurosurgery, or Orthopaedics.

Table 11 outlines the type and number of major procedures performed on major trauma patients in the Emergency Department of an Alberta Health Services Edmonton Zone trauma centre.

Table 11: Type of Number of ER Procedures

Procedures	Number Procedure	% of Patients (n= 1446*)
CT scan	1187	82.1%
Peripheral IV Insertion	614	42.5%
Foley Catheter	452	31.3%
Splinting	216	14.9%
FAST Ultrasound	197	13.6%
Arterial/Central Lines	168	11.6%
Gastric Tube Insertion	167	11.5%
Chest Tube Insertion	157	10.9%
Oral Intubation	142	9.8%

*This accounts for only the top 9 procedures preformed in the Emergency Department.
This number is only patients who made a stop in the ED, it does not include patients directly admitted (n=44)

17.2 EMERGENCY DEPARTMENT DISCHARGE DISPOSITION

The amount of time a major trauma patient spends in the Emergency Department can vary by the severity of their injuries and by the availability of resources of the admitting patient care area. After leaving the Emergency Department, 66.5% (n=961) of the major trauma patients were admitted to a patient care unit such as a trauma unit, surgical unit, or orthopaedic unit. 16.0% (n=232) were admitted directly to the Intensive Care Unit (ICU), while 13.5% (n= 195) went directly to the operating room and 1.1% (n=16) went to the Burn Unit. In 2012, 2.9% (n=42 DIE) of the major trauma patients sustained injuries so severe that they died in the Emergency Department.

Table 12 depicts the post Emergency Department destination and median length of stay (LOS) in the Emergency Department. **Table 13** shows the destination of patients Directly Admitted (bypass ED).Emergency Department **Table 14** shows the Emergency Department median length of stay (LOS) by ISS grouping.

Table 12: Post ER Destination and Length of Time in ER

Post ED Destination	n= 1446*	%	Median/Range
Ward	961	66.5%	8 hrs 4 minutes (52 min – 48 hrs 39 min)
Intensive Care Unit	232	16.0%	4 hrs 22 minutes (43 min – 22 hrs 42 min)
Operating Room	195	13.5%	3 hrs 44 minutes (4 min – 27 hrs 20 min)
DIE	42	2.9%	0 hr 22 minutes (3 min – 9 hrs 41 min)
Burn Unit	16	1.1%	2 hrs 02 minutes (43 min – 5 hrs 8 min)

* This number is only patients who made a stop in the ED, it does not include patients directly admitted (n=44)

Table 13: Direct Admission Destination

Direct Admission Destination	n = 44	%
ICU	21	47.7 %
Ward	19	43.2 %
OR	1	2.3 %
Burn Unit	3	6.8 %

Table 14: Median LOS in the Emergency Department by ISS Grouping.

ISS Grouping	n= 1446*	%	Median/Range
All ISS Groupings	1446	100%	6 hrs 28 min (3 min – 48 hrs 39 min)
ISS 12 – 15	198	13.7%	7 hrs 47 min (32 min – 30 hrs 35 min)
ISS 16 – 19	450	31.1%	7 hrs 44 min (4 min - 48 hrs 39 min)
ISS 20 – 29	568	39.3%	6 hrs 16 min (4 min - 36 hrs 20 min)
ISS 30 – 39	124	8.6%	4 hrs 45 min (3 min - 23 hrs 6 min)
ISS 40 – 49	62	4.3%	3 hrs 41 min (19 min - 20 hrs 58 min)
ISS 50 – 74	42	2.9%	3 hrs 37 min (3 min - 11 hrs 45 min)
ISS 75	2	0.1%	0 hrs 13 min (8 min - 19 min)

Note: A time <10 min usually is indicative of a death in the ER.
*This number is only patients who made a stop in the ED, it does not include patients directly admitted (n=44).

18.0 INTENSIVE CARE UNIT (ICU) ADMISSIONS

At some point during their treatment in a trauma centre, 27.6% (n=412) of the major trauma patients required specialized care in an intensive care unit. Of these 412 patients, (not including burn unit or step-down unit) 232 (56.3%) were admitted directly from the ED. The average / median ICU length of stay by ISS grouping are listed in **Table 15**.

Table 15: ICU Admissions and ICU LOS

	# of Admissions to an ICU	% of ICU admissions	Median LOS (Days)	Range (Days)
All ISS Groups	412	100%	5	1 - 118
ISS 12 – 15	11	2.7%	6	1 - 20
ISS 16 – 19	61	14.8%	2	1 - 51
ISS 20 – 29	194	47.1%	4	1 - 118
ISS 30 – 39	67	16.3%	7	1 – 53
ISS 40 – 49	45	10.9%	9	1 - 109
ISS 50 - 74	33	8.0%	8	1 - 28
ISS 75	1	0.2%	11	11

University of Alberta Fire Fighters Burn Unit

Nineteen patients were injured in a burn incident that was severe enough that they required a stay at the University of Alberta's Fire Fighter's Burn Unit. A burn injury qualifies for the trauma registry if the total body surface area is 30% or greater or total body surface area is between 20-29% and includes face, hand or genitalia.
The majority of burn patients were males over 19 years of age.

Table 16: Burn unit LOS and gender

	# of Admissions	Median & Range LOS (Days)	Males	Females
All ISS Groups	19	25 (1 – 56)	16	3
ISS 12 – 15	0	0	0	0
ISS 16 – 19	9	18 (3 – 50)	6	3
ISS 20 – 29	5	32 (14 – 52)	5	0
ISS 30 – 39	2	20 (9 - 31)	2	0
ISS 40 – 49	1	1 (1)	1	0
ISS 50 – 74	1	1 (1)	1	0
ISS 75	1	1 (1)	1	0

19.0 SURGICAL PROCEDURES

13.5% percent (n=195) of the major trauma patients went directly from the Emergency Department to the Operating Room (OR). Of the 1490 major trauma patients treated, 44.9% (669) required at least one visit to OR. The table below reflects the OR utilization by physician service (number of cases). There were 6 deaths in the OR in 2012.

Table 17: Physician Service by Number of Cases and Procedures

Physician Service	Number of OR Cases n= 831	Number of OR Procedures n= 1734
ENT	11	23
General Surgery	98	257
Neurosurgery	150	201
Orthopaedics	352	798
Ophthalmology	3	3
ICU	14	14
Pediatric Surgery	8	16
Plastics	137	325
Urology	12	14
Cardiovascular	6	10
Thoracics	26	55
Other	14	18

20.0 TRAUMA CENTRE LENGTH OF STAY (LOS)

During 2012, the 1490 major trauma patients had a median LOS of 6 days. The median LOS according to ISS grouping is shown in **Table.18.**

Table 18: Trauma Centre LOS

	# Admissions	Median LOS (Days)	Range (Days)
All Cases	1490	6	0 – 407
ISS 12 – 15	198	4	1 – 50
ISS 16 – 19	462	5	0 – 407
ISS 20 – 29	593	6	0 – 309
ISS 30 – 39	127	13	0 – 137
ISS 40 – 49	63	15	0 – 168
ISS 50 – 74	44	11	0 – 124
ISS 75	3	1	0 - 101

21.0 PATIENT OUTCOMES

Patients' discharge dispositions are determined by the patients' outcomes. Patients admitted to the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital trauma centres leave by various means. Of the patients who survived (n=1324; 88.9%) over half were discharged home (n=903, 68.2%), while the remaining went to another acute care facility, a rehabilitation facility or other chronic care/nursing home facility **(Table 19).**

21.1 DISCHARGE DESTINATION

The majority of major trauma patients were discharged home with or without support services from a trauma centre in 2012. This year saw 68.2% (n=903) patients discharged home or home with support services.

Table 19 outlines the number of patients by discharge destination from the Royal Alexandra Hospital, University of Alberta Hospital and Stollery Children's Hospital trauma centres.

Table 19: Discharge Destination

Discharged To	Count	Percentage n=1490
Home	824	55.3%
Another Acute Care Facility	216	14.5%
Rehabilitation Facility	120	8.1%
Died	166	11.1%
Home with Support Services	79	5.3%
Chronic Care Facility	41	2.8%
Nursing Home	20	1.3%
Other	23	1.5%
Children's Foster Care	1	0.1%

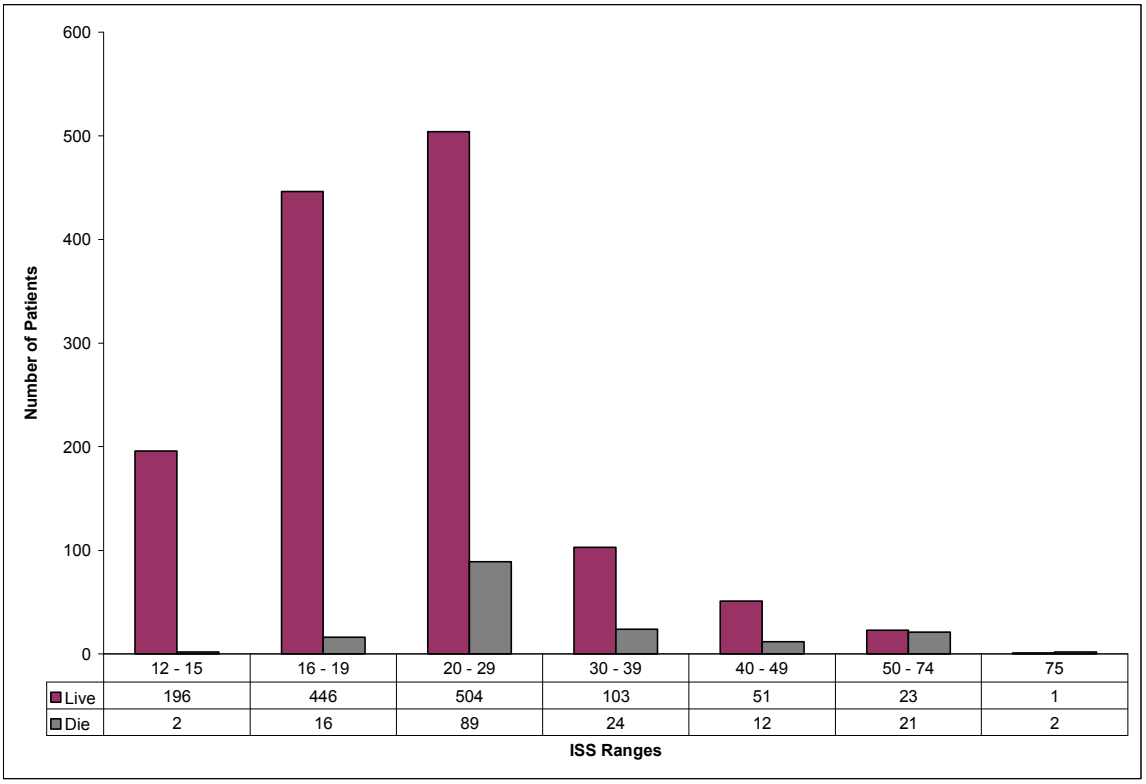
22.0 IN-HOSPITAL DEATHS

Of the 1490 major trauma patients admitted to the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital's trauma centres, 88.9% (n=1324) lived while, 11.1% (n=166) died. Of these deaths, 25.3% (n=42) died in the Emergency Department. Injury severity is correlated to the risk of dying from a traumatic injury, with 48.9% (n= 23) of the major trauma patients with an ISS ≥ 50 (n=47) not surviving.

Figure 19 depicts major trauma patient survival by ISS score.

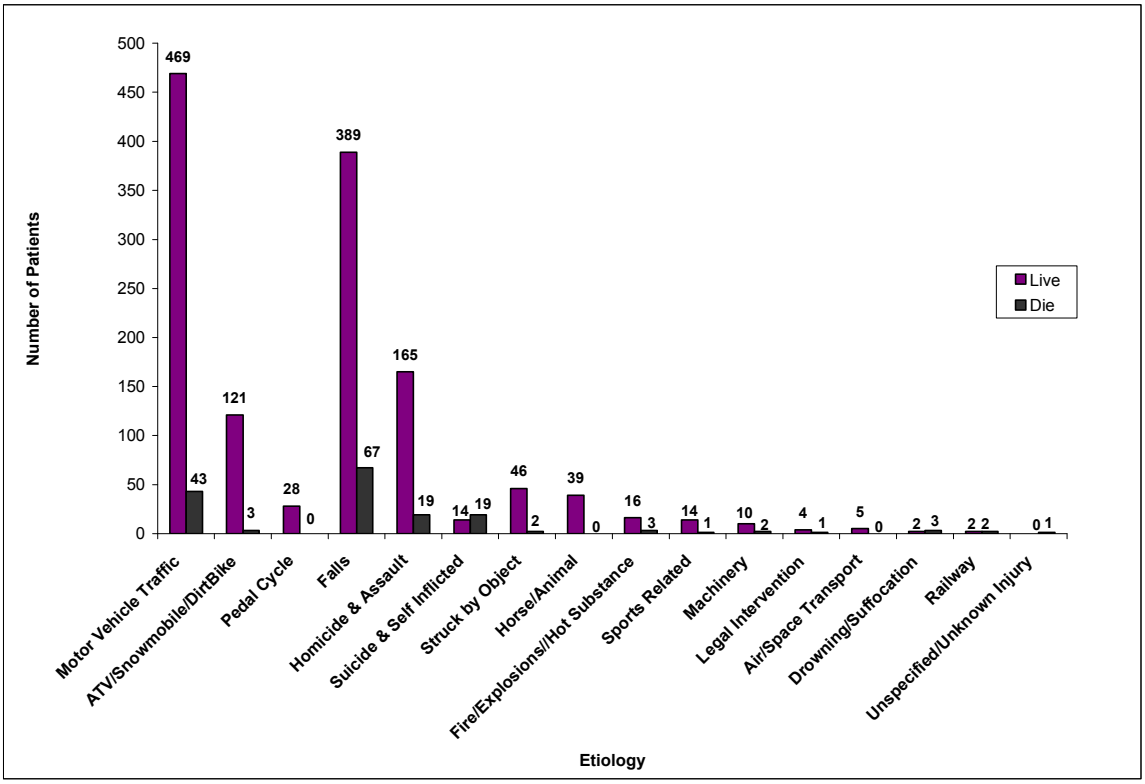
Figure 20 demonstrates the 2012 trauma deaths by etiology.

Figure 19: Patient Survival Based on ISS Score



	12 - 15	16 - 19	20 - 29	30 - 39	40 - 49	50 - 74	75
Live	196	446	504	103	51	23	1
Die	2	16	89	24	12	21	2

Figure 20: Major Trauma by Etiology



23.0 PERFORMANCE INDICATORS

As part of Alberta Health Services Edmonton Zone's Trauma Services' commitment to excellence in their trauma care and the continued quality improvement process, there are several indicators throughout the continuum of care that are regularly monitored by the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital. These indicators are recommended by the American College of Surgeons Committee on trauma that sets a standard of care for all trauma patients. Non-compliance with these standards does not imply inappropriate care.

The following is a summary of these indicators for the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital, for the patients who have met the inclusion criteria (ISS >=12) for the 2012 calendar year. The Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital routinely use these 'audit filters' as part of their monthly Mortality and Morbidity review.

Table 20(a-o): Performance Indicator 'Audit Filters'- RAH/UAH/Stollery

a) Absence of q30 min. chart documentation for patient beginning with ER, including time in radiology, up to admission to the OR, ICU, ward, death, or transfer to another hospital.		
Indicator	Yes	Total Patients
RAH	397	517
UAH	83	854
Stollery	1	119

b) Absence of sequential neurological documentation on ER record if patient had a diagnosis of skull fracture, intracranial injury, or spinal cord injury.		
Indicator	Yes	Total Patients
RAH	129	517
UAH	40	854
Stollery	1	119

c) Patient with epidural or subdural brain hematoma receiving craniotomy > 4 hours after arrival in ER.		
Indicator	Yes	Total Patients
RAH	18	517
UAH	2	854
Stollery	0	119

d) Patient with diagnosis at discharge of cervical spine injury, not indicated on admission diagnosis.		
Indicator	Yes	Total Patients
RAH	1	517
UAH	1	854
Stollery	0	119

e) Patient requiring a laparotomy that was not performed within 1 hour of arrival to ER.		
Indicator	Yes	Total Patients
RAH	6	517
UAH	2	854
Stollery	0	119

f) Patient sustained a gunshot wound to the abdomen who was managed non-operatively.		
Indicator	Yes	Total Patients
RAH	0	517
UAH	0	854
Stollery	0	119

g) Patient with a femur fracture that was operated on > 24 hours after admission.		
Indicator	No	Total Patients
RAH	5	517
UAH	0	854
Stollery	1	119

h) Patient with a compound fracture that was operated on > 6 hours after admission		
Indicator	No	Total Patients
RAH	17	517
UAH	0	854
Stollery	0	119

i) Unplanned return to the operating room within 48 hours of initial procedure.		
Indicator	Yes	Total Patients
RAH	1	517
UAH	0	854
Stollery	0	119

j) Trauma patient admitted to hospital under other than a surgeon or intensivist.		
Indicator	Yes	Total Patients
RAH	43	517
UAH	0	854
Stollery	0	119

k) Patient had missed injuries that subsequently required surgery.		
Indicator	Yes	Total Patients
RAH	4	517
UAH	2	854
Stollery	1	119

l) Did the trauma team response time exceed 20 minutes?		
Indicator	Yes	Total Patients
RAH	1	517
UAH	0	854
Stollery	0	119

m) Length of time at rural hospital exceeded rural hospital guidelines: ≤ 200km = 3hrs, 200-400km = 4hrs, > 400km = 6hrs		
Indicator	Yes	Total Patients
RAH	30	517
UAH	4	854
Stollery	1	119

n) Patient died during transport.		
Indicator	Yes	Total Patients
RAH	1	517
UAH	0	854
Stollery	0	119

o) Patient died < 24 hours of admission.		
Indicator	Yes	Total Patients
RAH	22	517
UAH	44	854
Stollery	6	119

24.0 TRAUMA SCORE INJURY SEVERITY SCORE (TRISS) METHODOLOGY

TRISS methodology uses a logistic regression equation to create a prediction coefficient of survival. This calculation uses the Revised Trauma Score, the Injury Severity Score, mechanism of injury, and age. The probability of survival lies between .00 and 1.00.

The TRISS 'Z' statistic is the standardized measure of the statistical difference between the actual number of survivors among a set of patients and the number of survivors expected from outcome norms based on the Major Trauma Outcomes Study database[1].

The 'W' score measures the clinical significance of the differences between the actual and unexpected survivors. 'W' is the number of survivors more than would be expected from the outcome norms per 100 patients treated. 'W' can only be calculated if the 'Z' is greater than one standard deviation from the mean (1.96)

Due to the parameters of the Revised Trauma Score, if patients do not have a complete Glasgow coma Score or are intubated the TRISS score cannot be calculated.

Table 21 indicates the TRISS scores for 2012 at the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital's Trauma Centres.

[1] Champion, H.R.; Copes, W.S.; Sacco, W.J.; Lawnick, M.M.; Keast, S.L.; Bain, L.W.; Flanagan, M.E.; & Frey, C.F. (1990). The major trauma outcome study: Establishing national norms for trauma care. *Journal of Trauma 30*(11), 1356-1365.

Table 21: TRISS analysis for University of Alberta Hospital

University of Alberta Hospital			
2012	**Z Score**	**W Score**	**Sample Size**
Adult Blunt	2.67	2.43	653
Adult Penetrating	0.83	-	29
Total	2.75	2.42	682

Table 22: TRISS analysis for Stollery Children's Hospital

Stollery Children's Hospital			
2012	**Z Score**	**W Score**	**Sample Size**
Paediatric	0.79	-	70
Total			

Table 23: TRISS analysis for Royal Alexandra Hospital

Royal Alexandra Hospital			
2012	**Z Score**	**W Score**	**Sample Size**
Adult Blunt	2.47	2.72	429
Adult Penetrating	0.77	-	23
Paediatric	-	-	0
Total	2.56	2.71	452

25.0 CONTINUED COMMITMENT TO THE EXCELLENCE OF TRAUMA CARE

The Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital Trauma Centres' endeavour to provide quality trauma care to all our patients. An important component to this care is the continued education we routinely provide to our healthcare providers.

A major component of this education mandate is the assemblage of monthly trauma rounds. The tertiary trauma centres provide informative talks on specific topics that often include the utilization of timely registry data.

The following is a list of titles of the 2012 trauma rounds presented at University of Alberta Hospital trauma centre and the Royal Alexandra Hospital trauma centre.

Table 24: Trauma Rounds - University of Alberta Hospital

Date	Speaker	Topic
February 9, 2012	Dr. Richard Fox	Spinal Trauma
March 8, 2012	Edward E. Tredget, MD, MSC, FRCSC	Management Of Severe Thermal Injury
April 19, 2012	Dr. Bryan Dicken	Blunt Splenic Trauma: The Pediatic Surgical Perspective
June 14, 2012	CAROLYN BIRON, B.SC., Client Services Team Leader, Brain Care Centre, Edmonton	Brain Care Centre: Community Based Services After Mild, Moderate and Severe Brain Injury
July 12, 2012	Dr. Mary van Wijngaarden – Stephens, Trauma Medical Director and Drs. Hobbs, Tsang & Manouchehri	Interesting Trauma Cases
September 20, 2012	Drs. Sunil Sookram & Judson Barkhurst	Traumatic Hemorrhage: The Alberta Approach
October 11, 2012	Dr. Mary vanWijngaarden-Stephens	Trauma Team Activation – Why Bother?

Table 25: Trauma/Radiology Teaching Rounds - University of Alberta Hospital

Date	Speaker	Topic
March 2, 2012	Dr. Ed Wiebe	Interesting Trauma Cases
May 4, 2012	Dr. Ed Wiebe	Interesting Trauma Cases
June 1, 2012	Dr. Ed Wiebe	Interesting Trauma Cases
October 19, 2012	Dr. Ed Wiebe	Interesting Trauma Cases
November 2, 2012	Dr. Ed Wiebe	Interesting Trauma Cases

Table 26: Trauma Rounds - RAH

Date	Speaker	Topic
January 10, 2012	Various Speakers	Case Presentations
February 7, 2012	Dr. Richard Fox	Cranio Cervical Junction Injuries
March 6, 2012	Dr. Paul Engels	Traumatic Air…Where?
April 3, 2012	Dr. Doug Matheson	Trauma Resuscitation – When to Quit
May 15, 2012	Dr. Damian Paton-Gay	Pitfalls in Trauma Management: "The Genesis of Avoidable Morbidity and Mortality"
June 26, 2012	Dr. Paul Engels & Dr. Simon Turner	Operative Management of Rib Fractures: Case Presentation and Discussion of New Frontiers
September 25, 2012	Dr. Damian Paton-Gay	Pan Scan for Trauma: Who, What and Why?
October 23, 2012	Dr. Vanessa Davis	The Open Abdomen: Principles and Management

Table 27: Combined Trauma/ICU Rounds – RAH/UAH

Date	Speaker	Topic
December 11, 2012	Dr. Broad, Neurosurgeon & Dr. Ashforth, Radiologist	Combined ICU/Trauma Rounds: C-Spine Trauma In Setting Of Degenerative Disk Disease
July 18, 2012	Dr. Peter Rhee, Chief Division Trauma, Critical Care & Emergency Surgery, Arizona Health Science Center, Tucson, AZ	Evolution of Fluid Resuscitation
August 15, 2012	Phil Barie, MD, MBA Weil Medical College of Cornell University	Multiple Organ Dysfunction Syndrome

ADVANCED TRAUMA LIFE SUPPORT (ATLS)

The Advanced Trauma Life Support (ATLS) course is published by the American College of Surgeons and provides a framework for the management of the injured patient. Ten ATLS courses were offered in 2012 for physicians/residents within the Edmonton and North Zones.

ADVANCED TRAUMA OPERATIVE MANAGEMENT (ATOM)

The ATOM course was established out of a demonstrated need for knowledge regarding the operative procedures in the management of Trauma. In 2008, the ATOM course came under the auspices of the American College of Surgeons. Each year at the University of Alberta Hospital an ATOM course is held for general surgeons and general surgery residents.

CHILD HEALTH INJURY SYMPOSIUM

The Stollery Children's Hospital 'Child Health Injury Symposium' is an annual education day. The purpose of the Child Health Injury Symposium is to review and update health professionals in assessment, management and transport of pediatric patients with traumatic injuries. In 2012 there were 167 participants. The theme for the 2012 Symposium was "Fire and Ice".

TRAUMA NURSE CORE COURSE (TNCC)
EMERGENCY NURSING PEDIATRIC COURSE (ENPC)

The main purposes of the TNCC and the ENPC are to present core-level knowledge, refine skills, and build a firm foundation in trauma nursing. Emergency Nurses Association developed and implemented the TNCC for national and international dissemination as a means of identifying a standardized body of trauma nursing knowledge. TNCC and ENPC are offered at various times throughout the year.

TRAUMA SYMPOSIUM

The University of Alberta Hospital along with the Royal Alexandra Hospital share in the collaboration of an annual Trauma Symposium. The purpose of the trauma symposium is to review and update health professionals in assessment, management and transport of patients with traumatic injuries. The attendance for 2012 was 345.

26.0 RESEARCH AND CONTINUED GROWTH

The Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital Trauma Registries continue to improve each year. Since inception in April 1995, through the dedication of the Data Analysts, the quality and consistency of the data collected is under constant review. Our goal is to provide accurate and valid data for the purpose of injury surveillance, epidemiological research, and policy generation. We are dedicated to these goals and continue to strive for excellence.