



Royal Alexandra Hospital, University of Alberta  
Hospital & Stollery Children's Hospital  
2013 Trauma Report



## TABLE OF CONTENTS

LIST OF FIGURES .....	4
LIST OF TABLES .....	5
DIRECTORS' MESSAGE .....	6
ACKNOWLEDGEMENTS .....	7
1.0 EXECUTIVE SUMMARY .....	8
2.0 GOALS OF THIS REPORT .....	9
3.0 METHODOLOGICAL NOTES .....	9
4.0 DEFINITIONS .....	10
5.0 MAJOR TRAUMA CASES .....	12
5.1 AGE AND GENDER .....	13
5.2 MAJOR TRAUMA BY TRAUMA CENTRE .....	14
5.3 TRAUMA CASES BY MONTH OF YEAR .....	15
5.4 TRAUMA CASES BY DAY OF THE WEEK .....	16
5.5 TRAUMA CASES BY TIME OF DAY .....	17
6.0 PLACE OF INJURY E-849X CODE .....	17
7.0 TRANSPORTATION INCIDENTS: E-CODE 810 – 829.9 .....	21
8.0 MOTOR VEHICLE TRAFFIC INCIDENTS: E-CODE 810-819.9 .....	22
8.1 MOTOR VEHICLE NON-TRAFFIC INCIDENTS: E-CODE 820 – 825.9 .....	24
8.2 PEDAL CYCLE INCIDENTS: E-CODE 826-826.9 .....	26
8.3 OTHER ROAD VEHICLE INCIDENTS: E-CODE 827-829.9 .....	26
8.4 USE OF PROTECTIVE HELMETS – TRANSPORTATION INCIDENTS .....	27
9.0 FALL RELATED INCIDENTS: E-CODE 880-888.9 .....	28
10.0 INTERPERSONAL VIOLENCE INCIDENTS: E-CODE 960-969.9 .....	29
11.0 MECHANISM OF INJURY: OTHER CAUSES .....	31

12.0 ALCOHOL RELATED TRAUMA .....	32
13.0 WORK RELATED TRAUMA .....	32
14.0 TYPE OF INJURY .....	33
15.0 BODY REGION INJURED .....	36
16.0 PROCESS OF CARE .....	36
16.1 PLACE OF INJURY TO TRAUMA CENTRE .....	36
16.2 TRANSFERS .....	37
17.0 TRAUMA CENTRE CARE .....	38
17.1 EMERGENCY DEPARTMENT .....	39
17.2 EMERGENCY DEPARTMENT DISCHARGE DISPOSITION .....	39
18.0 INTENSIVE CARE UNIT (ICU) ADMISSIONS .....	41
19.0 SURGICAL PROCEDURES .....	42
20.0 TRAUMA CENTRE LENGTH OF STAY (LOS) .....	42
21.0 PATIENT OUTCOMES .....	43
21.1 DISCHARGE DESTINATION .....	43
22.0 IN-HOSPITAL DEATHS .....	44
23.0 PERFORMANCE INDICATORS .....	45
24.0 TRAUMA SCORE INJURY SEVERITY SCORE (TRISS) METHODOLOGY .....	49
25.0 CONTINUED COMMITMENT TO THE EXCELLENCE OF TRAUMA CARE .....	51
25.1 ADVANCED TRAUMA LIFE SUPPORT (ATLS) .....	52
25.2 ADVANCED TRAUMA OPERATIVE MANAGEMENT (ATOM) .....	52
25.3 CHILD HEALTH INJURY SYMPOSIUM .....	52
25.4 TRAUMA NURSE CORE COURSE (TNCC) EMERGENCY NURSING PEDIATRIC COURSE (ENPC) .....	53
25.5 TRAUMA SYMPOSIUM .....	53
26.0 RESEARCH AND CONTINUED GROWTH .....	53

**LIST OF FIGURES**

FIGURE 1: MAJOR TRAUMA CASES - 5 YR TREND 2009-2013 .....13

FIGURE 2: MAJOR TRAUMA CASES BY HOSPITAL SITE – 5 YR TREND 2009-2013.....13

FIGURE 3: MAJOR TRAUMA BY AGE AND GENDER.....14

FIGURE 4: MAJOR TRAUMA CASES BY MONTH.....15

FIGURE 5: MAJOR TRAUMA BY DAY OF THE WEEK.....16

FIGURE 6: MAJOR TRAUMA CASES BY TIME OF DAY.....17

FIGURE 7: ALL TRANSPORTATION 5 YR TREND.....21

FIGURE 8: TRANSPORTATION INCIDENTS BY AGE GROUP AND GENDER.....21

FIGURE 9: MVC 5 YR TREND.....22

FIGURE 10: MOTOR VEHICLE TRAFFIC INCIDENT BY AGE AND GENDER 2013.....22

FIGURE 11: SEATBELT USE FOR MAJOR TRAUMA INVOLVING PASSENGER VEHICLES.....23

FIGURE 12: NON-TRAFFIC MOTOR VEHICLE 5 YR TREND.....24

FIGURE 13: MOTOR VEHICLE NON-TRAFFIC INCIDENTS BY AGE AND GENDER.....25

FIGURE 14: MOTOR VEHICLE NON-TRAFFIC INCIDENT BY VEHICLE TYPE.....25

FIGURE 15: BICYCLE 5 YR TREND.....26

FIGURE 16: USE OF PROTECTIVE HELMETS AND MECHANISMS OF INJURY.....27

FIGURE 17: FALL RELATED INDIDENTS 5 YR TREND.....28

FIGURE 18: FALLS BY AGE AND GENDER.....29

FIGURE 19: VIOLENCE 5 YR TREND.....29

FIGURE 20: INTERPERSONAL VIOLENCE BY AGE AND GENDER.....30

FIGURE 21: PROPORTION OF MAJOR TRAUMA CASES BY INJURY TYPE.....34

FIGURE 22: PROPORTION OF BLUNT TRAUMA CASES BY HOSPITAL SITE.....34

FIGURE 23: PROPORTION OF PENETRATING TRAUMA CASES BY HOSPITAL SITE.....35

FIGURE 24: PROPORTION OF BURN CASES BY HOSPITAL SITE.....35

FIGURE 25: MODE OF TRANSPORT FROM SCENE TO TRAUMA CENTRE.....37

FIGURE 26: FINAL MODE OF TRANSPORT FROM TRANSFER HOSPITAL TO TRAUMA CENTRE.....38

FIGURE 27: PATIENT SURVIVAL BASED ON ISS SCORE.....44

FIGURE 28: MAJOR TRAUMA BY ETIOLOGY.....45

**25.4 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.

**25.6 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. Unfortunately, due to policy changes within Alberta Health Services, the event was unable to be held.

**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.

**Table 27: Trauma Rounds - RAH**

Date	Speaker	Topic
January 16, 2013	Dr. Paul Engels	EAST Practice Management Guidelines: An Update
March 13, 2013	Dr. Angela Chan	The Gravity of Falls
May 15, 2013	Drs. Paul Engels and Sandy Widder	Update from TAC, 2013

**Table 28: Combined Trauma/ICU Rounds – RAH/UAH**

Date	Speaker	Topic
February 12, 2013	Dr. Scott Johnson	The Traumatized Pleural Space
April 16, 2013	Dr. Doug Matheson	Code Orange: On Mass Casualty Situations and Disaster Planning

### 25.1 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 and one ATLS instructor course were offered in 2013 for physicians/residents within the Edmonton and North Zones.

### 25.2 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.

### 25.3 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 2013 there were 210 participants. The theme for the 2013 Symposium was "Tweens, Teens, and Rock 'N' Roll".

## LIST OF TABLES

TABLE 1: HEALTH ZONE OF INJURY IN 2013.....	12
TABLE 2: CAUSE AND PLACE OF INJURY E-849X CODE IN 2013.....	18
TABLE 3: CHARACTERISTICS OF MOTOR VEHICLE TRAFFIC INCIDENTS.....	23
TABLE 4: INCIDENTS OF HEAD INJURIES.....	27
TABLE 5: TYPES OF FALLS.....	28
TABLE 6: TYPES OF INTERPERSONAL VIOLENCE.....	30
TABLE 7: OTHER CAUSES BY PRIMARY ICD 9, E-CODE.....	31
TABLE 8: TRAUMA AND BLOOD ALCOHOL LEVEL.....	32
TABLE 9: WORK RELATED TRAUMA.....	32
TABLE 10: TYPE OF INJURY 5 YEAR TREND.....	33
TABLE 11: BODY REGION INJURED.....	36
TABLE 12: TYPE OF NUMBER OF ER PROCEDURES.....	39
TABLE 13: POST ER DESTINATION AND LENGTH OF TIME IN ER.....	40
TABLE 14: DIRECT ADMISSION DESTINATION.....	40
TABLE 15: MEDIAN LOS IN THE EMERGENCY DEPARTMENT BY ISS GROUPING.....	40
TABLE 16: ICU ADMISSIONS AND LOS.....	41
TABLE 17: BURN UNIT MEDIAN LOS AND GENDER.....	41
TABLE 18: PHYSICIAN SERVICE BY NUMBER OF CASES AND PROCEDURES.....	42
TABLE 19: TRAUMA CENTRE LOS.....	42
TABLE 20: DISCHARGE DESTINATION.....	43
TABLE 21: PERFORMANCE INDICATOR 'AUDIT FILTERS' - RAH/UAH/STOLLERY.....	46
TABLE 22: TRISS ANALYSIS FOR UAH.....	50
TABLE 23: TRISS ANALYSIS FOR STOLLERY.....	50
TABLE 24: TRISS ANALYSIS FOR RAH.....	50
TABLE 25: TRAUMA ROUNDS – UAH.....	51
TABLE 26: TRAUMA RADIOLOGY TEACHING ROUNDS – UAH.....	51
TABLE 27: TRAUMA ROUNDS – RAH.....	52
TABLE 28: COMBINED TRAUMA/ICU ROUNDS – RAH/UAH.....	52

**2013 DIRECTORS MESSAGE**

Enclosed please find the 2013 Edmonton Trauma Report. This report provides a picture of the 1415 severely injured patients (Injury Severity Score >=12) treated in Edmonton in 2013. Edmonton provides Level 1 trauma care for Northern Alberta, northeastern BC, and the Northwest Territories. This report does not encompass all injury in Northern Alberta, only the most severe. Within Edmonton trauma centres, more trauma of lesser injury severity (ISS<12) is seen.

Five year data trends suggest that the incidence of some severe trauma is diminishing (motor vehicle collisions, violence), while the incidence of other events is increasing (bicycle related events).

The Alberta Trauma Registry provides more data than is described in this report. This data is available to users for QI, QA and research purposes.

This report is only possible due to the hard work and dedication of our Alberta Trauma Registry data registrars (Irma Brown, Michelle Sadler and Bonnie Duley) overseen by the Edmonton Trauma Coordinators (, Rachelle Saybel, Cathy Falconer, and Mark Fuhr).

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 Trauma Director (January 1, 2013 –December 31, 2013)  
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**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 25: Trauma Rounds - University of Alberta Hospital**

Date	Speaker	Topic
March 14, 2013	Dr. Matthew Menon	2013 Musculoskeletal Trauma Update
May 9, 2013	Dr. R.J. Brisebois, CD	Blast Injuries
June 13, 2013	Dr. Matthew Menon	2013 Musculoskeletal Trauma Update
October 10, 2013	Dr. Alison Kabaroff	Hypothermia – You Aren't Dead Unless You Are Warm and Dead – Unless You Are Dead
November 14, 2013	Dr. Eric Huang	Cervical Spine Clearance in the Unconscious ICU Patient

**Table 26: Trauma/Radiology Teaching Rounds - University of Alberta Hospital**

Date	Speaker	Topic
January 11, 2013	Dr. Ed Wiebe	Radiology Case Review
March 1, 2013	Dr. Ed Wiebe	Radiology Case Review
May 3, 2013	Dr. Ed Wiebe	Radiology Case Review
May 31, 2013	Dr. Ed Wiebe	Radiology Case Review
October 4, 2013	Dr. Ed Wiebe	Radiology Case Review
December 13, 2013	Dr. Ed Wiebe	Radiology Case Review

**Table 22: TRISS analysis for University of Alberta Hospital**

University of Alberta Hospital			
2013	Z Score	W Score	Sample Size
Adult Blunt	2.72	2.65	601
Adult Penetrating	0.27	-	29
Total	2.72	2.58	630

**Table 23: TRISS analysis for Stollery Children's Hospital**

Stollery Children's Hospital			
2013	Z Score	W Score	Sample Size
Paediatric	1.30	-	56
Total	1.30	-	56

**Table 24: TRISS analysis for Royal Alexandra Hospital**

Royal Alexandra Hospital			
2013	Z Score	W Score	Sample Size
Adult Blunt	0.60	-	416
Adult Penetrating	2.07	6.25	29
Paediatric	0.12	-	1
Total	0.97	-	446

**ACKNOWLEDGEMENTS**

The University of Alberta Hospital & Stollery Children's Hospital's Trauma Registry is managed by the Trauma Services Department at the University of Alberta Hospital. The Royal Alexandra Hospital Trauma Registry is managed at the Royal Alexandra Hospital. We would like to thank the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital for helping to create this document and for their ongoing support of the Trauma Registry.

The Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital 2013 Trauma Report was prepared by the Alberta Trauma Registry under the direction of Dr. Mary vanWingaarden-Stephens, by:

Irma Brown, Senior Data Analyst, University of Alberta Hospital & Stollery Children's Hospital  
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We would like to thank the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospitals' Trauma Services staff for providing content feedback and their respective data analysts for dedication to quality data input:

Bonnie Duley, Data Analyst, Royal Alexandra Hospital  
 Mark Fuhr, Trauma Coordinator, Royal Alexandra Hospital

Cathy Falconer, Pediatric Trauma Coordinator, Stollery Children's Hospital  
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## 1.0 EXECUTIVE SUMMARY

The Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital 2013 Trauma Report includes information on the epidemiology, process of care, and outcomes of major traumatic injuries (Injury Severity Score  $\geq 12$ ) for the patients admitted to a trauma centre in the Edmonton Zone.

This report focuses on the 1415 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, 2013 – December 31, 2013 calendar year. Unless otherwise stated, the following information is specific to the 2013 calendar year:

There were 1415 major trauma cases (ISS  $\geq 12$ ) admitted to these three trauma centres in the Edmonton Zone.

Of these major trauma patients, 56.4% (n=798) were injured within the Edmonton zone.

The three leading mechanisms of injury for major trauma were, Transportation Related (47.2%, n= 668), Falls (30.5%, n= 431), and Interpersonal Violence (10.6%, n=150). **pg 21, 28 & 29 respectively**

Overall, males accounted for 74.1% (n=1048) of the major trauma cases. **pg 13**

- The busiest months for major trauma admissions were May and August (n=157, and n= 153, respectively). **pg 15**
- The highest number of injuries occurred between the hours of 1200 hr and 1559hr (n= 274). **pg 17**
- Most major trauma, 44.7% (n=632), occurred on the street, while 24.1% (n=341), occurred at home. **pg 18-20**
- The leading cause of major trauma was 'transport related incidents', encompassing 47.2% (n=668) of all cases. **pg 21**
- Approximately 36.2% (n=118) 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 23**
- The number of major trauma cases admitted due to injuries caused by 'motor vehicle non-traffic incidents' (E-codes 820-825.9) was 128 cases (9.0%). **pg 24**
- Among riders of all-terrain vehicles (ATV), 69.67% (n= 55/79) of the persons injured were not wearing a helmet. **pg 27**
- Motorcyclists had the highest helmet use with 92.2% (n= 83/90) of patients wearing a helmet. **pg 27**
- Of the 1415 major trauma patients (over the age of 10), 74.6% (n=1016) were tested for alcohol levels upon arrival at an Alberta Health Services Edmonton Zone trauma centre, of these 1016, 33.6% (n=341) tested positive. **pg 32**
- Work-related injuries comprise 11.1% (n=157) of the total injuries admitted to Alberta Health Services Edmonton Zone trauma centre. **pg 32**
- The leading causes of work related injuries are falls n= 51 (32.5%), followed by transportation related incidents n= 48 (30.6%). **pg 32**
- Of the 879 major trauma patients with a head injury, 69.5% (n=611) of these were classified as severe (AIS  $\geq 4$ ). **pg 36**

## 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<sup>1</sup>.

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 2013 at the University of Alberta Hospital Trauma Centre.

**Table 22** indicates the TRISS scores for 2013 at the Stollery Children's Hospital Trauma Centre.

**Table 23** indicates the TRISS scores for 2013 at the Royal Alexandra Hospital Trauma Centre.

<sup>1</sup> 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.



<b>k) Patient had missed injuries that subsequently required surgery.</b>		
Indicator	Yes	Total Patients
RAH	1	511
UAH	2	854
Stollery	0	103

<b>l) Did the trauma team response time exceed 20 minutes?</b>		
Indicator	Yes	Total Patients
RAH	1	511
UAH	0	801
Stollery	0	103

<b>m) Length of time at rural hospital exceeded rural hospital guidelines: ≤ 200km = 3hrs, 200-400km = 4hrs, &gt; 400km = 6hrs</b>		
Indicator	Yes	Total Patients
RAH		511
UAH	0	801
Stollery	0	103

<b>n) Patient died during transport.</b>		
Indicator	Yes	Total Patients
RAH	0	511
UAH	0	801
Stollery	0	103

<b>o) Patient died &lt; 24 hours of admission.</b>		
Indicator	Yes	Total Patients
RAH	26	511
UAH	19	801
Stollery	6	103

- Fifty six percent, 56.5%, (n=800) of the major trauma patients were admitted directly to an Alberta Health Services Edmonton Zone trauma centre from the scene of injury while 43.5% (n=615) were transferred from another facility. **pg 36, 37 & 38**
- After leaving the Emergency Department, 65.3% (n=892) of the major trauma patients were admitted as inpatients to a hospital ward (i.e. trauma unit, orthopedic units, general surgical unit), 17.7% (n=242) were admitted directly to an Intensive Care Unit (ICU), 12.9% (n=177) went directly to the operating room and 1.3% (n=18) went to the Burn Unit. **pg 39**
- 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 25 minutes. **pg 40**
- At some time during their treatment, 30.2% (n=428) of the major trauma patients required specialized care in an intensive care unit. **pg 41**
- The median ICU length of stay (all ICU admissions) was 5 days, the range was 1-131 days. **pg 41**
- Of the 1415 trauma patients 47.1% (n=666) required at least one visit to the operating room. **pg 42**
- The median Trauma Centre length of stay was 7 days; the range was 0-331 days. **pg 42**
- Of the 1415 major trauma patients admitted to an Alberta Health Services Edmonton Zone trauma centre, 9.5% (n=134) died. **pg 44**
- More than half, 67.0% (n=858) of the major trauma cases were discharged home, 16.0% (n=227) were discharged to another acute care facility and 9.1% (n=129) were referred to a rehabilitation facility. **pg 43**

Trauma Team Activation and Trauma Team Leader Coverage rates were not collected in 2013.

## 2.0 GOALS OF THIS REPORT

- To examine the epidemiology of major (ISS ≥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 2013 Trauma Report consists of information on patients hospitalized with major trauma in the calendar year January 1<sup>st</sup> to December 31<sup>st</sup>, 2013.

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.

Trauma quality indicators such as Trauma Team Activation rates, Trauma Team Leader Coverage, Missed Injuries and Readmission rates are not included, as this information was not collected by any of the trauma registries in 2013.

#### 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).

**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-9<sup>th</sup> revision). These codes allow for the classification and analysis of environmental events, circumstances, and conditions as the cause of injury.

**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.

f) Patient sustained a gunshot wound to the abdomen who was managed non-operatively.		
Indicator	Yes	Total Patients
RAH	0	511
UAH	1	801
Stollery	0	103

g) Patient with a femur fracture that was operated on > 24 hours after admission.		
Indicator	No	Total Patients
RAH	10	511
UAH	0	801
Stollery	0	103

h) Patient with a compound fracture that was operated on > 6 hours after admission		
Indicator	No	Total Patients
RAH	19	511
UAH	0	801
Stollery	0	103

i) Unplanned return to the operating room within 48 hours of initial procedure.		
Indicator	Yes	Total Patients
RAH	1	511
UAH	0	801
Stollery	0	103

j) Trauma patient admitted to hospital under other than a surgeon or intensivist.		
Indicator	Yes	Total Patients
RAH	31	511
UAH	0	801
Stollery	0	103

**Table 21(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	390	511
UAH	72	801
Stollery	0	103

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	111	511
UAH	26	801
Stollery	0	103

c) Patient with epidural or subdural brain hematoma receiving craniotomy > 4 hours after arrival in ER.		
Indicator	Yes	Total Patients
RAH	16	511
UAH	1	801
Stollery	0	103

d) Patient with diagnosis at discharge of cervical spine injury, not indicated on admission diagnosis.		
Indicator	Yes	Total Patients
RAH	1	511
UAH	1	801
Stollery	0	103

e) Patient requiring a laparotomy that was not performed within 1 hour of arrival to ER.		
Indicator	Yes	Total Patients
RAH	5	511
UAH	3	801
Stollery	1	103

**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  $\geq 12$ .

**Median:** A measure of central tendency of a set of observations; it is the 50<sup>th</sup> 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.

**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 (Level II)
- University of Alberta Hospital, Edmonton (Level I)
- Stollery Children's Hospital, Edmonton (Level I)

### 5.0 MAJOR TRAUMA CASES

From January 1, 2013 to December 31, 2013, there were 1415 patients who were seriously injured and treated at an Alberta Health Services Edmonton Zone Trauma Centre.

**Table 1: Health Zone of Injury in 2013**



**NORTH ZONE = (n= 351) 24.8%**  
(Zone 5)

Edmonton Zone = (n 798=) 56.4%  
(Zone 4)

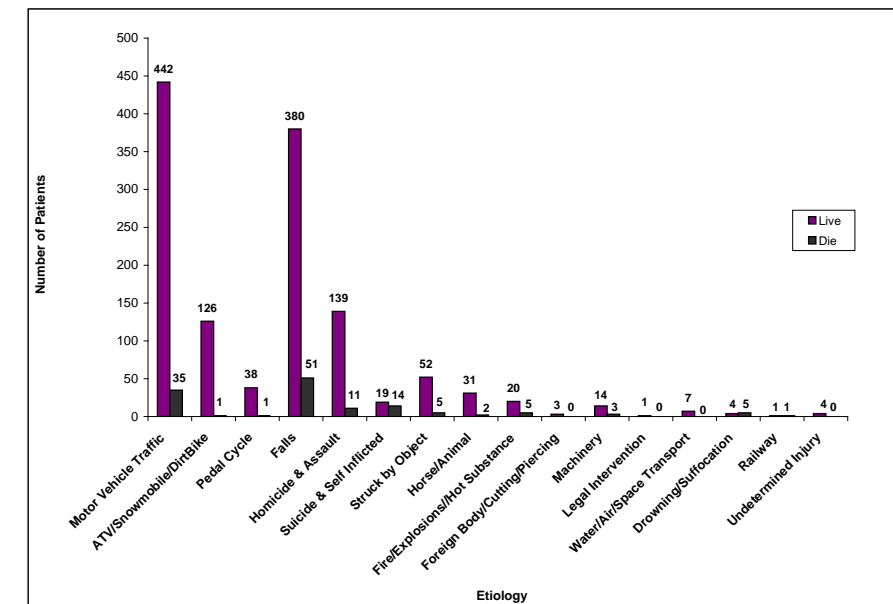
Central Zone = (n= 190) 13.4%  
(Zone 3)

Calgary Zone = (n= 1) 0.1%  
(Zone 2)

South Zone = (n=1) 0.1%  
(Zone 1)

Out of Province = (n= 74) 5.2%

**Figure 28: 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.

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 2013 calendar year.

## 22.0 IN-HOSPITAL DEATHS

Of the 1415 major trauma patients admitted to the Royal Alexandra Hospital, University of Alberta Hospital & Stollery Children's Hospital's trauma centres, 90.5% (n=1281) lived while, 9.5% (n=134) died. Of these deaths, 28.4% (n=38) died in the Emergency Department. Injury severity is correlated to the risk of dying from a traumatic injury, with 66.7% (n=2) of the major trauma patients with an ISS = 75 (n=3) not surviving.

Figure 27 depicts major trauma patient survival by ISS score.

Figure 28 demonstrates the 2013 trauma live/death by etiology.

**Figure 27: Patient Survival Based on ISS Score**

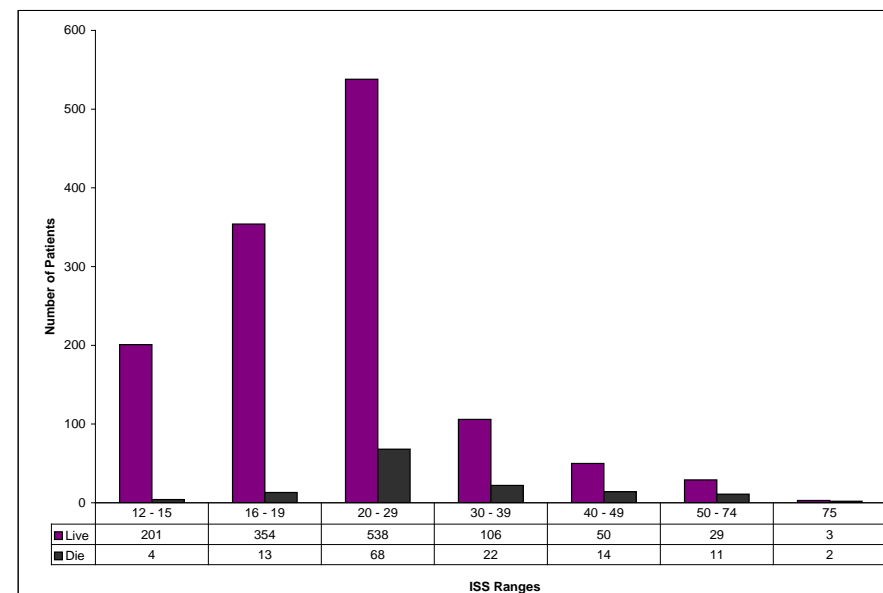


Figure 1 displays the collective trends in the major trauma cases over a five year period.

**Figure 1: Major Trauma Cases – 5 Year Trend (2009-2013)**

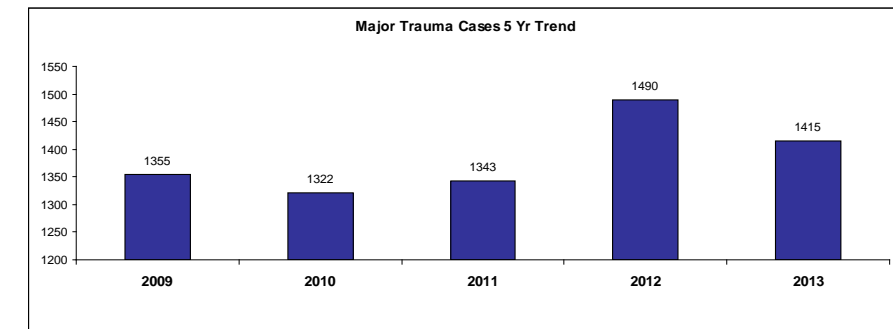
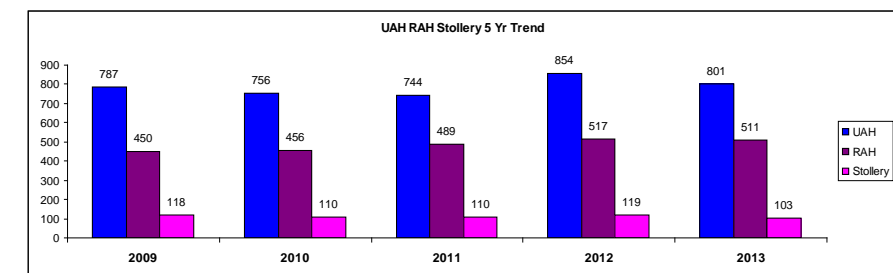


Figure 2 displays trends by hospital site over a five year period

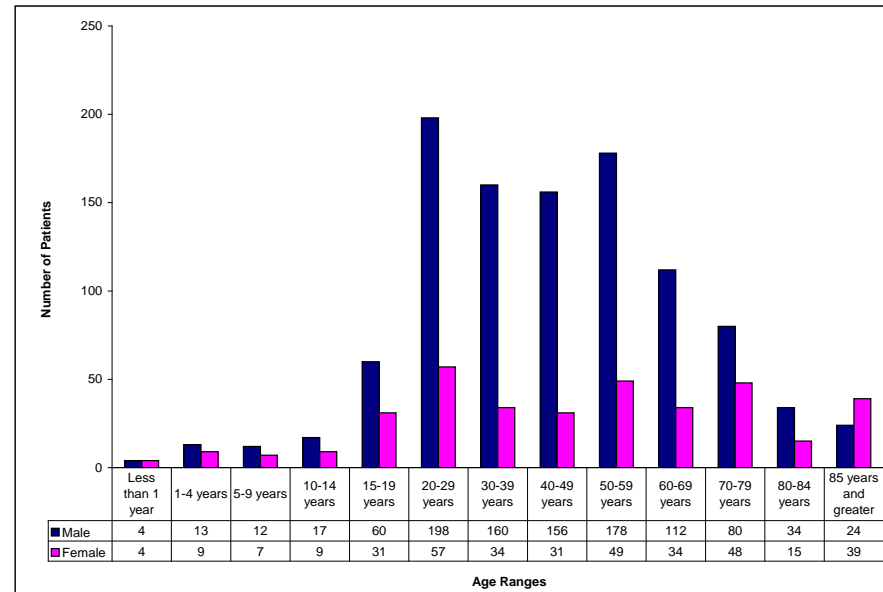
**Figure 2: Trauma Cases by Hospital Site - 5 Year Trend (2009-2013)**



## 5.1 AGE AND GENDER

Figure 3 displays the age and gender distribution of major trauma admissions to the Alberta Health Services Edmonton Zone Trauma Centres during 2013. Males accounted for 74.1% (n= 1048) of the major trauma cases. Males ages 20-29 years old had the largest incidents of major trauma with, 14.0% (n= 198).

**Figure 3: Major Trauma by Age and Gender**



**5.2 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 2013, 56.6% (N=801) of adult trauma patients were treated at the University of Alberta Hospital while 36.1% (N=511) were treated at the Royal Alexandra Hospital. Pediatrics accounted for 7.3% (N=103) of major trauma and they were all treated at the Stollery Children's Hospital.

**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=1281; 90.5%) over half were discharged home (n=858, 67.0%), 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 2013. This year saw 67.0% (n=858) patients discharged home or home with support services.

Unfortunately, in 2013, the number of missed injuries and readmissions were not included in any of the Edmonton Zone Trauma Registries.

**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 20: Discharge Destination**

Discharged To	Count	Percentage n=1415
Home	768	54.3%
Another Acute Care Facility	227	16.0%
Rehabilitation Facility	129	9.1%
Died	134	9.5%
Home with Support Services	90	6.4%
Chronic Care Facility	25	1.8%
Nursing Home	19	1.3%
Other	23	1.6%

### 19.0 SURGICAL PROCEDURES

12.9% percent (n=177) of the major trauma patients went directly from the Emergency Department to the Operating Room (OR). Of the 1415 major trauma patients treated, 47.1% (666) required at least one visit to OR. The table below reflects the OR utilization by physician service (number of cases). There was 1 death in the OR in 2013.

**Table 18: Physician Service by Number of Cases and Procedures**

Physician Service	Number of OR Cases n= 826	Number of OR Procedures n= 1656
ENT	12	31
General Surgery	93	195
Neurosurgery	159	210
Orthopaedics	325	729
Ophthalmology	7	9
ICU	30	31
Pediatric Surgery	5	9
Plastics	148	369
Urology	12	14
Cardiovascular	4	5
Thoracics	21	41
Other	10	13

### 20.0 TRAUMA CENTRE LENGTH OF STAY (LOS)

During 2013, the 1415 major trauma patients had a median LOS of 6 days. The median LOS according to ISS grouping is shown in **Table.18**.

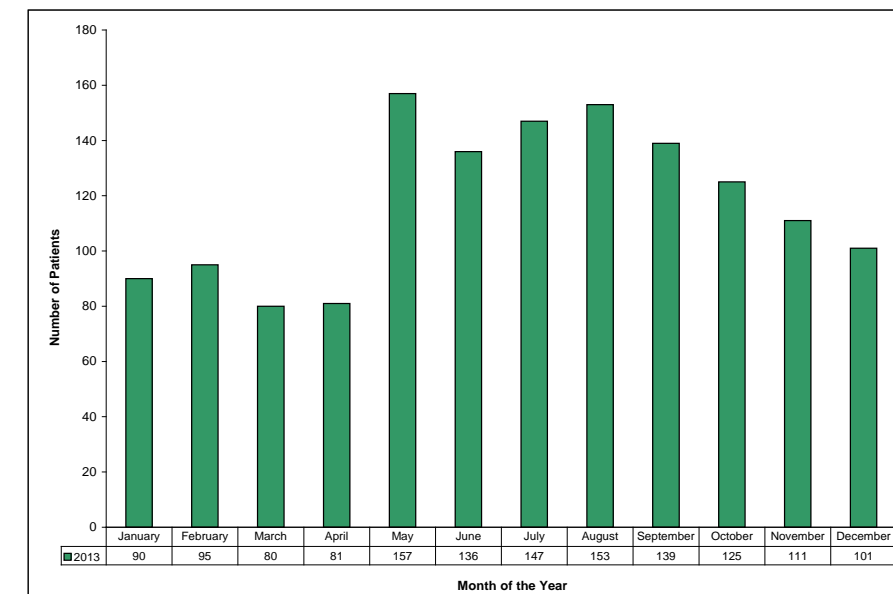
**Table 19: Trauma Centre LOS**

	# Admissions	Median LOS (Days)	Range (Days) ?Start at 1? Irma
All Cases	1415	7	0 – 331
ISS 12 – 15	205	4	1 – 139
ISS 16 – 19	367	5	0 – 92
ISS 20 – 29	606	8	0 – 331
ISS 30 – 39	128	16	0 – 114
ISS 40 – 49	64	19	0 – 112
ISS 50 – 74	40	30	0 – 138
ISS 75	5	85	0 - 180

### 5.3 TRAUMA CASES BY MONTH OF YEAR

**Figure 4** shows the distribution of major trauma by month. During the 2013 calendar year, May had the highest incidents of major trauma, with 11.1% (n=157) of the total year's trauma. This was followed by August with 10.8% (n= 153) and July with 10.4% (n= 147).

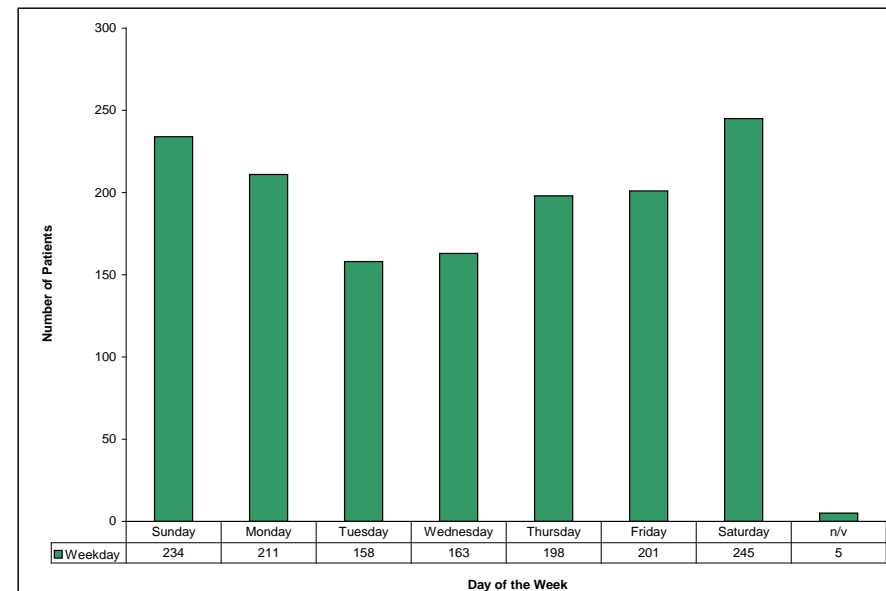
**Figure 4: Major Trauma Cases by Month**



### 5.4 TRAUMA CASES BY DAY OF THE WEEK

Figure 5 shows during the 2013 calendar year, 17.3% (n=245) of the major trauma cases occurred on a Saturday, followed by Sunday with 16.5% (n=234) of all cases.

Figure 5: Major Trauma by Day of the Week



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

### 18.0 INTENSIVE CARE UNIT (ICU) ADMISSIONS

At some point during their treatment in a trauma centre, 30.2% (n=428) of the major trauma patients required specialized care in an intensive care unit. Of these 428 patients, (not including burn unit or step-down unit) 242 (56.5%) were admitted directly from the ED. The median ICU length of stay by ISS groupings are listed in Table 15.

Table 16: ICU Admissions and ICU LOS

	# of Admissions to an ICU	% of ICU admissions	Median LOS (Days)	Range (Days)
All ISS Groups	428	100%	5	1 - 131
ISS 12 – 15	15	3.5%	4	1 - 15
ISS 16 – 19	60	14.0%	3	1 - 43
ISS 20 – 29	195	45.6%	5	1 - 131
ISS 30 – 39	80	18.7%	6	1 – 99
ISS 40 – 49	40	9.3%	9	1 - 112
ISS 50 - 74	36	8.4%	13	1 - 34
ISS 75	2	0.5%	16	12 - 20

#### University of Alberta Fire Fighters Burn Unit

Twenty three 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. One burn patient was pronounced deceased in the Royal Alexandra Hospital ED. 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 25 years of age.

Table 17: Burn unit LOS and gender

	# of Admissions	Median & Range LOS (Days)	Males	Females
All ISS Groups	24	27 (0 – 180)	20	4
ISS 12 – 15	0	0	0	0
ISS 16 – 19	9	18 (14 – 31)	6	3
ISS 20 – 29	11	34 (0 – 131)	10	1
ISS 30 – 39	0	0	0	0
ISS 40 – 49	2	63 (13-112)	2	0
ISS 50 – 74	0	0	0	0
ISS 75	2	90 (1-180)	2	0



**Table 13: Post ER Destination and Length of Time in ER**

Post ED Destination	n= 1367*	%	Median/Range
Ward	892	65.3%	7 hrs 50 minutes (18 min – 51 hrs 59 min)
Intensive Care Unit	242	17.7%	4 hrs 46 minutes (46 min – 38 hrs 56 min)
Operating Room	177	12.9%	3 hrs 6 minutes (10 min – 36 hrs 50 min)
Died in Emergency	38	2.8%	0 hr 28 minutes (1 min – 12 hrs 45 min)
Burn Unit	18	1.3%	2 hrs 6 minutes (59 min – 4 hrs 39 min)

\* This number is only patients who made a stop in the ED, it does not include patients directly admitted (n=48)

**Table 14: Direct Admission Destination**

Direct Admission Destination	n = 48	%
Ward	24	50.0 %
ICU	17	35.4 %
Burn Unit	4	8.3 %
OR	3	6.3 %

**Table 15: Median LOS in the Emergency Department by ISS Grouping.**

ISS Grouping	n= 1367*	%	Median/Range
All ISS Groupings	1367	100%	6 hrs 25 min (1 min – 51 hrs 59 min)
ISS 12 – 15	199	14.5%	7 hrs 43 min (1 hr 2 min – 32 hrs 2 min)
ISS 16 – 19	359	26.3%	6 hrs 56 min (15 min - 46 hrs 31 min)
ISS 20 – 29	581	42.5%	6 hrs 26 min (4 min - 51 hrs 59 min)
ISS 30 – 39	126	9.2%	4 hrs 45 min (1 min - 38 hrs 56 min)
ISS 40 – 49	60	4.4%	4 hrs 41 min (24 min - 18 hrs 27 min)
ISS 50 – 74	37	2.7%	3 hrs 35 min (26 min - 20 hrs 26 min)
ISS 75	5	0.4%	1 hrs 24 min (16 min – 5 hrs 33 min)

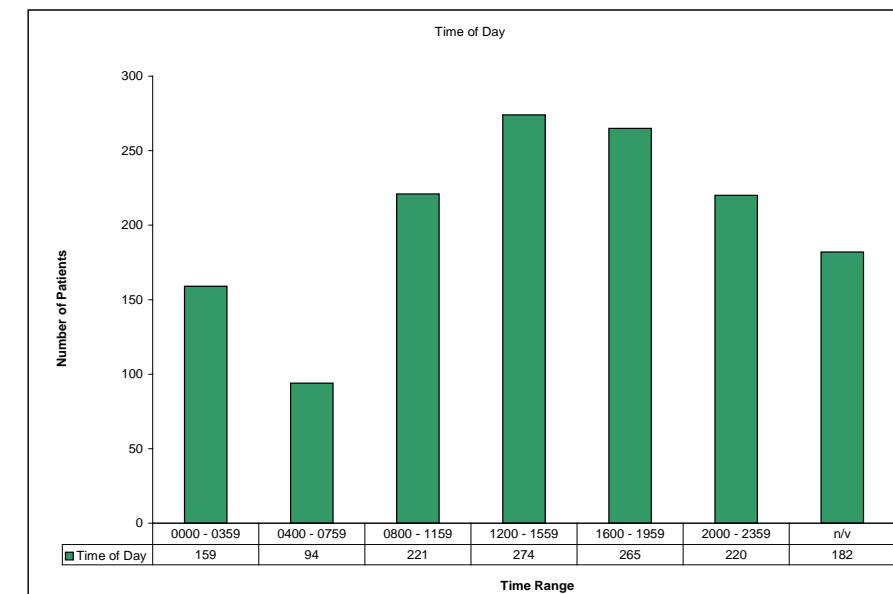
Note: A time <10 min usually is indicative of a death in the ER.

\*This number is only patients who made a stop in the ED, it does not include patients directly admitted (n=48).

**5.5 TRAUMA CASES BY TIME OF DAY**

For the 2013 calendar year, most major trauma injuries (19.4%) occurred between 1200h-1559h (n=274) followed by 1600-1959h with 18.7% (n=265). **Figure 6** shows the distribution of injury events by the time of day.

**Figure 6: Major Trauma Cases by Time of Day**



\*\*Note: for 182 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 44.7% (n=632) of all injuries. This was followed by home, with 24.1% (n=341). **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 2013**

	Home	Farm	Mine	Industry	Recreational	Street	Public Building	Residential Institution	Other	Unspecified	Total
Railway Accident (800 – 807.9)	0	0	0	1	0	1	0	0	0	0	2
Motor Vehicle Traffic (810 – 819.9)	0	2	0	0	0	466	2	0	7	0	477
Motor Vehicle Non-traffic (820 – 825.9)	2	3	0	1	8	17	0	0	97	0	128
Pedal Cycle (826 – 826.9)	0	0	0	0	4	31	0	0	4	0	39
Other Road Vehicle (827 – 829.9)	1	5	0	0	10	1	0	0	7	0	24
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	1	0	0	0	4	0	6
Vehicle Accident NEC (846 – 848)	0	0	0	0	0	0	0	0	0	0	0
Falls (880 – 888.9)	236	5	0	43	10	55	27	32	18	5	431
Fire & Flame (890 – 899)	9	3	0	2	0	0	0	0	1	0	15
Natural or Environmental Factors (900 – 909.9)	0	4	0	0	1	1	0	0	2	0	8

## 17.1 EMERGENCY DEPARTMENT

Of the 1415 major trauma patients who were admitted to Alberta Health Services Edmonton Zone trauma centres in 2013, 96.6% (n=1367) had their acute care begin in the Emergency Department (ED). The remaining 3.4% (n=48) were admitted directly to a specific patient care service such as the General Surgery, Plastics, 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 12: Type of Number of ED Procedures**

Procedures	Number Procedure	% of Patients (n= 1367*)
CT scan	1114	81.5%
Peripheral IV Insertion	654	47.8%
Foley Catheter	467	34.2%
FAST/Ultrasound	231	16.9%
Splinting	210	15.4%
Gastric Tube Insertion	201	14.7%
Oral Intubation	166	12.1%
Arterial/Central Lines	165	12.1%
Chest Tube Insertion	151	11.1%

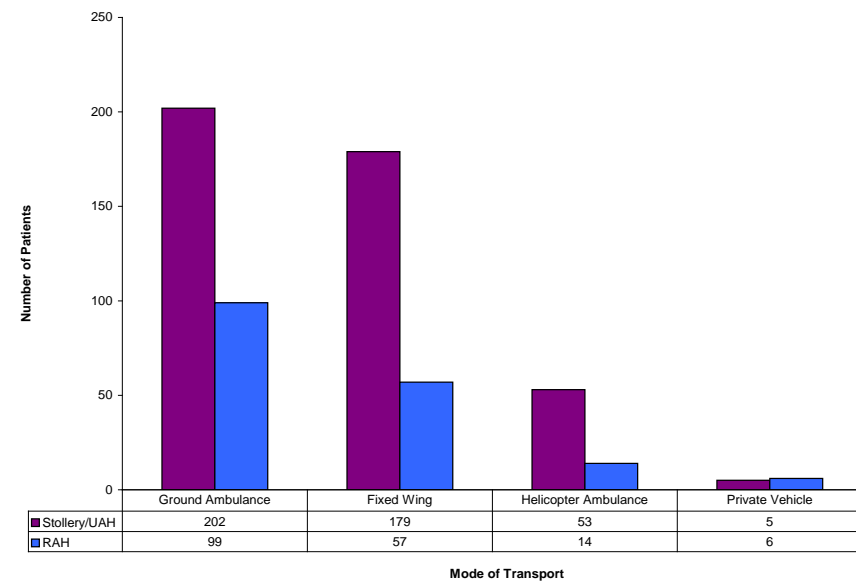
\*This accounts for only the top 9 procedures performed in the Emergency Department. This number is only patients who made a stop in the ED, it does not include patients directly admitted (n=48). Some procedures (eg IV's, Intubation, Chest tubes, Splinting) were already done Prehospital so not included in ED count.

## 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, 65.3% (n=892) of the major trauma patients were admitted to a patient care unit such as a trauma unit, surgical unit, or orthopaedic unit. 17.7% (n=242) were admitted directly to the Intensive Care Unit (ICU), while 12.9% (n= 177) went directly to the operating room and 1.3% (n=18) went to the Burn Unit. In 2013, 2.8% (n=38) 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.

**Figure 26: Final Mode of Transport from Transfer Hospital to Trauma Centre**



**17.0 TRAUMA CENTRE CARE**

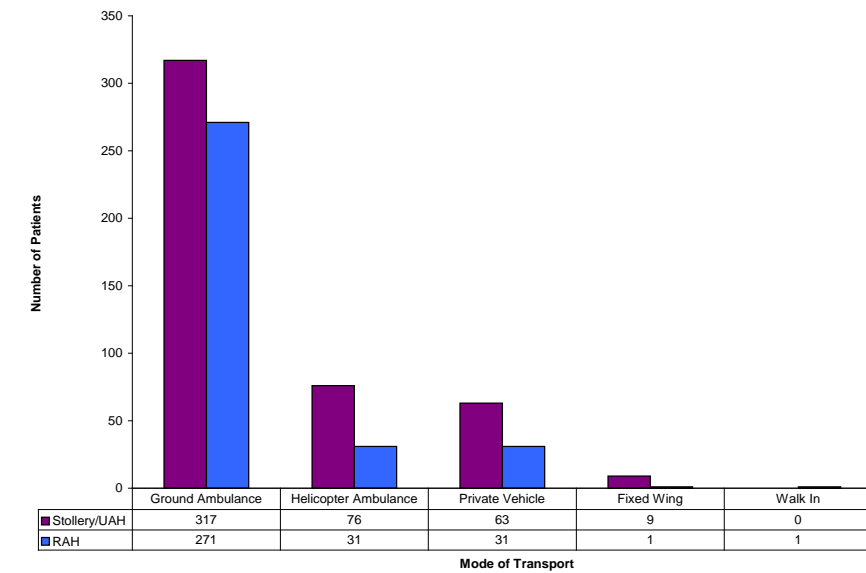
This section refers to care provided to major trauma patients at one of the three trauma centres in the Edmonton Zone for the 2013 calendar year.

	Home	Farm	Mine	Industry	Recreational	Street	Public Building	Residential Institution	Other	Unspecified	Total
Drowning & Suffocation (910 – 913.9)	2	1	0	0	4	0	0	0	2	0	9
Foreign Body (915)	1	0	0	0	0	0	0	0	0	0	1
Struck /Caught in/by Object /Overexertion (916- 918,927)	9	5	0	20	17	0	0	0	6	0	57
Caused by Machinery (919 – 919.9)	1	4	0	9	0	0	0	0	3	0	17
Cutting/Piercing (920-920.9)	2	0	0	0	0	0	0	0	0	0	2
Explosives/Firearms (921 – 923.9)	1	0	0	4	0	1	0	0	1	1	8
Hot Substance/Object or Electric Current (924 – 925.9)	0	0	0	2	0	0	0	0	0	0	2
Suicide/Self Inflicted (950-959)	22	0	0	0	0	2	1	3	5	0	33
Homicide & Assault (960-969.9)	53	1	0	1	1	55	13	3	20	3	150
Legal Intervention (970 – 978)	0	0	0	0	0	0	1	0	0	0	1
Undetermined if accidental or Self Inflicted (980 – 989)	2	0	0	0	0	2	0	0	0	0	4

	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
<b>Totals</b>	<b>341</b>	<b>33</b>	<b>0</b>	<b>84</b>	<b>56</b>	<b>632</b>	<b>44</b>	<b>38</b>	<b>178</b>	<b>9</b>	<b>1415</b>

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

Figure 25: Mode of Transport from Scene to Trauma Centre



## 16.2 TRANSFERS

Transfers from another health care facility to Alberta Health Services Edmonton Zone trauma centres accounted for 43.5% (n=615) of the major trauma admissions.

Of the 615 patients who were transferred from another health care facility, 48.9% (n=301) were transported from a first or second hospital to a trauma centre by ground ambulance, 38.4% (n=236) by fixed wing ambulance, 10.9% (n=67) by helicopter ambulance and 1.8% (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.

### 15.0 BODY REGION INJURED

The most frequent place of injury according to body region is the head. In 2013, there were 879 head injuries; 611 (69.5%) of which were classified as severe (AIS≥4).

**Table 10** displays the number of injuries by body region. In 2013 there were a total of 3393 injuries sustained across 1415 patients.

**Table 11 Body Region Injured**

Body Region	Number of Injuries n = 3393	Percent of Patients with an injury in this region n = 1415
Head/ C spine	932	65.9%
Chest/ T spine	739	52.2%
Extremities/Pelvis	569	40.2%
External (Burns/Abrasions/Contusions/lacerations)	486	34.3%
Abdomen/ L spine	387	27.3%
Face	280	19.8%

\*Note: The total number of injuries will not add up to the 1415 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 centres, for the 2013 calendar year.

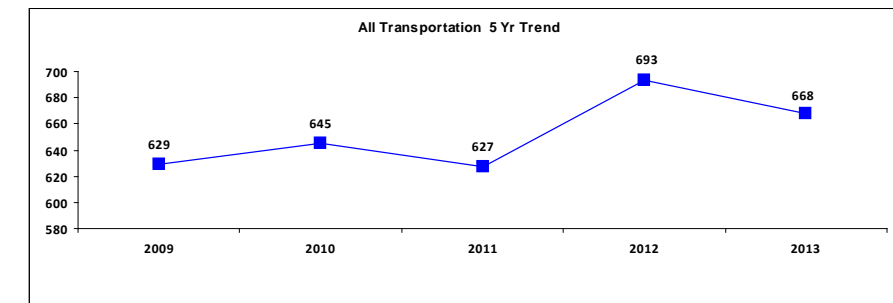
### 16.1 PLACE OF INJURY TO TRAUMA CENTRE

During the 2013 calendar year, 56.5% (n=800) 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 800 injured patients, 73.5% (n=588) were transported to a trauma centre by ground ambulance. Helicopter ambulances were the second most common mode of transportation, accounting for 13.4% (n=107) of the total transports from place of injury to a trauma centre.

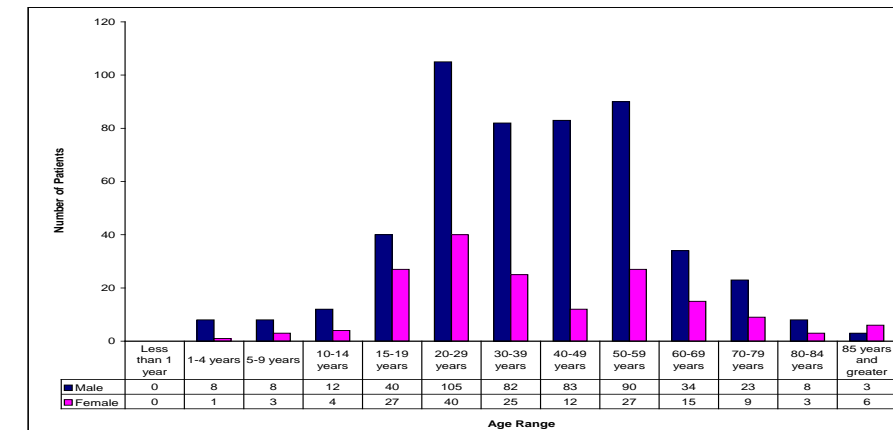
### 7.0 TRANSPORTATION INCIDENTS: E-CODE 810 – 829.9

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 2013, 47.2 % (n=668) of all major trauma cases were due to this cause. Males accounted for 74.3% (n=496) of the major trauma cases due to transportation incidents, while females accounted for 25.7% (n=172).

**Figure 7: All Transportation 5 Year Trend**



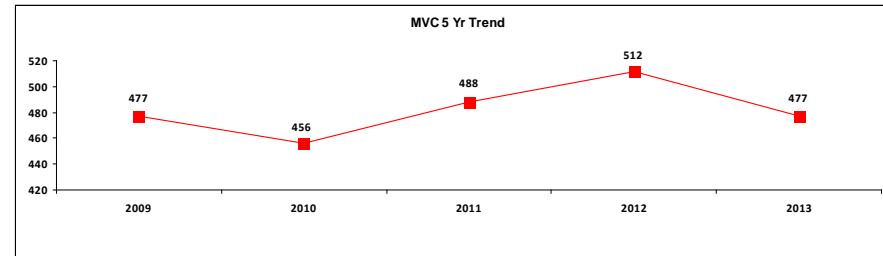
**Figure 8: Transportation Incidents by Age Group and Gender**



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

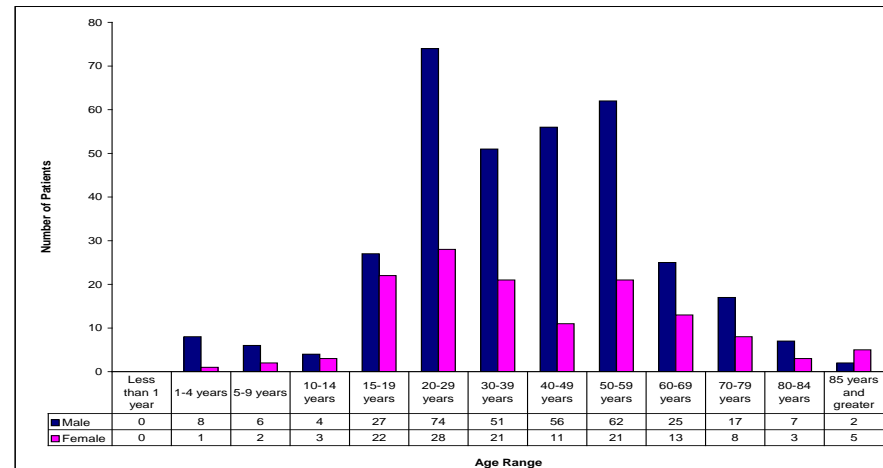
Motor vehicle traffic incidents that occurred entirely on public highways or roads, accounted for 33.7% (n=477) of the major traumas admitted to an Alberta Health Services Edmonton Zone Trauma Centre in 2013.

**Figure 9: MVC 5 Year Trend**

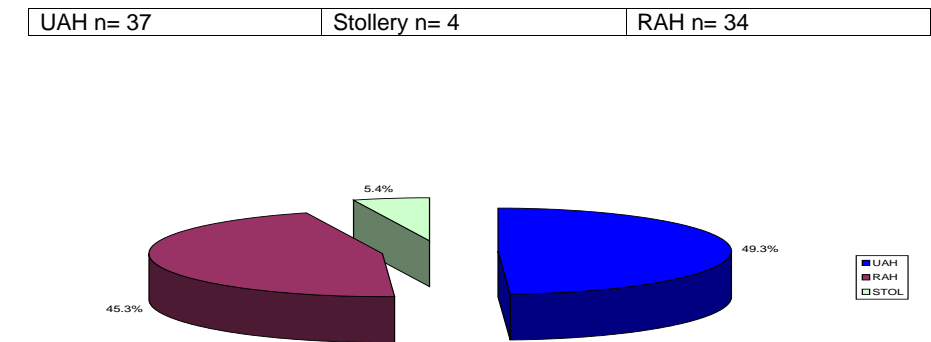


Males accounted for 71.1% (n=339) of motor vehicle traffic incidents. The 20 – 29 year age range accounted for the highest incident in both males and females at 15.5% (n=74) and 5.9% (n=28) respectively. **Figure 10** demonstrates Motor Vehicle Traffic Incidents by age and gender.

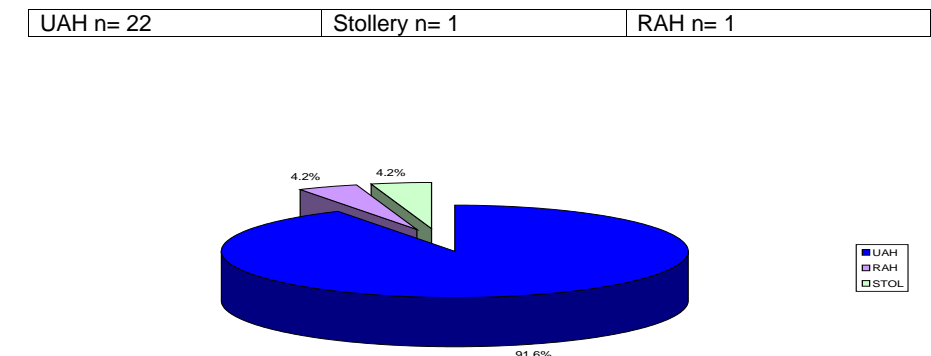
**Figure 10: Motor Vehicle Traffic Incident by Age and Gender 2013**



**Figure 23: Proportion of Penetrating Trauma Cases by Hospital Site**

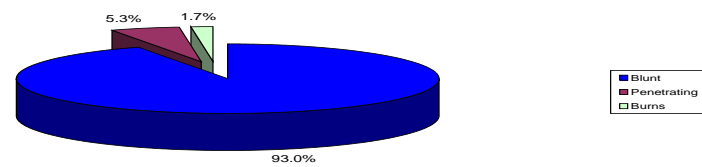


**Figure 24: Proportion of Burn Cases by Hospital Site**



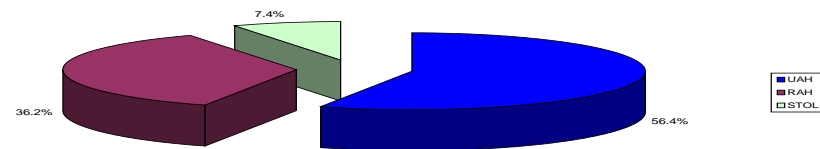
**Figure 21: Proportion of Major Trauma Cases by Injury Type**

Blunt n= 1316	Penetrating n= 75	Burns n= 24
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**Figure 22: Proportion of Blunt Trauma Cases by Hospital Site**

UAH n= 742	Stollery n= 98	RAH n= 476
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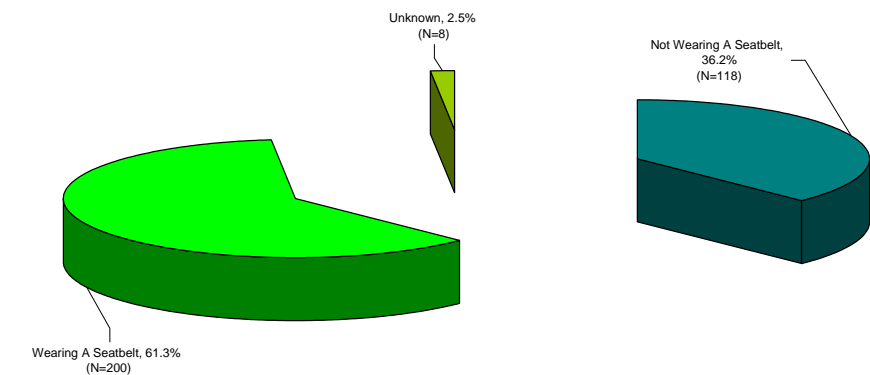
**Table 3: Characteristics of Motor Vehicle Traffic Incidents**

Characteristic	Number of Cases n= 477	Percentage of Total
Driver	203	42.5%
Passenger	133	27.9%
Pedestrian	68	14.3%
Motorcyclist	65	13.6%
Bicyclist	6	1.3%
Hanging on to Vehicle/Other*	2	0.4%

\*Other-Fall from "trunk" of car & "Flat Bed Trailer" pulled by truck

Passenger vehicles such as cars, trucks (including light trucks & heavy trucks; excluding transport trucks), minivans, and SUVs account for 68.3% (n=326) of the motor vehicle traffic incidents. Of these, 61.3% (n=200) were wearing a seatbelt and 36.2% (n=118) were not, for 2.5% (n=8) the use of a seatbelt was unknown, as shown in **Figure 11**.

**Figure 11: Seatbelt Use for Major Trauma Involving Passenger Vehicles**

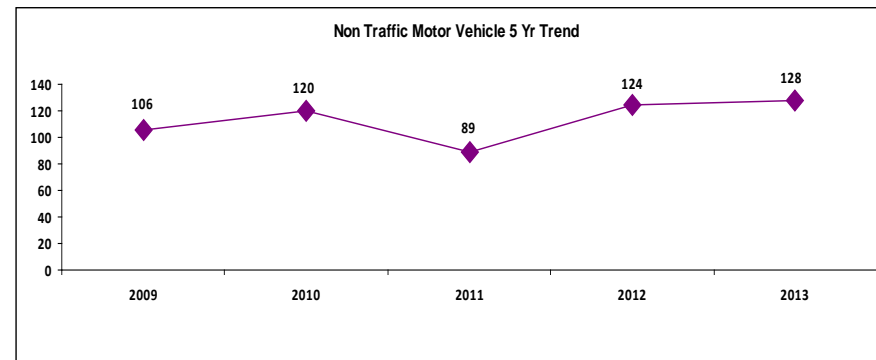


### 8.1 MOTOR VEHICLE NON-TRAFFIC INCIDENTS: E-CODE 820 – 825.9

Motor vehicle non-traffic incidents occurring any place other than public highways or roads accounted for 9.0% (n=128) of the major trauma admitted to Alberta Health Services Edmonton Zone Trauma Centres in 2013. Males accounted for 81.2% (n=104), while females accounted for 18.8% (n=24) of the motor vehicle non-traffic incidents with the most occurring in the 20-29 year age range.

Figure 12 illustrates the 5 year trend of non-traffic motor vehicles

Figure 12: Non-Traffic Motor Vehicle 5 Year Trend



### 14.0 TYPE OF INJURY

Injuries can be grouped by the type of force that causes the trauma.

Table 10: Type of Injury – 5 Year Trend

Type of Injury - 5 Year Trend					
Year	2009	2010	2011	2012	2013
<b>Blunt</b>	<b>1230</b>	<b>1218</b>	<b>1247</b>	<b>1394</b>	<b>1316</b>
RAH	403	418	454	483	476
Stollery	106	104	102	114	98
UAH	721	696	691	797	742
<b>Penetrating</b>	<b>100</b>	<b>85</b>	<b>79</b>	<b>77</b>	<b>75</b>
RAH	47	38	35	34	34
Stollery	8	3	7	4	4
UAH	45	44	37	39	37
<b>Burns</b>	<b>25</b>	<b>19</b>	<b>17</b>	<b>19</b>	<b>24</b>
RAH	0	0	0	0	1
Stollery	4	3	1	1	1
UAH	21	16	16	18	22

Most injuries seen at an Alberta Health Services' Edmonton Zone trauma centre in 2013 were caused by blunt trauma, (Figure 21). 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 (stabblings, gunshot wounds, etc.) may be under-reported (Figure 21). Although penetrating injuries can be very serious, these injuries often do not score an ISS of 12 or greater.



### 12.0 ALCOHOL RELATED TRAUMA

Among the 1415 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 1362 patients (over the age of 10). 74.6 % (n=1016) (age 10 and over) were tested for alcohol use.

Of these, 1016 patients 33.6% (n=341) tested positive for alcohol use. For those who tested positive, the median blood alcohol level was 36.0 mmol/L (Range 2.0 mmol/L – 95.0 mmol/L) which is more than three times the legal level of 11.0 mmol/L.

Of the 341 patients who tested positive for alcohol 52.0% (n=177) were injured in a transportation incident including bicycles, 24.9% (n=85) were injured in a violent altercation and 16.7% (n=57) were injured by a fall.

6.4% (n=22) 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=341	Percentage of n=341
Transportation Related	177	52.0%
Interpersonal Violence	85	24.9%
Falls	57	16.7%
Other	22	6.4%

### 13.0 WORK RELATED TRAUMA

Work related injuries comprise 11.1% (n=157) 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 32.5% (n=51) due to this cause. The second most common mechanism of injury was due to transportation 30.6% (n=48).

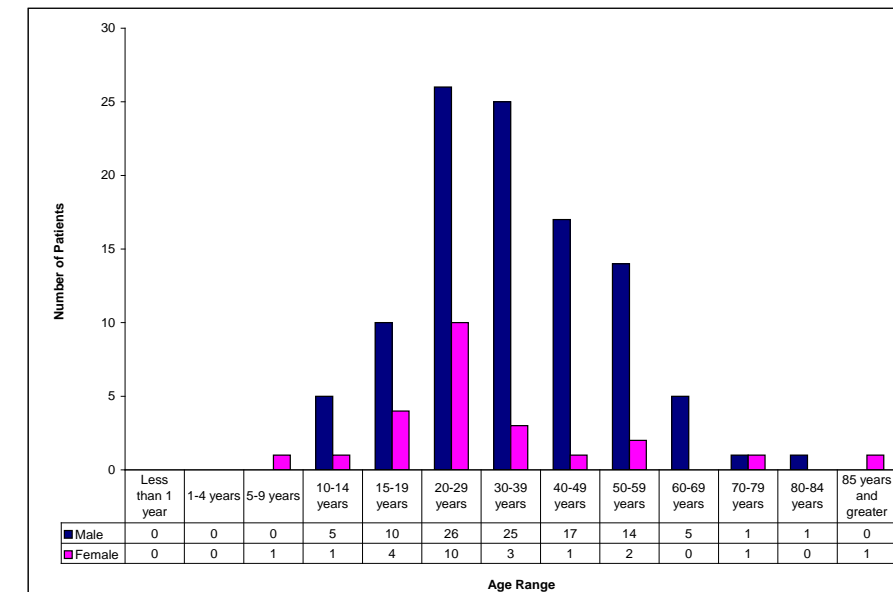
**Table 9** displays these mechanisms of injury.

**Table 9: Work Related Trauma**

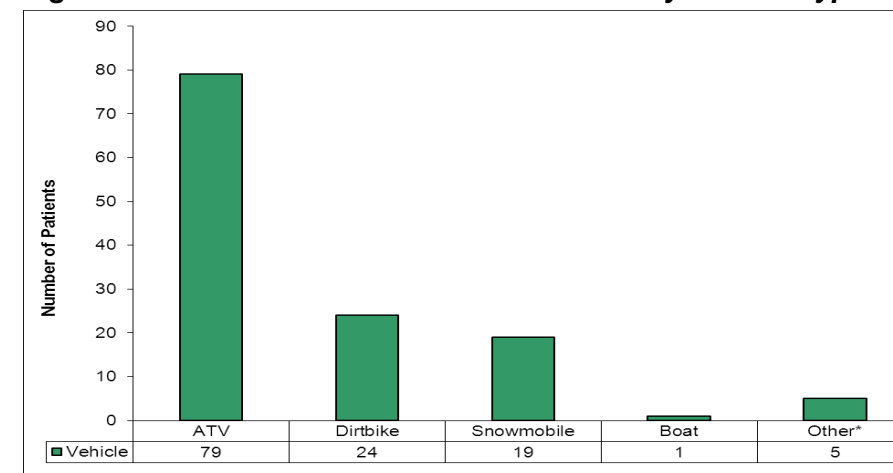
Mechanism of Injury	n= 157	Percentage of n= 157
Falls	51	32.5%
Transportation	48	30.6%
Struck by Object/Tires Exploding	25	16.0%
Caused by Machinery/Hot Substance/Fire and Flame	19	12.1%
Explosion Pressure Vessel	4	2.5%
Caused by Animal (Horse, Bull, Cow)	4	2.5%
Homicide & Assault	3	1.9%
Air & Space Transport	3	1.9%

**Figure 13** demonstrates motor vehicle non-traffic incidents by age and gender and **Figure 14** shows the vehicle type involved in the motor vehicle non-traffic incidents.

**Figure 13: Motor Vehicle Non-Traffic Incidents by Age and Gender**



**Figure 14: Motor Vehicle Non-Traffic Incident by Vehicle Type**



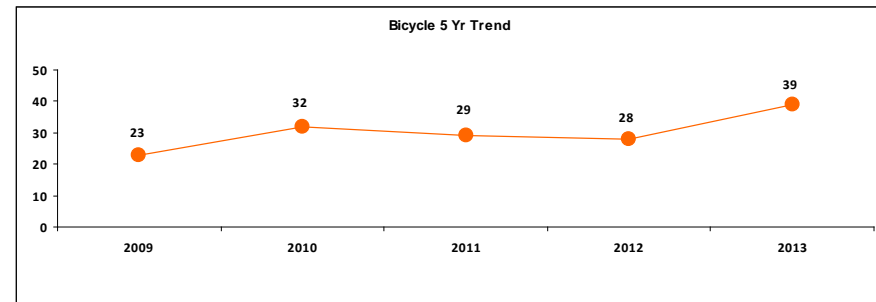
*Other\* includes patients boarding vehicle, vehicle falling on patients*

### 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 2.8% (n=39) of the major trauma admitted to an Alberta Health Services Edmonton Zone trauma centre in 2013.

\*Does not include pedal cycle involved in a motor vehicle collision (struck by vehicle). **Figure 15** shows the 5 year bicycle trend

**FIGURE 15: Bicycle 5 Year Trend**



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

Other road vehicle incidents accounted for 1.7% (n= 24) of the major trauma cases admitted to an Alberta Health Services Edmonton Zone trauma centre. 17 cases (70.8%) occurred under the E-Code 828.2 involving "horse" being ridden; 4 cases (16.7%) involved animal drawn vehicles; 3 cases (12.5%) involved a "bull" rider.

### 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 2013.

**Table 7** displays the other causes of trauma that occurred in 2013.

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

Other Mechanism of Injury 2013			
Cause of Injury (E-Code)		Total Number n=166	
800-807.9	Railway Accident	2	1.2%
830-838.9	Water Transport	1	0.6%
840-845	Air & Space Transport	6	3.6%
890-899	Fire and Flames	15	9.0%
900-909.9	Natural or Environmental Causes	8	4.8%
910-913.9	Drowning & Suffocation	9	5.4%
915,920-920.9	Foreign Body/Cutting Piercing	3	1.8%
916-			34.4%
917.9,927	Struck by Object or Person in Sports	57	
919-919.9	Caused by Machinery	17	10.3%
921-923.9	Explosives/Firearms	8	4.8%
924-925.9	Hot Substance or Object/Electric Current	2	1.2%
950-959	Suicide / Self-Inflicted *	33	19.9%
970-978	Legal Intervention	1	0.6%
980-989	Undetermined if Accidental or Self Inflicted	4	2.4%
990-999	Operations of War	0	0%

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

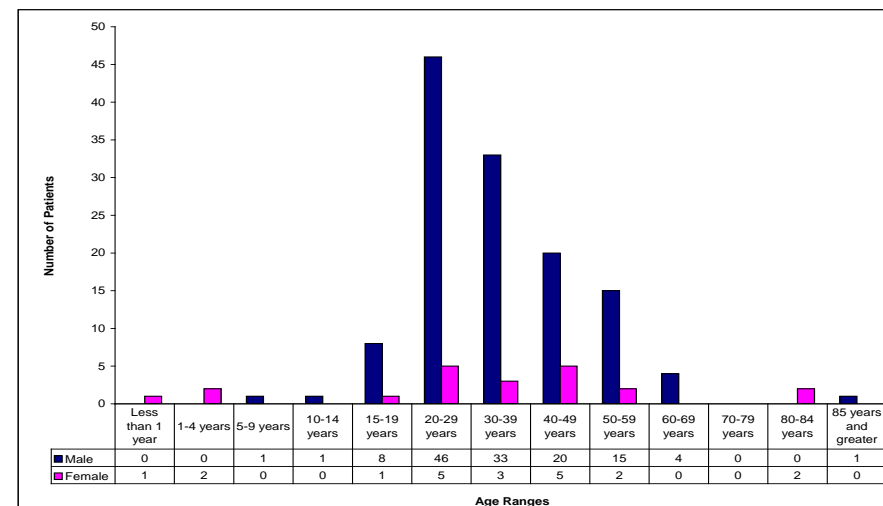
Interpersonal violent acts are defined as injuries purposely inflicted by another person. These types of injuries accounted for 10.6% (n= 150) of all the major trauma admissions to an Alberta Health Services Edmonton Zone trauma facility. The most frequent cause of interpersonal violence injuries were assaults by unarmed Fight/Brawl/Rape. **Table 6** lists the number and type of interpersonal violence incidents for 2013 by E-Code category.

**Table 6: Types of Interpersonal Violence**

E-Code	Description	Number of Patients n=150	Percentage
960.0-9	Fight/Brawl/Rape-Unarmed	57	38.0%
963.0	Assault by Submersion(Drowning)	1	0.7%
965.0-9	Assault by Firearms-Handgun, Hunting Rifle	9	6.0%
966.0	Assault by Stabbings	44	29.3%
967.0-9	Child/Adult Abuse	3	2.0%
968.0-9	Assault by Other Unspecified Means-Striking with Blunt Object, Vehicular/Fire	36	24.0%

Males accounted for 86.0% (n=129) of the major trauma cases due to this mechanism of injury. Of these males, 35.7% (n= 46) were between the ages of 20 and 29 years as represented in **Figure 20**.

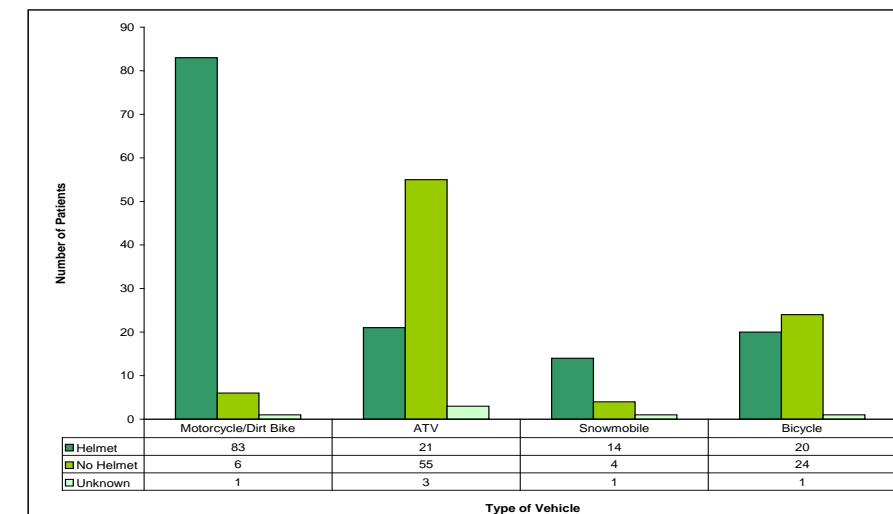
**Figure 20: Interpersonal Violence by Age and Gender**



### 8.4 USE OF PROTECTIVE HELMETS – TRANSPORTATION INCIDENTS

The use of protective helmets continues to vary. Of the 90, motorcycle and dirtbike related trauma, 83 (92.2%) were wearing a helmet. There were 79 ATV related trauma incidents, of these only 21 (26.6%) were wearing a helmet. Of the 19 snowmobile incidents, 14 (73.7%) were wearing a helmet. For the 45 bicyclists injured 44.4% (n=20) injured were wearing a helmet.

**Figure 16: Use of Protective Helmets and Mechanisms of Injury**



**Table 4: Incidents of Head Injuries**

	Motorcycle (N=90)	ATV (N=79)	Snowmobile (N=19)	Bicycle (N=45)
% Wearing Helmet	92.2% (83)	26.6% (21)	73.7% (14)	44.4% (20)
% With Head Injury	43.3% (39)	46.8% (37)	36.8% (7)	57.8% (26)
% With Severe Head Injury (AIS>=4)	20.0% (18)	32.9% (26)	10.5% (2)	37.8% (17)
% No Helmet with Head Injury	50.0% (3)	58.2% (32)	75.0% (3)	79.0% (19)
% Wearing Helmet With Head Injury	43.4% (36)	23.8% (5)	28.6% (4)	35.0% (7)

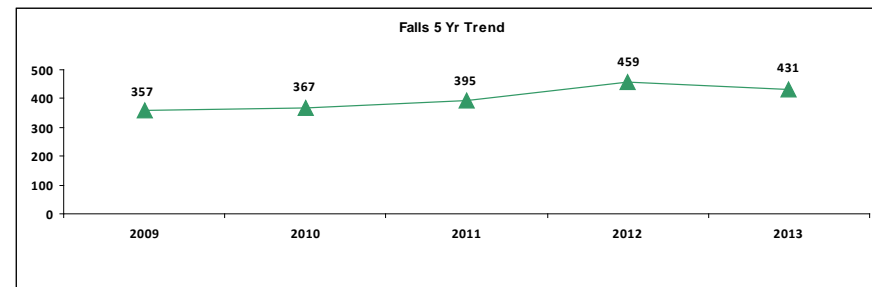
\* Head Injuries are considered severe if they have an AIS code of 4 or greater

### 9.0 FALL RELATED INCIDENTS: E-CODE 880-888.9

During 2013, 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 30.5% (n=431) of the major trauma cases.

Figure 17 depicts the 5 year trend of fall related incidents

Figure 17: Fall Related Incidents 5 Yr Trend



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 2013 by E-Code category.

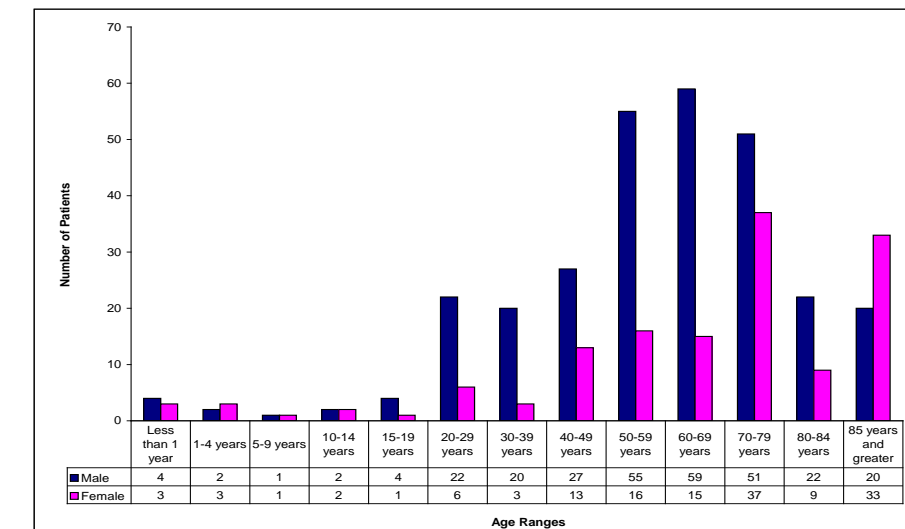
Table 5: Types of Falls

E-Code	Description	Total Number n= 431	Percent
880.0-9	Fall on or From Stairs/Steps	75	17.4%
881.0-9	Fall on or From Ladder/Scaffolding	46	10.7%
882	Fall From or Out of Building/Other Structure	31	7.2%
883.0-9	Fall into Hole or Other Opening in Surface	5	1.2%
884.0-9	Multi-Level Fall	55	12.8%
885.0-9	Fall on Same Level	205	47.5%
888.0-9	Other and Unspecified Falls	14	3.2%

Males accounted for 67.1% (n=289) of the major trauma cases due to this mechanism of injury.

Figure 18 shows the distribution of fall related trauma by age and gender.

Figure 18: 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.

Figure 19 depicts the 5 year trend for violence

FIGURE 19: Violence 5 Year Trend

