



# 2014 TRAUMA REGISTRY REPORT ON INJURY IN NOVA SCOTIA

## PROVINCIAL REPORT DATA YEAR 2012-13



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## *Acknowledgements*

Welcome to the eleventh annual Provincial Trauma Program Registry Report developed and written by the Emergency Health Services Nova Scotia Trauma Program. We would like to thank those who provided their comments on our previous reports and continue to look forward to your input and suggestions in order to make this document accessible and user friendly.

The data contained in this report would not be available to the Nova Scotia Trauma Program without the participation and cooperation of Nova Scotia's District & Tertiary Trauma Centres, the Office of the Chief Medical Examiner, and the Department of Health's Information Analysis & Reporting Section and those individuals who assist in data collection at regional trauma centres. We thank them for their continued participation and assistance.

As well, we would like to thank all those individuals who work each day to care for the province's trauma patients and who are key in the initial collection of data in patient care records.

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## *Provincial Medical Director's Message*

Major trauma is common in Nova Scotia and is a leading cause of death and disability for a significant proportion of our population. Despite substantial efforts to change behaviors which lead to traumatic injury and initiatives to improve the medical system to manage traumatic injury, the burden of trauma continues to be felt by many. A substantial amount of traumatic injury occurs in the younger patient population and results in a considerable loss of life and disability.

We have seen an increase in major trauma in Nova Scotia in 2012-2013 to 1,051, further illustrating a trend that has been evident in Nova Scotia for a number of years. The Nova Scotia Trauma Registry provides invaluable information on a provincial level involving all major traumas within Nova Scotia. Coordinated by Nova Scotia Trauma Registry staff, data from Nova Scotia's district and tertiary trauma centers, the office of the Chief Medical Examiner and the Department of Health's information analysts and reporting section are combined and collated in an effort to accurately report traumatic injury in Nova Scotia.

The Nova Scotia Trauma Program would like to thank the enthusiastic support and participation of members of our NS trauma advisory committee. This committee ([Appendix D](#)) has served our patients well, and helped identify important issues from around the province. As part of our effort to build an improved trauma system in Nova Scotia, we are redesigning this committee. We looked forward to the continued support from key members and District Health authorities as we move forward.

We would like to thank and acknowledge all the individuals who have contributed their time and energy to allow us to do this. We would specifically like to acknowledge the leadership and expertise of Mrs. Beth Sealy, Trauma Registry Coordinator, Nova Scotia Trauma Program. Mrs. Sealy works together with other Nova Scotia Trauma Program staff members including Kathy Hartlen, Darlene Cathcart and Virginia Manuel.

We hope that this data will serve to highlight the importance of traumatic injury in Nova Scotia so we can work together to minimize patient injury and improve patient outcomes.

Sincerely,

*Rob Green, BSc, MD, DABEM, FRCPC*

*Medical Director*

*Emergency Health Services Nova Scotia Trauma Program and  
Capital District Health Authority Trauma Program*

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## *Executive Summary*

The Nova Scotia Trauma Program's Registry Report on Injury provides a descriptive and quantitative summary of trauma in the province in the fiscal year 2012-13. The Nova Scotia Trauma Program Registry continues to be unique in Canada in that it is population based, involving the entire province and thus inferences and conclusions concerning patterns of injury and other questions can be answered without restrictions often inherent in many institution-based tertiary trauma registries.

Currently, the Nova Scotia Trauma Registry contains over 11,500 records (individual cases), dating back to October 1994, and has the capacity to collect 2200+ data elements per record. Only cases with an anatomic injury resulting from a transfer of energy (mechanical, chemical or thermal) due to an appropriate mechanism (see Appendix A) and meet specific criteria, are considered "Major" Trauma" (Comprehensive Data Set or CDS; see glossary). Commencing April 1, 2011, the Nova Scotia Trauma Registry began using two versions of the Abbreviated Injury Scale (AIS): AIS 90 and AIS 2005, Update 2008, for ISS calculation, to assess the impact of the change in versions and to maintain continuity for statistics and research. This allows for the inclusion of Hangings, Drownings and other Asphyxia's and thus increases the death rate this year.

In addition, the Nova Scotia Trauma Program's Registry includes a dataset of All Hospitalized Trauma patients, (admitted to any hospital in the province, due to injury, regardless of severity), received as a download from the Department of Health's Discharge Abstract Database (all admitted trauma/injured patients are contained in the Minimal Data Set or MDS).

It is important for the reader of this report to appreciate the distinct difference between MAJOR trauma, as outlined above and other admitted injured patients to fully understand all facets of this report and implications for the health care system, trauma care, program evaluation and trauma research.

There were 1051 (968 based on AIS'90 criteria and 936 based on AIS'05) "Major" Trauma cases in the Comprehensive Dataset (CDS) in 2012-13 and 960 cases in 2011-12 for Nova Scotia. This represents an increase of approximately 9% in total cases over that time period. The total number of ALL injured patients admitted to a hospital in Nova Scotia was 5816 cases (acute inpatients only) in 2012-13 and 5636 in 2011-12.

NOTE: The Nova Scotia Trauma Registry (NSTR) criteria for "Major" Trauma are broader, in that all Trauma Team Activations and deaths up to 24 hours of admission, regardless of ISS are included. Also, penetrating injuries (such as gunshot wounds or stabbings) with an ISS greater than or equal to nine are included in the NSTR. The National Trauma Registry (NTR), CIHI only includes ISS greater than or equal to twelve and deaths in the Emergency Department in their definition of "Major Trauma".

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## *Provincial Data Summary*

- There were 5816 trauma cases admitted (Acute/Inpatient) to Nova Scotia hospitals in 2012-13 and included in the Minimal Dataset (MDS). There were 1051 “Major” Trauma cases in the Nova Scotia Trauma Registry Comprehensive Data Set (CDS), in 2012-13. 968 cases met the inclusion criteria based on AIS’90 and 936 based on AIS’05.
- All (Acute/Inpatient) Hospitalized (MDS) trauma cases represented 613 per 100,000 population of Nova Scotia, in 2012-13. In 2010-11, the calculated national rate was 615 per 100,000. Based on the 2012 population of Nova Scotia, the “Major” Trauma injury rate was 111 per 100,000 population. The national injury rate based on NTR data was not yet available.
- Blunt trauma (such as injury from a motor vehicle crash, fall, etc.) continued to be the leading injury mechanism in the CDS.
- The ratio of males to females with “Major” Trauma (CDS), 2.5:1 more than twice that of the All (Acute/Inpatient) Hospitalized Trauma (MDS) patients 0.9:1.
- The highest percentage of All (Acute/Inpatient) Hospitalized Trauma (MDS) and “Major” Trauma (CDS) patients, were aged 65 years and older.
- The most common places of injury in “Major” Trauma (CDS) patients was “Street & Highway” and “Home”; “Motor Vehicle” related injuries and “Falls”, are the most common causes. In the All Hospitalized Trauma (MDS) patients, the most common place of injury was “Home”, with “Falls” being the most common cause.
- Over 50% of the “Major” Trauma patients experienced an injury to the “Head & Neck” body region reflecting the serious nature of the injuries incurred.
- There were 27.5% of “Major” Trauma (CDS) which resulted in death, with “Motor Vehicle” related incidents, “Drowning/Asphyxias” and “Falls” being the most common causes of death in the “Major” Trauma (CDS) group.

The Provincial Trauma Registry Report on Injury in Nova Scotia is also available on the website: [www.cdha.nshealth.ca/trauma](http://www.cdha.nshealth.ca/trauma) , Trauma Registry - Related Documents “Provincial Trauma Report”.

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## ***Glossary of Terms***

Abbreviated Injury Score (AIS): Classification of injuries within six body regions based on threat to life, permanent impairment, treatment period, and energy dissipation. The injury is assigned a value between 1 (least severe) and 6 (considered unsurvivable). AIS codes the severity of each individual injury, not the overall effect of multiple injuries.<sup>1</sup> Currently, the Nova Scotia Trauma Registry is using two versions of AIS: AIS 90 and AIS 2005, Update 2008, for assessment of the impact of the change and to maintain continuity for statistics and research.

Canadian Institute for Health Information (CIHI): “CIHI is an independent, not-for-profit, organization that provides essential data and analysis on Canada’s health system and the health of Canadians”.<sup>2</sup> CIHI collects and analyzes information on health and health care in Canada and makes it publicly available. CIHI’s goal is to provide timely, accurate and comparable information. CIHI’s data and reports inform health policies, support the effective delivery of health services and raise awareness among Canadians of the factors that contribute to good health.<sup>3</sup>

Comprehensive Data Set (CDS): The Comprehensive Data Set includes detailed information specific to “Major” injury cases. Broadly defined, a major injury is one where the severity of injury reaches a predetermined threshold, as defined by international standards and commonly represents “multisystem” or major trauma. The information in the Comprehensive Data Set includes facts related to the injury event, patient demographics, the types and severity of injuries sustained in the event, the process of care, procedures and treatments, and discharge outcome.

Death Data Set (DDS): The Death Data Set includes the same detailed information captured in the CDS, however has the ability to capture those cases where a person has been pronounced deceased at the scene of the injury, expires during transport or on arrival at a Primary Trauma Centre, where Registry data is not otherwise collected. This information, obtained for the DDS, is collected by the Nova Scotia Trauma Program, through the Office of the Chief Medical Examiner.

Discharge Abstract Database (DAD): The DAD is the minimal data set of information that all facilities must report to the Canadian Institute of Health Information (CIHI) regarding information **on all inpatient admissions, day surgery, forensics, chronic and rehab cases** and includes demographic information, diagnoses, procedures, length of stay and discharge status. This information is compiled upon discharge and submitted to CIHI on a regular basis.

District Trauma Centre (DTC): May be an urban or rural community hospital. The DTC is a strategically located trauma centre with resources (human and physical) – sufficient to treat single-system injuries, some multi-system injuries and to fulfill resuscitation requirements, prior to referral to a tertiary centre.

Injury Severity Score (ISS): “is an anatomical scoring system that provides an overall score for patients with multiple injuries. Each injury is assigned an Abbreviated Injury Scale (AIS) score and is allocated to one of six body regions (Head, Face, Chest, Abdomen, Extremities (including Pelvis), External). Only the highest AIS score in each body region is used. The 3 most severely injured body regions have their score squared and added together to produce the ISS score.”<sup>4</sup> It is a summary score to characterize the multiple injuries typically sustained by the trauma patient.

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<sup>1</sup> Committee on Medical Aspects of Automotive Safety. Rating severity of tissue damage: I. The Abbreviated Scale. *JAMA*. 1971;215:277-280.

<sup>2</sup> Canadian Institute for Health Information, “CIHI Profile”, <http://secure.cihi.ca/cihiweb>, accessed April 21, 2010

<sup>3</sup> National Trauma Registry 2006 Report: Major Injury in Canada, Includes 2004-05 Data.

<sup>4</sup> Trauma.org, “trauma scoring”, <http://www.trauma.org/archive/scores/iss.html>, accessed April 21, 2010



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International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada (ICD-10-CA): ICD-10-CA is the International Statistical Classification of Diseases and Health Related Problems, Tenth Revision, Canada. ICD-10-CA was developed by the Canadian Institute for Health Information (CIHI) in collaboration with an Expert Panel of physicians, external field reviewers and the CIHI classification team. It is based on the World Health Organization (WHO) ICD-10 and is wholly comparable with this classification. ICD-10 is the official classification used for reporting mortality data in Canada. It is the national standard for reporting morbidity statistics.

Minimal Data Set (MDS): The Minimal Data Set captures more general information for all injury-related hospitalizations in Nova Scotia, irrespective of injury severity. While the MDS lacks the detailed information contained in the CDS on major trauma, it allows the Nova Scotia Trauma Registry to maintain a more complete picture of the overall volume of injury in Nova Scotia. The information housed in the MDS comes from the Nova Scotia Department of Health, Information Management Service, Discharge Abstract Database and is downloaded to the Nova Scotia Trauma Registry's custom database. It includes all inpatient admissions, day surgery, forensics, chronic and rehab cases.

National Trauma Registry (NTR): The NTR was established in 1997 to provide trauma health care providers, researchers and injury prevention programs with essential information on injury, or trauma, in Canada. It is comprised of two distinct data sets:

- the Minimal Data Set (MDS) which contains demographic, diagnostic, and procedural information on all acute care hospitalizations due to trauma in Canada. The source of data is CIHI's Discharge Abstract Database (DAD) or provincial Ministries of Health.

- the Comprehensive Data Set (CDS) which is comprised of a subset of patients, who have been hospitalized at a participating lead trauma center in Canada, and who have sustained a severe injury. Only injuries with a severity score (ISS) of greater than 12 with a specific ICD-10-CA External Cause of Injury code are included in this data set. Data is submitted to the NTR from 108 facilities across eight provinces.<sup>5</sup>

Parts of this material in this report are based on data and information provided by the Canadian Institute for Health Information. However, the analyses, conclusions, opinions and statements expressed herein are those of the author, and not necessarily those of the Canadian Institute for Health Information.

The NTR will cease operation March 31, 2014.

Tertiary Trauma Centre (TTC): Plays the lead role within the region or community trauma system. It has the capability of providing definitive care for seriously injured patients. The TTC assumes the leadership role in the (1) delivery of optimal care to the injured patient (2) research (3) teaching (4) data collection and evaluation, and (5) injury control and prevention programs. The province of Nova Scotia has two tertiary trauma centres: the IWK Health Centre for pediatric trauma and the Queen Elizabeth II Health Sciences Centre for adult trauma.

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<sup>5</sup> National Trauma Registry 2011 Report: Hospitalizations for Major Injury in Canada, 2008-09 Data

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## ***Emergency Health Services, Nova Scotia Trauma Program***

The Emergency Health Services, Nova Scotia Trauma Program was founded in 1997 and has a mandate to facilitate the provision of optimal trauma care through leadership in injury prevention and control, education, research, and continuous development and improvement of the trauma system. The core functions of the Nova Scotia Trauma Program are briefly described below.

### ***1. Nova Scotia Trauma Registry***

The Nova Scotia Trauma Registry collects and analyzes information on injuries. This information includes facts related to the injury event, patient demographics, the types and severity of injuries sustained in the event, the process of care, and discharge outcome. To date this registry has collected facts on over 11,000 major trauma cases.

The Registry includes data commencing in October 1994 at the Adult Tertiary Trauma Centre, the QEII HSC (initially the Victoria General Hospital). In April 1999, the Pediatric Tertiary Trauma Centre, the IWK Health Centre was added, followed by the eight District Trauma Centres and the Medical Examiners Office in April 2000.

There are three components of the Nova Scotia Trauma Registry, which are the:

1) Comprehensive Data Set (CDS); 2) Death Data Set (DDS), which contains the same detailed data as the CDS, on deaths at the scene, enroute or on arrival at a Primary Trauma Centre, where Registry data is not otherwise collected and 3) Minimal Data Set (MDS), received as a download from the Department of Health, Discharge Abstract Database (DAD), which includes all hospitalized injured patients in Nova Scotia.

The data is collected at the eight District Trauma Centres (Cape Breton Healthcare Complex, St. Martha's Regional Hospital, Aberdeen Hospital, Colchester East Hants Health Centre, Cumberland Regional Health Care Centre, Valley Regional Hospital, Yarmouth Regional Hospital and South Shore Regional), two Tertiary Trauma Centres, (IWK Health Centre and QEII Health Sciences Centre) and the Medical Examiner's Office. (see [Appendix B](#) & [Appendix C](#))

Information from the Nova Scotia Trauma Program's Registry can be made available to clinicians, researchers, and injury prevention organizations by contacting the Nova Scotia Trauma Registry at (902) 473-5949. The Research and Data Request forms for Nova Scotia Trauma Registry Information and associated policies are currently under revision and will be made available upon request.

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## ***2. Professional Education***

To be effective, a trauma system must include well trained and highly skilled trauma care professionals. A key area of focus for the Nova Scotia Trauma Program is professional education, designed to develop and enhance the trauma care knowledge and skills of those who care for Nova Scotia's injured. The Nova Scotia Trauma Program's major provider education activities are listed below.

### ***Advanced Trauma Life Support (ATLS)***

The Nova Scotia Trauma Program (NSTP) manages the Advanced Trauma Life Support (ATLS) Program for Nova Scotia and PEI. ATLS is an internationally recognized certification in trauma treatment and resuscitation. Although the ATLS certification is only available to physicians, the course may be audited by other health care providers. Courses are scheduled throughout the year. In 2012/13, 90 physicians were certified or re-certified in ATLS and 25 other health care professionals audited the courses.

### ***Provincial Telehealth Education Sessions***

Utilizing the provincial telehealth network, the Nova Scotia Trauma Program broadcasts monthly education sessions to trauma care providers in their home communities. These sessions are attended by a variety of care providers and health system stakeholders, who would otherwise be unable to access such educational resources. A total of 81 inter professionals attended the sessions and an additional 258 DVDs were distributed. Limited copies of these sessions are available upon request.

### ***Provincial Webinar Education Sessions***

In September 2013, we will introduce monthly education sessions in a new web based computer format. We plan to reach out to our provincial trauma care providers by making the sessions accessible in a recorded format. Watch for a new exciting selection of topics.

### ***Rural Trauma Team Development Course 3<sup>rd</sup> Edition (RTTDC)***

The RTTDC is based on the concept that in most situations, rural facilities can form a trauma team consisting of at least three core members. The course emphasizes an inter-professional team approach to the initial assessment, resuscitation and transfer of the trauma patient in a systemized, concise manner. It is offered in a single day format with a didactic component as well as skills stations and team scenarios. The team performance scenarios can be customized to the facility so that decision making reflects both local and provincial resources available to assist in the care of the injured patient. This course also allows for any provincial or systems updates and information sharing which optimizes the care providers knowledge and skills in caring for the trauma patient. This year we were able to offer the course to several facilities across the province, with 25 physicians, 29 nurses, 19 paramedics and 3 respiratory therapists completing this course.

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### ***Inter Professional Trauma Rounds***

In partnership with the trauma team specialties at CDHA, the Nova Scotia Trauma Program facilitates inter professional trauma rounds to engage the various care providers in current literature discussions and review of cases, optimizing the delivery of care, and team communication for the trauma patient. In 2012/13, ten Inter Professional Trauma Rounds were presented.

### ***3. Research***

A major component of the Nova Scotia Trauma Program is the facilitation of continuous improvements in the care of the injured. This is accomplished in many ways and is reflected in the integrated nature of Nova Scotia's trauma system. Research in trauma care, including the seminal components of knowledge translation and implementation, are key and growing parts of the NS Trauma Program.

The Nova Scotia Trauma Registry is utilized for research purposes by investigators and administrators to evaluate patient outcomes and trauma system performance with the overall goal of improved patient outcomes. The NSTR now includes robust data on over 11,000 patients gathered over a 19-year period. See [Appendix F](#) for current and published adult and pediatric research involving the NSTP and its partners using registry data and other data sources.

The Nova Scotia Trauma Program strives to utilize research to continuously evaluate and improve the trauma system in the best interests of patient care, and to inform appropriate policy development through knowledge translation.

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## ***Purpose of Report***

The purpose of this report is to provide a descriptive analysis of all major injuries, injury-related deaths, and injury-related hospitalizations. This analysis includes both intentional and unintentional injuries, along with the outcome post event.

## ***Trauma and Injury Defined***

The World Health Organization (WHO) defines “Injury” as “a bodily lesion at the organic level, resulting from acute exposure to energy (mechanical, thermal, electrical, chemical or radiant) in amounts that exceed the threshold of physiological tolerance. In some cases (e.g. drowning, strangulation, freezing), the injury results from an insufficiency of a vital element.”<sup>6</sup>

The definition used by the Canadian Institute of Health Information, National Trauma Registry (NTR) for trauma is.... “*Injury resulting from the transfer of energy e.g. kinetic, thermal*” with an Injury Severity Score (ISS) greater than 12 and an appropriate ICD External Cause of Injury Code.

The Nova Scotia Trauma Program’s Registry (NSTPR) defines trauma based on the Canadian Institute of Health Information, National Trauma Registry (NTR) definition, (“*Injury resulting from the transfer of energy e.g. kinetic, thermal*” with an Injury Severity Score (ISS) greater than 12 and an appropriate ICD External Cause of Injury Code), with the following variations: penetrating injury cases with an  $ISS \geq 9$  are included and drownings, hangings, suffocations and asphyxias were excluded, unless they also have an anatomic lesion meeting the ISS criteria.

Commencing April 2011, the NSTPR implemented the newest version of the Abbreviated Injury Scale, AIS 2005 – Update 2008 (AIS’05). Many of the severity scores have changed, so rather than eliminating the previous version AIS 90, both versions will be used for a period of 2 – 3 years. During this time, the impact of the change will be evaluated and the Inclusion criteria will be reviewed. One main difference with AIS’05, which has an impact on the cases included in the NSTPR, is the ability to generate ISS for Hangings, Drownings and other asphyxias. These cases will be included if they have an  $ISS \geq 12$ .

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<sup>6</sup> Baker SP, O’Neill B, Karpf RS. *The injury fact book*. Lexington, MA, Lexington Books, 1984.

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## Methods

### Inclusion / Exclusion Criteria

**Inclusion** in the Nova Scotia Trauma Program Registry's Major Injury Dataset is based on the following criteria:

Injuries resulting from a transfer of energy (mechanical, chemical or thermal) and resulting in an anatomical lesion due to an appropriate mechanism described by the Inclusion ICD-10-CA External Cause of Injury codes ([Appendix A](#)) AND

<b>Event</b>	ISS $\geq$ 12* for blunt, burn or drowning/asphyxia trauma
<i>or...</i>	ISS $\geq$ 9* for penetrating trauma
<i>or...</i>	Trauma Team activation with/without admission to acute care facility, regardless of ISS
<i>or...</i>	Death in the Emergency Department due to appropriate mechanism of injury, regardless of ISS
<i>or...</i>	Death within 24 hours of admission to DTC/TTC due to appropriate mechanism of injury, regardless of ISS
<i>or...</i>	Death at the scene due to appropriate mechanism of injury, regardless of ISS
<i>or....</i>	Predetermined inclusion at another trauma centre, where the individual has been treated and admitted, prior to transfer to a second, or third trauma centre for continuing care of initial injury.

\*Effective April 2011, the ISS criteria may be met in either AIS'90 or AIS'05 and hangings, drownings and other asphyxia's with an ISS  $\geq$  12 will also be included.

**Exclusions** to the NSTPR include all injuries which do not meet the above criteria, medical errors (Appendix A) and discharges from the Emergency Department which were not Trauma Team Activations.

### The data collection process

Potential "Major" Trauma cases are identified by review of facility generated reports of all trauma cases based on the Inclusion External Cause of Injury Codes (see [Appendix A](#)); ER admission lists; facility transfer lists; death lists. The data collection process involves abstracting patient records retrospectively in the respective hospitals.

Trauma Registry cases are selected for inclusion based primarily on Injury Severity Score. The Injury Severity Scoring is a common methodology, which allows for comparison of patients. The Injury Severity Score (ISS) considers the severity of injuries and the body regions involved. Injuries are evaluated and the three most severe injuries from up to three different body regions are used to calculate the ISS. The ISS ranges from a score of one to 75. The higher the ISS, the greater the severity of injury.

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## ***Data Sources for Major Injuries***

There are many data sources used to develop the most accurate picture possible for each trauma registry case. The primary source of data is the hospital patient care record. The hospital patient care record normally includes:

- the prehospital patient care record
- the patients' hospital "health care record" (nursing, physician, and other health provider notes); trauma team activation records (where applicable), Diagnostic and Operative reports, Discharge Summaries, etc.

Additional information for the trauma registry is captured using data sources from other EHS programs and some external sources. These additional sources include, but are not limited to:

- the EHS Communication Centre's Computer Aided Dispatch system (CAD)
- the EHS Air Medical Transport Program's (EHS LifeFlight) PCR
- Records from the Office of the Chief Medical Examiner

## ***Data Elements for Major Injuries***

There are over 2200 data elements per case in the Nova Scotia Trauma Registry database. Of these 2200 fields, many are mandatory fields for the purpose of data entry/collection. See [Appendix E](#).

## ***Data Quality***

Quality checks are performed as data is transferred to the Provincial database and at the end of each data collection year to ensure data quality, accuracy, and completeness.

Annual re-abstracting audits are done on 10% of all identified trauma cases. CIHI provides an error report following the annual data submissions. All errors are corrected and abstracts resubmitted to the central site database.

## ***Reporting Guidelines***

The Nova Scotia Trauma Registry will only report on aggregate data. This policy, which reflects that of Statistics Canada, dictates that the Nova Scotia Trauma Registry will not report on facilities or other smaller elements where there are less than 5 cases.

## ***National Trauma Registry***

The Nova Scotia Trauma Program Registry submits data annually to the National Trauma Registry (NTR), which is managed by the Canadian Institute for Health Information (CIHI). This data is included in NTR publications such as the Major Injury in Canada report. The NTR will cease operation under the Canadian Institute for Health Information, March 2014.

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## *Trauma Registry Information Specialists of Canada (TRISC)*

The Trauma Registry Information Specialists of Canada (TRISC) is a subcommittee of the Trauma Association of Canada (TAC), formally established in April 2004. TRISC was formed to provide a national forum for Trauma Registry Information Specialists to network and collectively strive to achieve excellence in trauma information management, expertise and provision of timely, high quality data contributing to the reduction of the incidence, severity and consequences of injury in Canada. Anyone involved in the collection, analysis, interpretation, or management of trauma data and registries, are welcome. More information is available on the TAC website: <http://www.traumacanada.org/> Subgroup – Trauma Registry Information Specialists of Canada.

### *Limitations*

When reading this report, in addition to the Inclusion and Exclusion criteria, please consider the following:

- The Comprehensive Data Set (CDS) includes only “Major” Trauma
- The Minimal Data Set (MDS) includes all Hospitalized Trauma (including those in the CDS)
- The data on Major Injuries is abstracted from the patient care record. As a result, the accuracy and completeness of data depends on documentation, particularly in relation to specific injury coding.
- Individuals treated in an Emergency Department (ED) for an injury and discharged from the department without being admitted, are not included, in the CDS or MDS, unless a Trauma Team was activated. This represents a large and important cohort of injured patients who are not currently captured in most data sets in Canada, with the exception of such examples as the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) and the National Ambulatory Care Reporting System (NACRS) data bases.
- Individuals seen and admitted to a Primary Trauma Centre without being transferred to a District or Tertiary Trauma Centre are not included in the CDS (see Glossary of Terms for definitions).
- Individuals admitted to a Trauma Centre (District or Tertiary) who had an ISS score of <12 for blunt/burn trauma or < 9 for penetrating trauma are not included in the CDS, **unless** there was a formalized Trauma Team Activation involved in treating the injured person. At the time of this report, there are two facilities in the province of Nova Scotia, whereby a trauma team can be activated: the Pediatric and Adult Tertiary Trauma Centres, (see Glossary of Terms for definitions).
- The Registry data collection process is facility-based, as opposed to patient-centered, and therefore some individuals may be registered in the database more than once for the same incident, due to transfers from one trauma centre to another. Cases are included in each database per facility they are admitted to.
- Aggregate data cells with less than five cases are not reported.
- There may be less than 1.5% of “Major” Trauma cases admitted to non District or non Tertiary Trauma centers, which are not included in this report.
- The Vital Statistics data was not 100% available at the time of printing this report, for verification of trauma deaths.



## Demographic Data

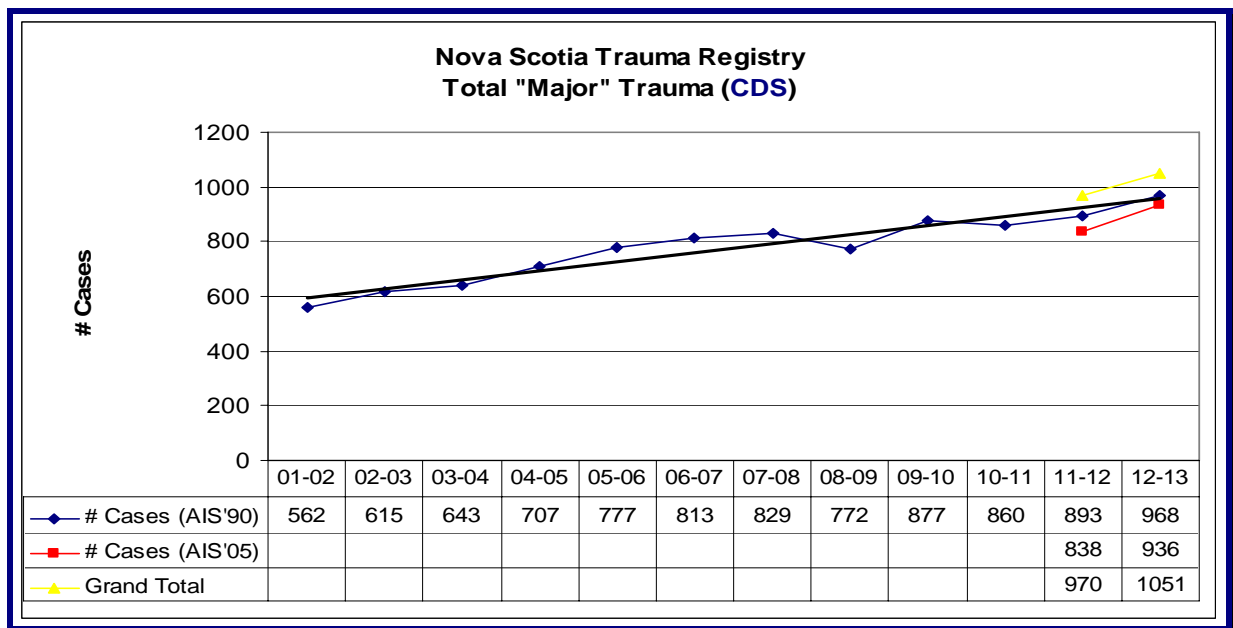
All of the patients included in this report presented and were treated at a District or Tertiary Trauma Center. Deaths at the scene, enroute or expiring at a Primary facility are also included in this report.

In 2012-13, there were a grand total of 1051 “Major” trauma cases, who met the Inclusion criteria, using either AIS’90 or AIS 2005 (968 using AIS’90 and 936 AIS’05). This represents an overall 8% increase over the previous year. In 2011-12, there were a grand total of 970 “Major” trauma cases, who met the Inclusion criteria, using either AIS’90 or AIS 2005 (893 using AIS’90 and 838 AIS’05). Of these 1051 patients, 94.1% were residents of Nova Scotia; 5.9% were residents from outside Nova Scotia (51 from other Canadian provinces) who were treated in a trauma centre within the province. In 2012-13, 53 (5.0%) patients were injured outside the province but transferred to Nova Scotia for care. Of the 1051 “Major” Trauma cases in 2012-13, 760 (72.3%) were treated in a trauma centre and discharged, while 289 (27.5%) expired.

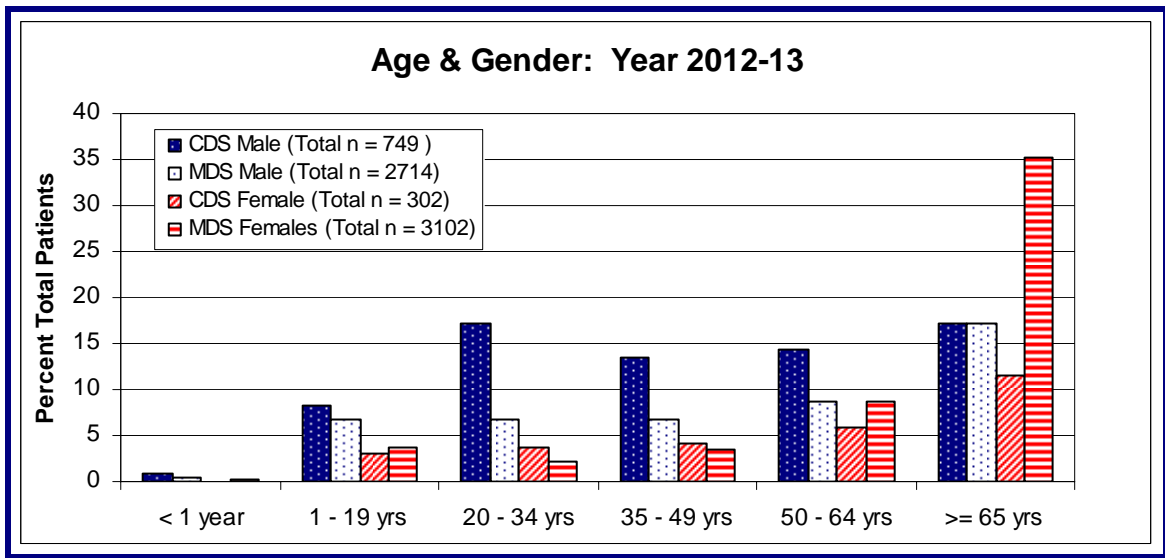
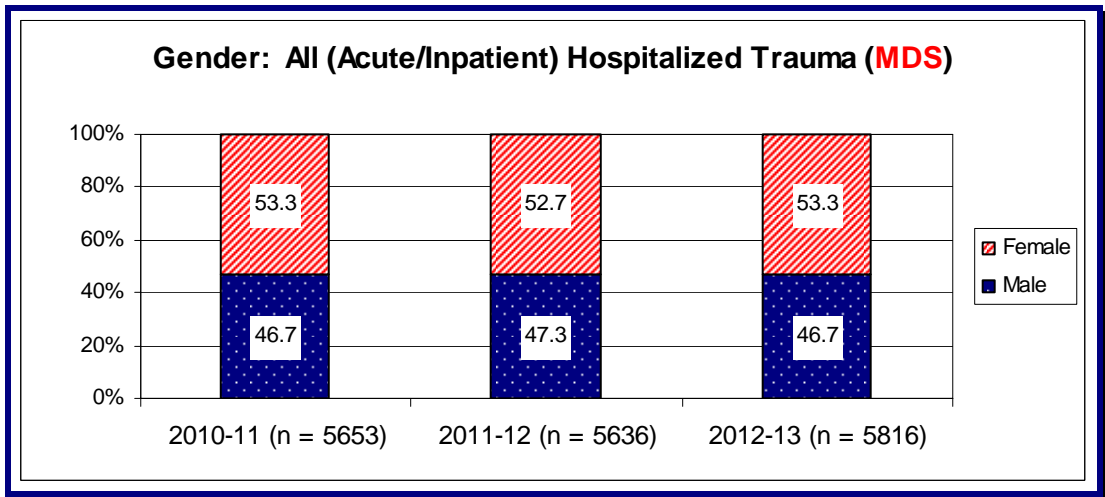
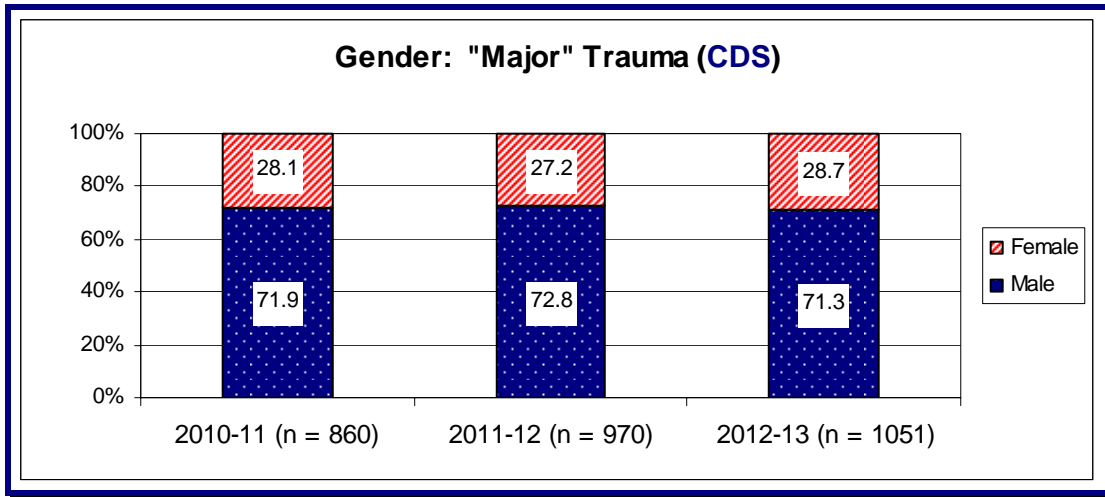
Also in 2012-13, there were 5816 Acute/Inpatients hospitalized in the province of Nova Scotia for any injury, regardless of Injury Severity Score (ISS). Approximately 13% of these patients were also in the CDS as “Major” Trauma (excluding Deaths on the Scene and non admitted patients).

In the National Trauma Registry (NTR), the percentage of “Major” Trauma (CDS) to All Hospitalized Trauma (MDS) cases in 2011-12 was 7.4% (this data excludes Quebec and Saskatchewan).

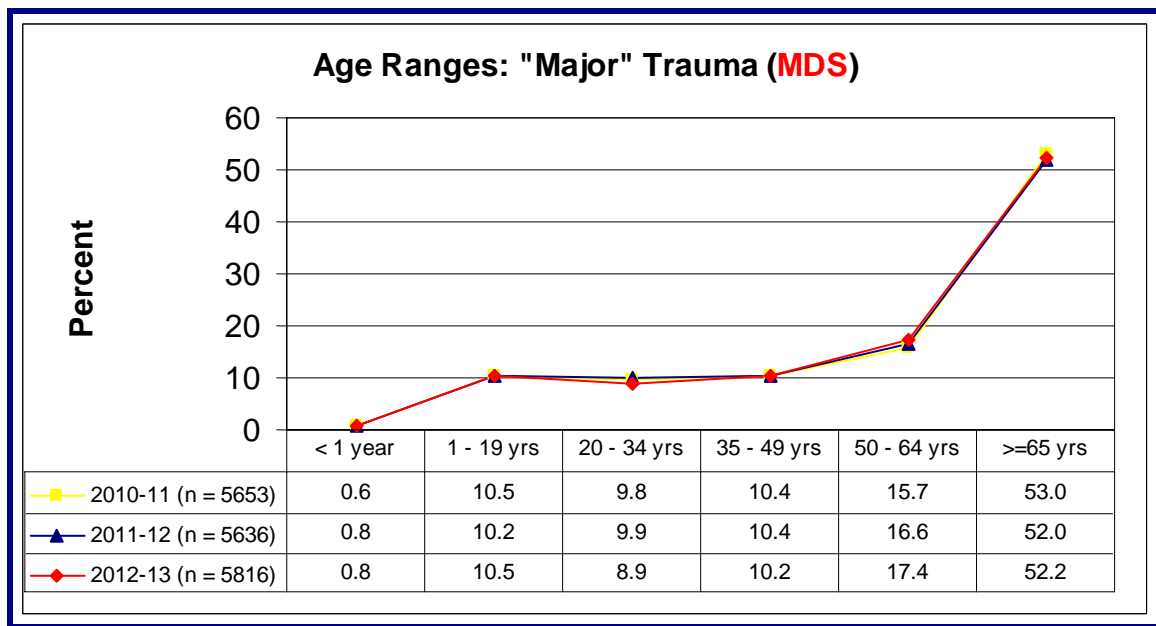
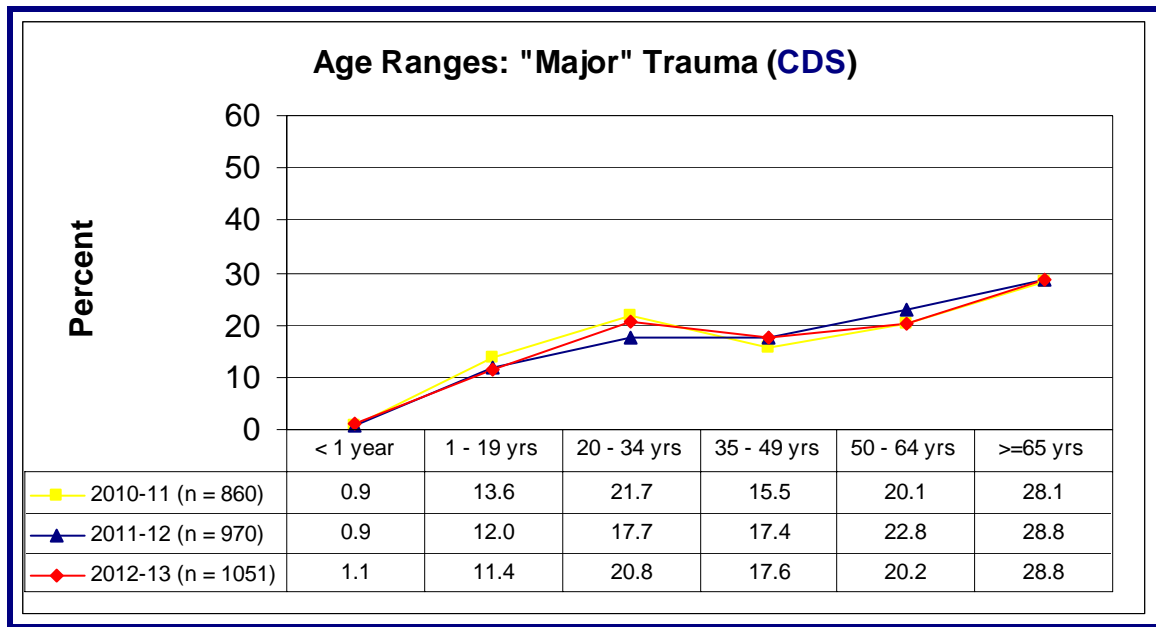
Based on the 2012 population of Nova Scotia, there was an All Hospitalized Trauma (MDS) injury rate of 613 per 100,000 population. The calculated national injury rate based on NTR data for 2010-11, was 615 per 100,000. The proportion of Nova Scotia “Major” Trauma (CDS) cases to All Hospitalized Trauma (MDS) cases is 18.1%.



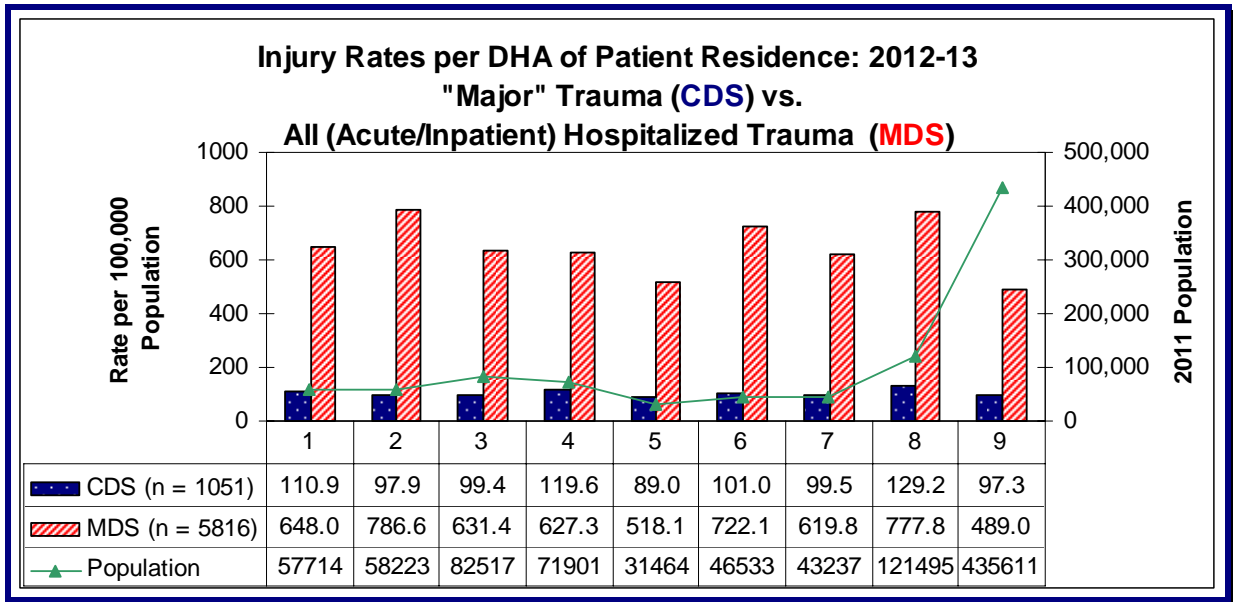
## Gender of Trauma Cases



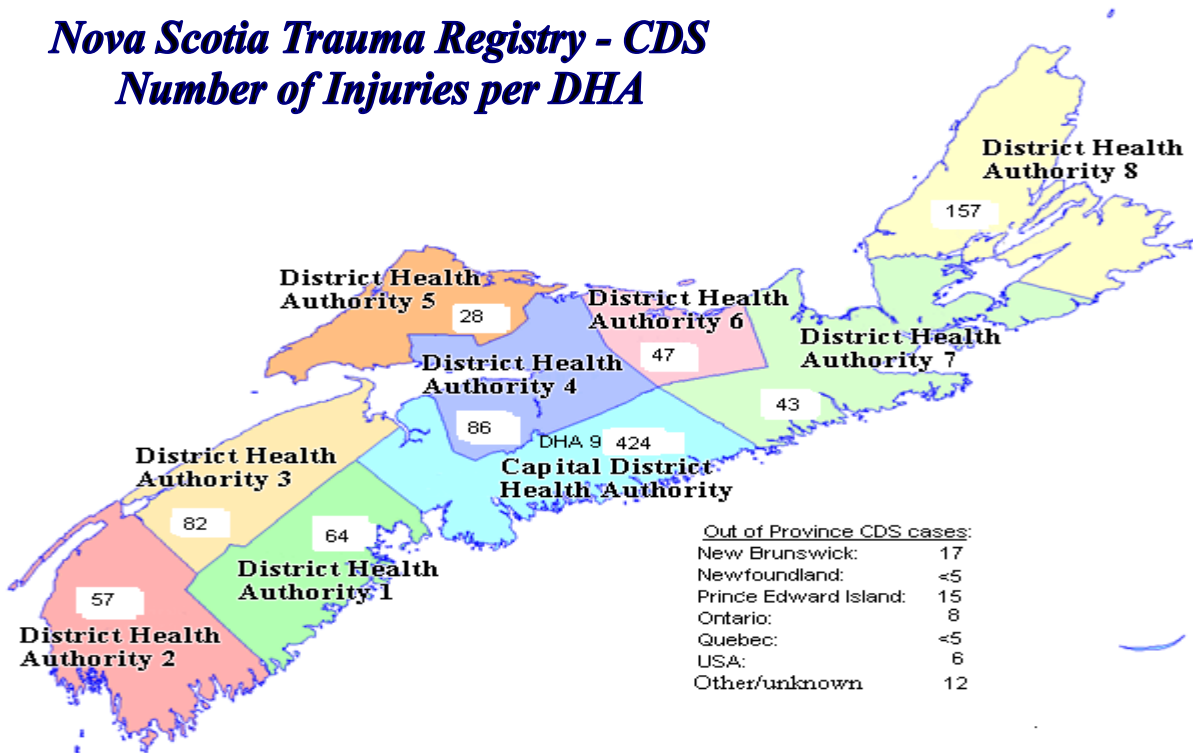
## Age Distribution



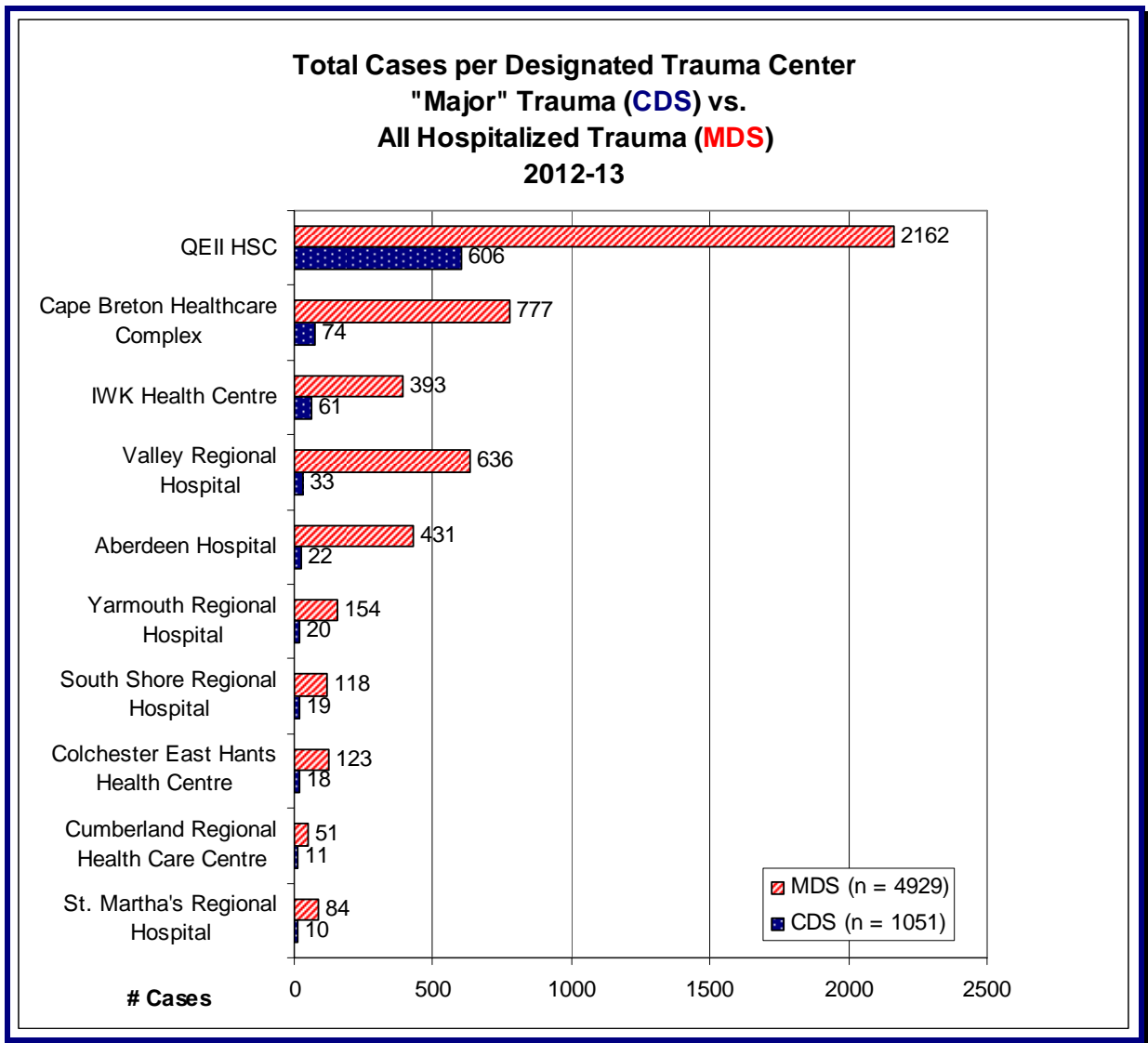
## Injury Rates per DHA of Patient Residence



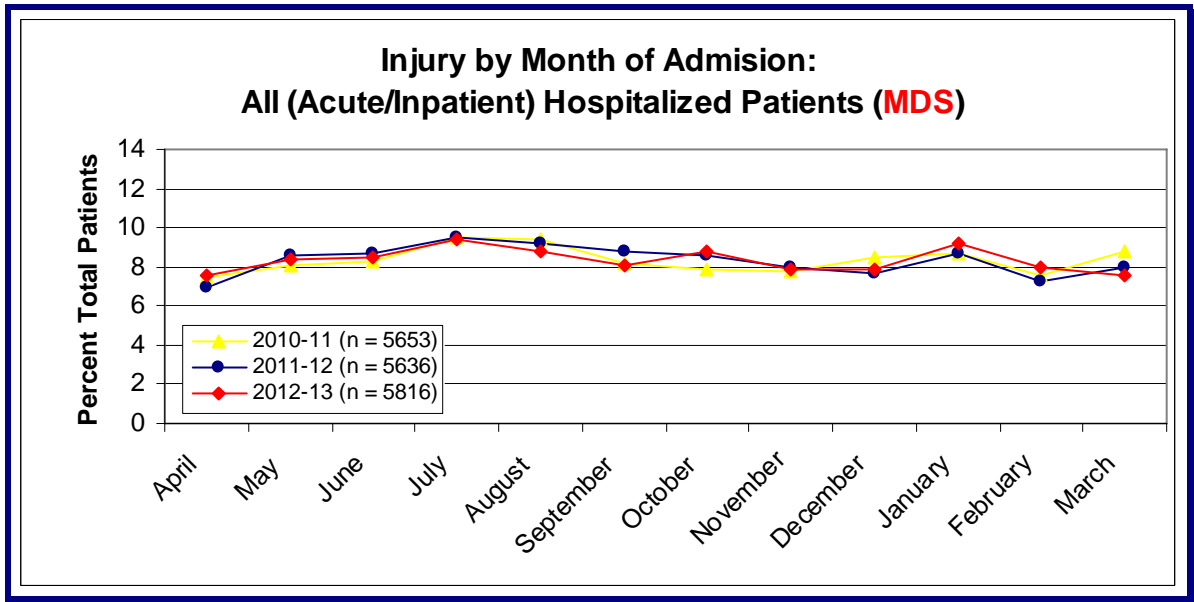
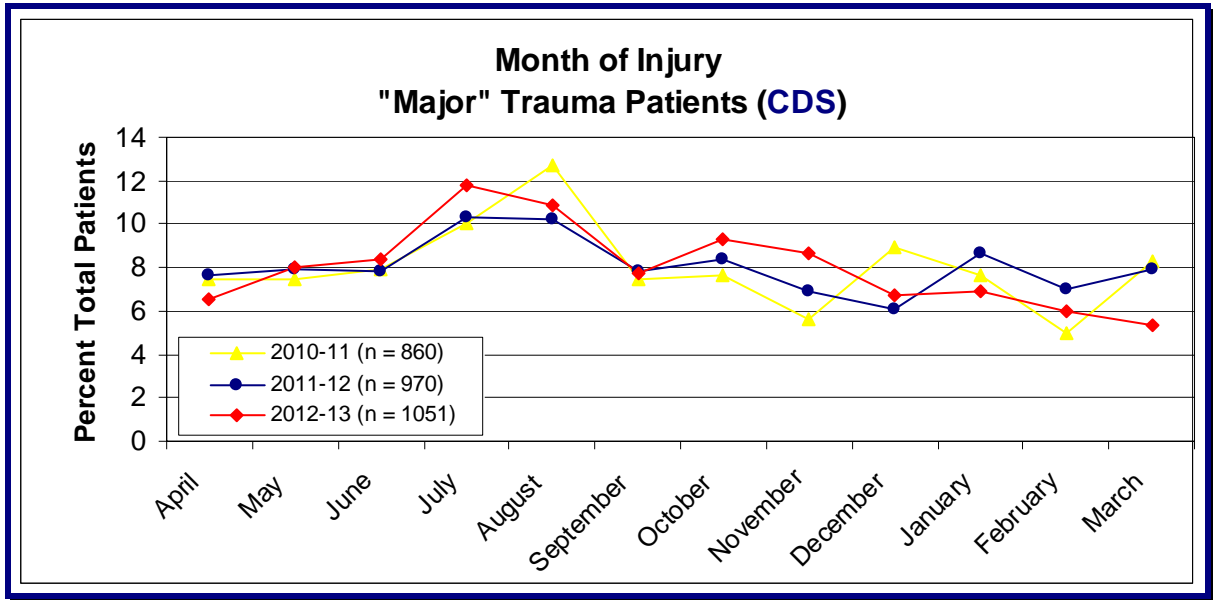
## Nova Scotia Trauma Registry - CDS Number of Injuries per DHA



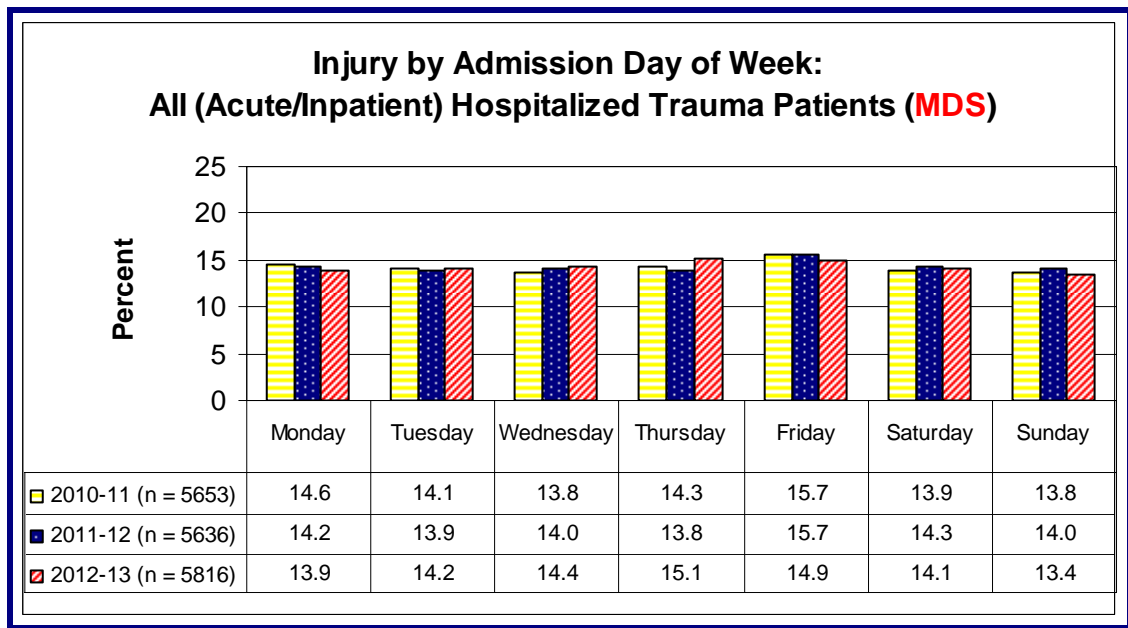
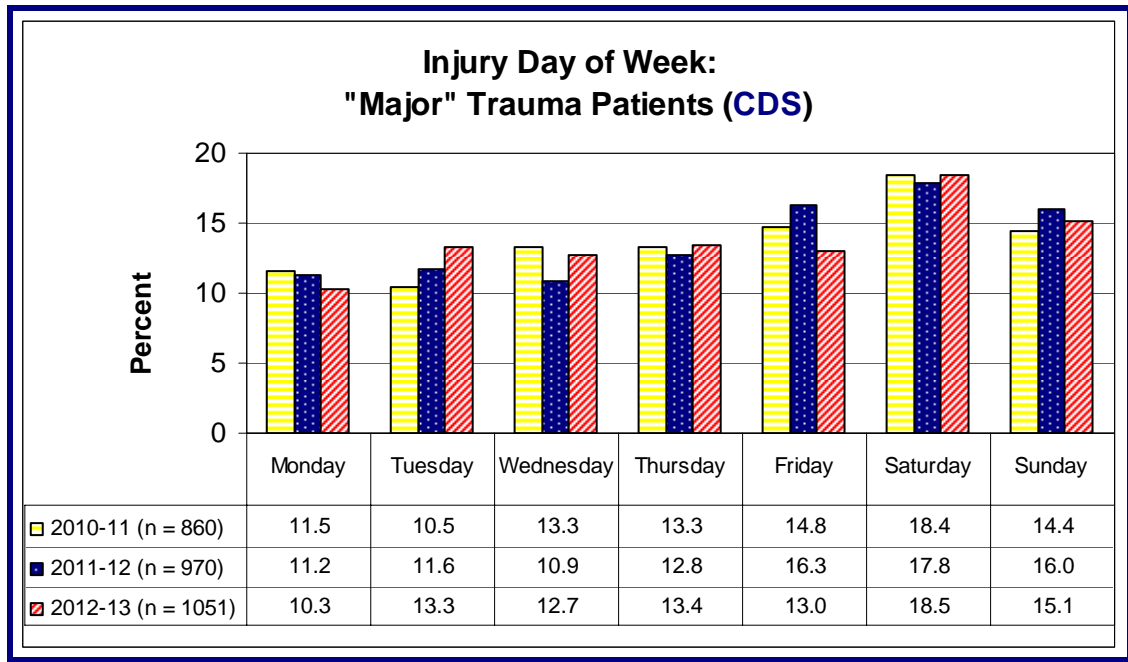
*Distribution of Cases per Designated Trauma Centre*



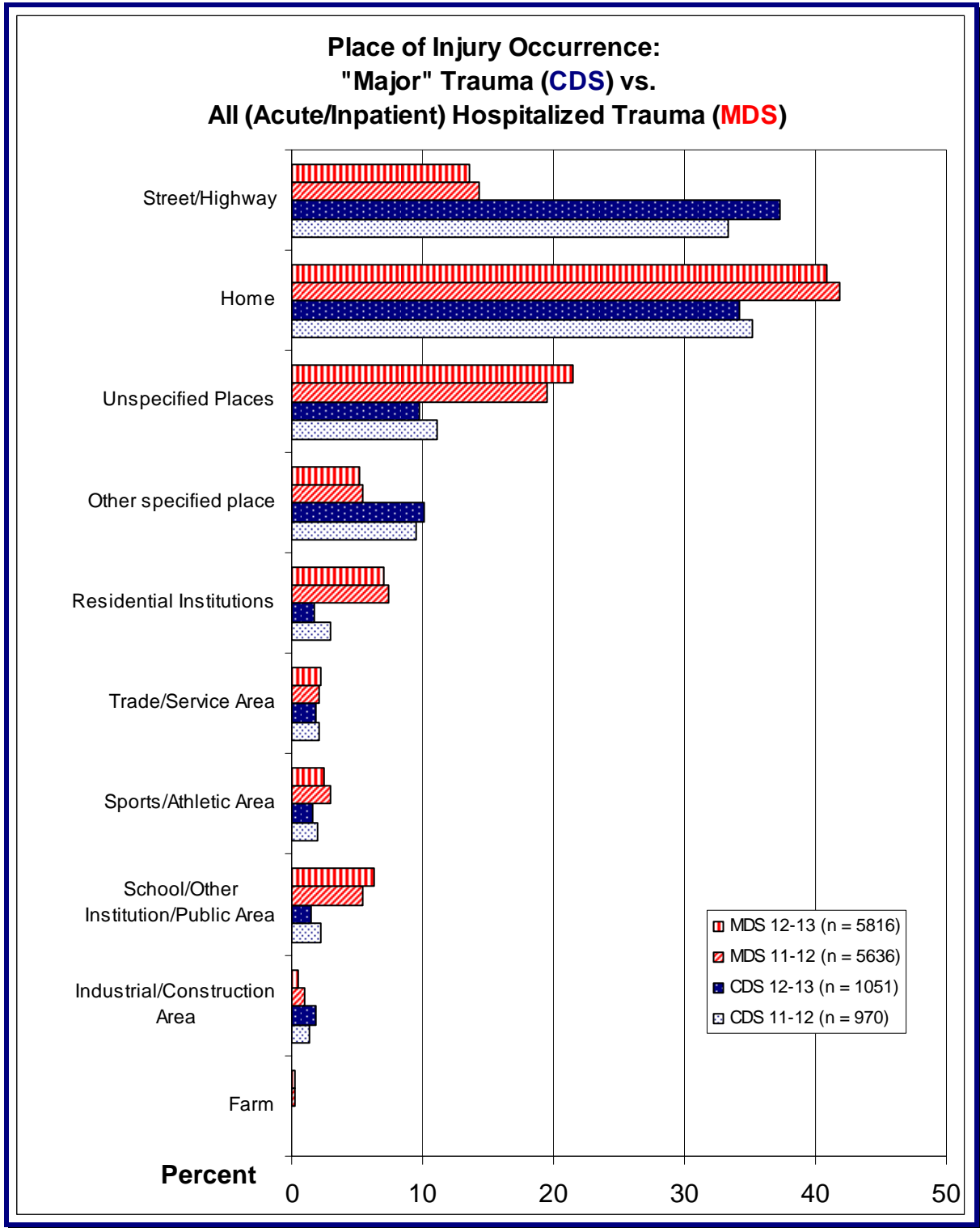
## Month of Injury



## Injury Occurrence by Day of Week

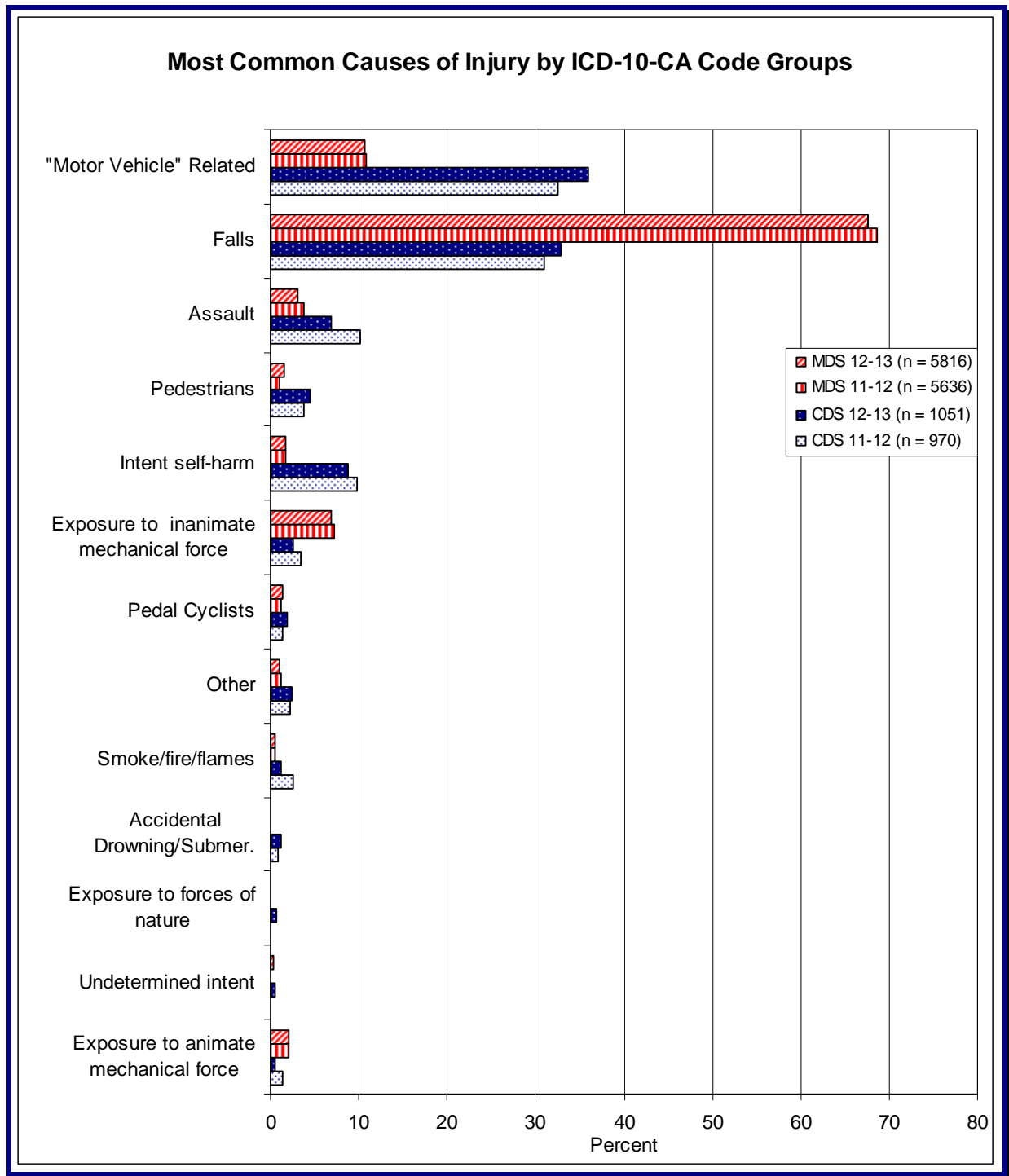


## Place of Injury Occurrence

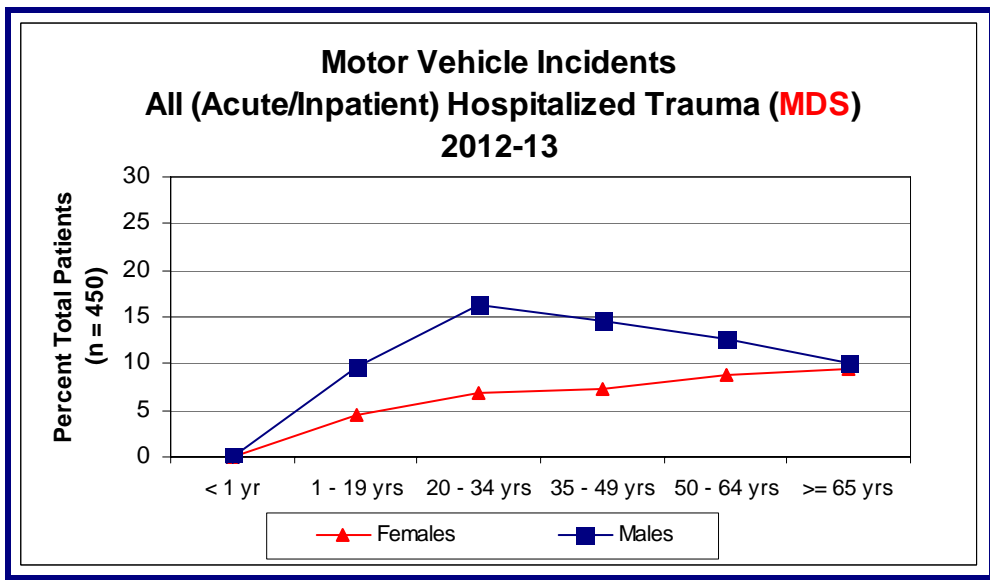
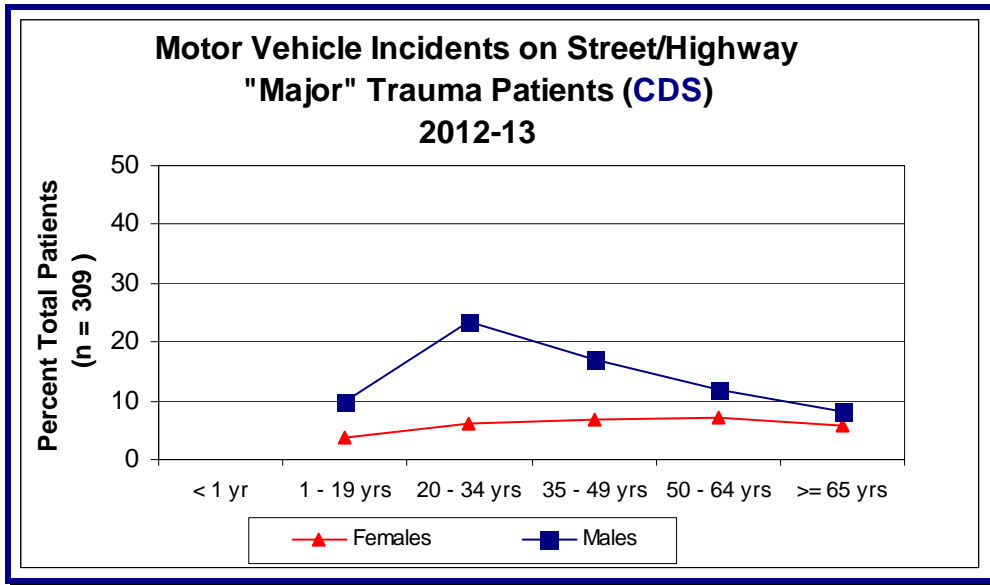




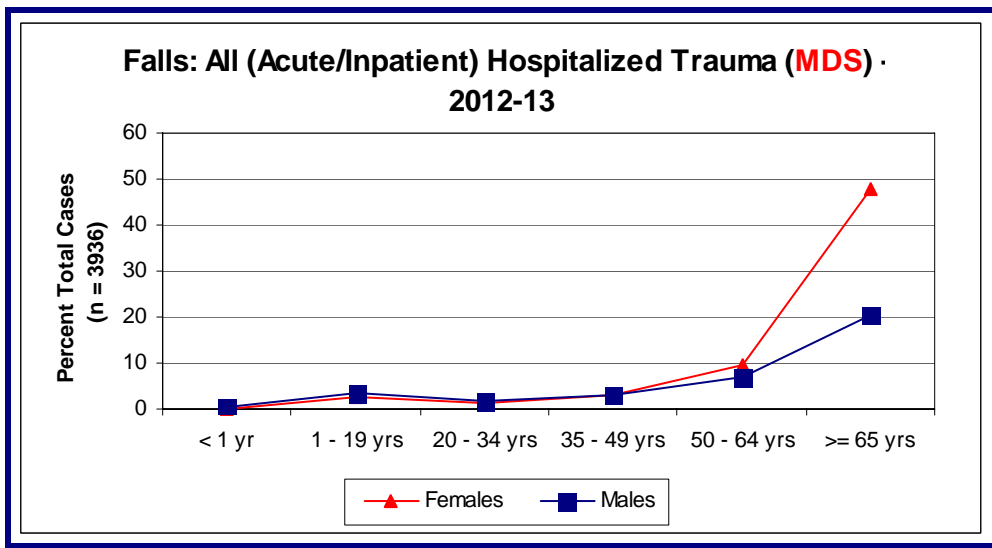
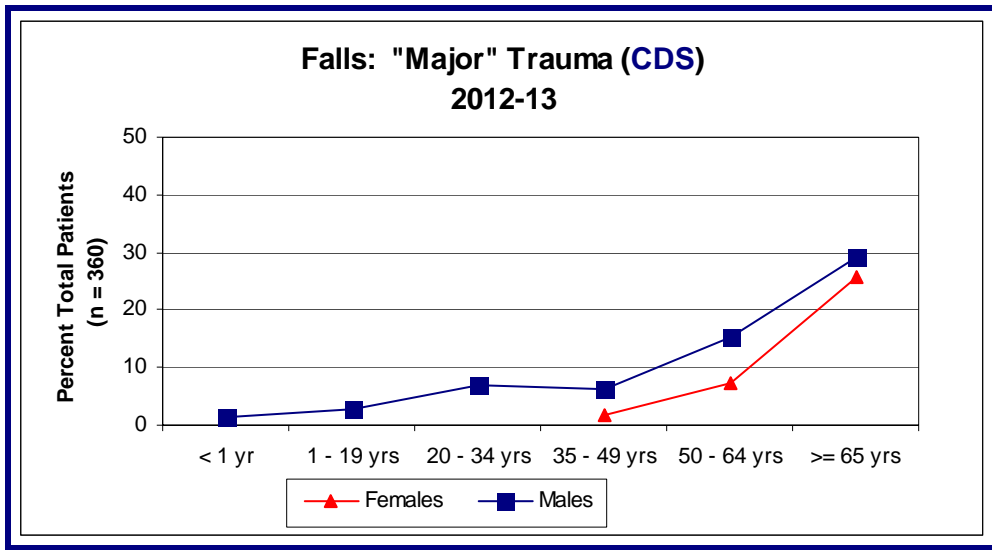
## Cause of Injury by ICD-10-CA Code Groups



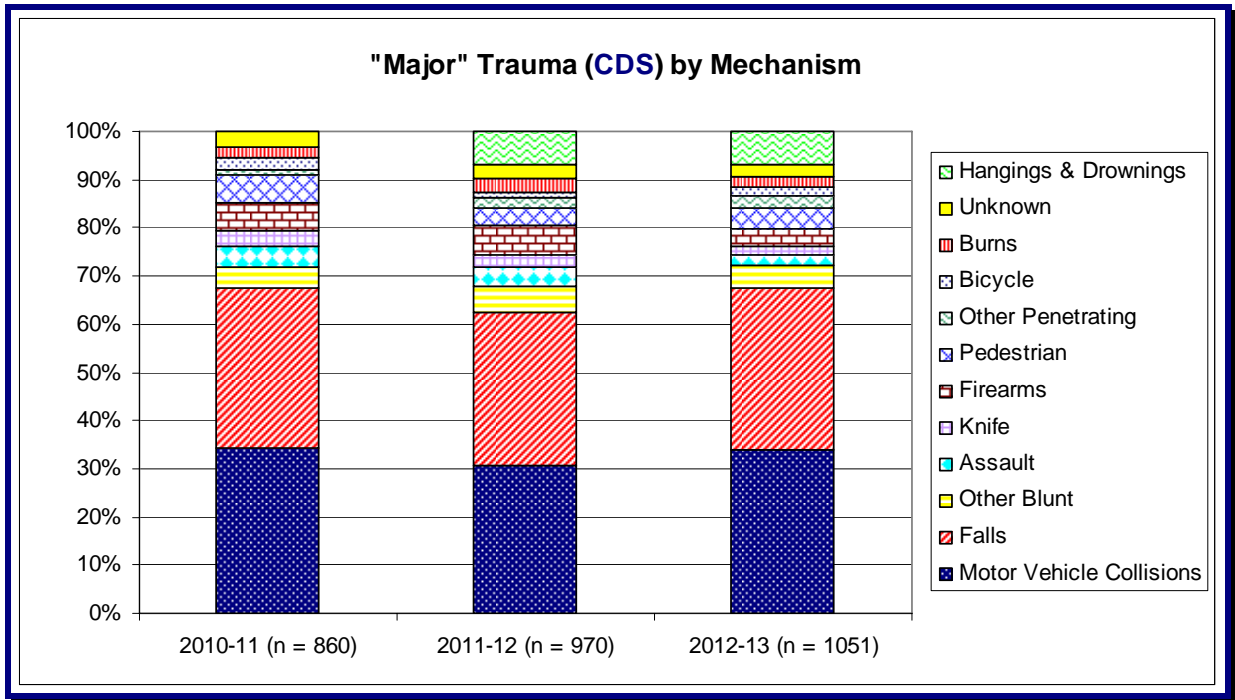
## Cause of Injury: MVC by Age and Gender



## Cause of Injury: Falls by Age and Gender

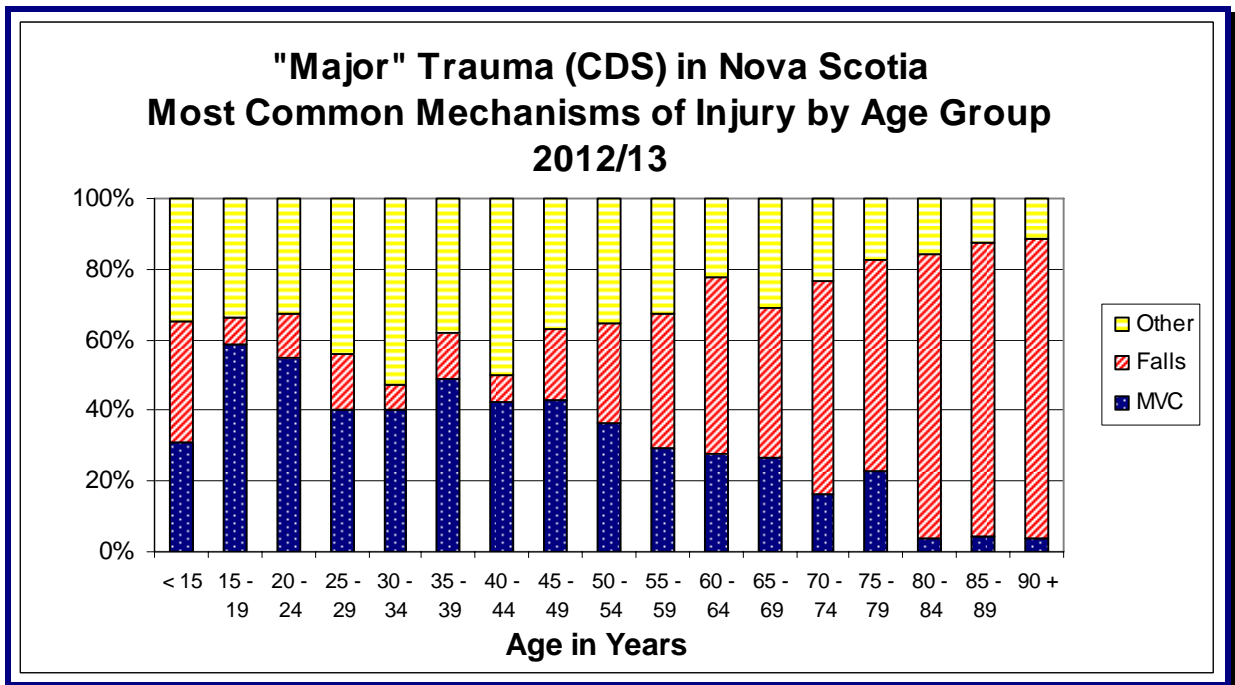


## Mechanism of Injury

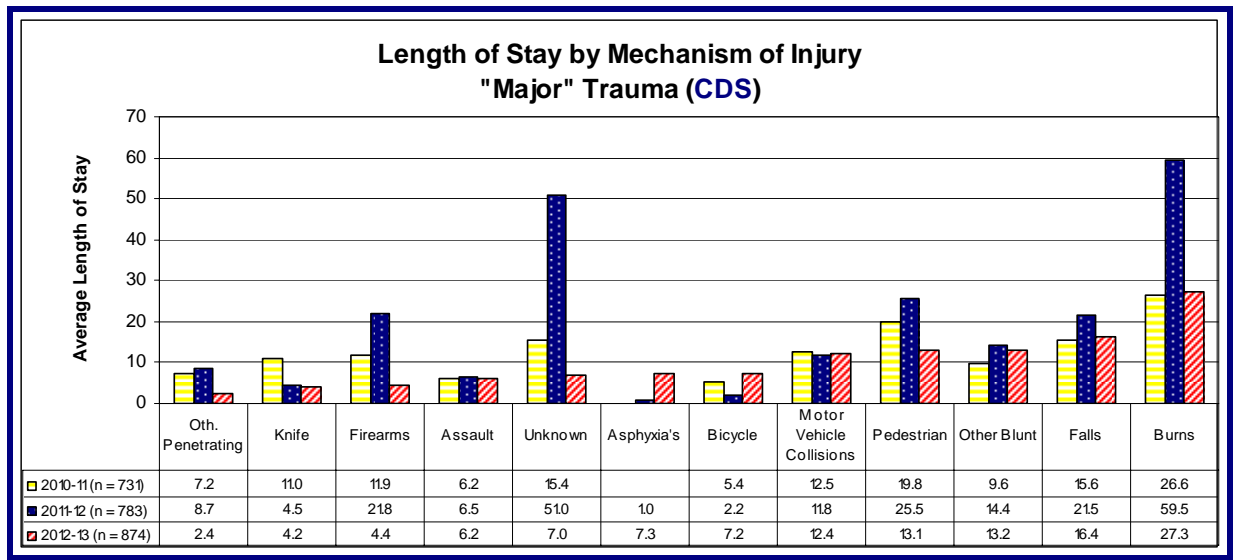


Note: Hangings & Drownings included effective: April 2012

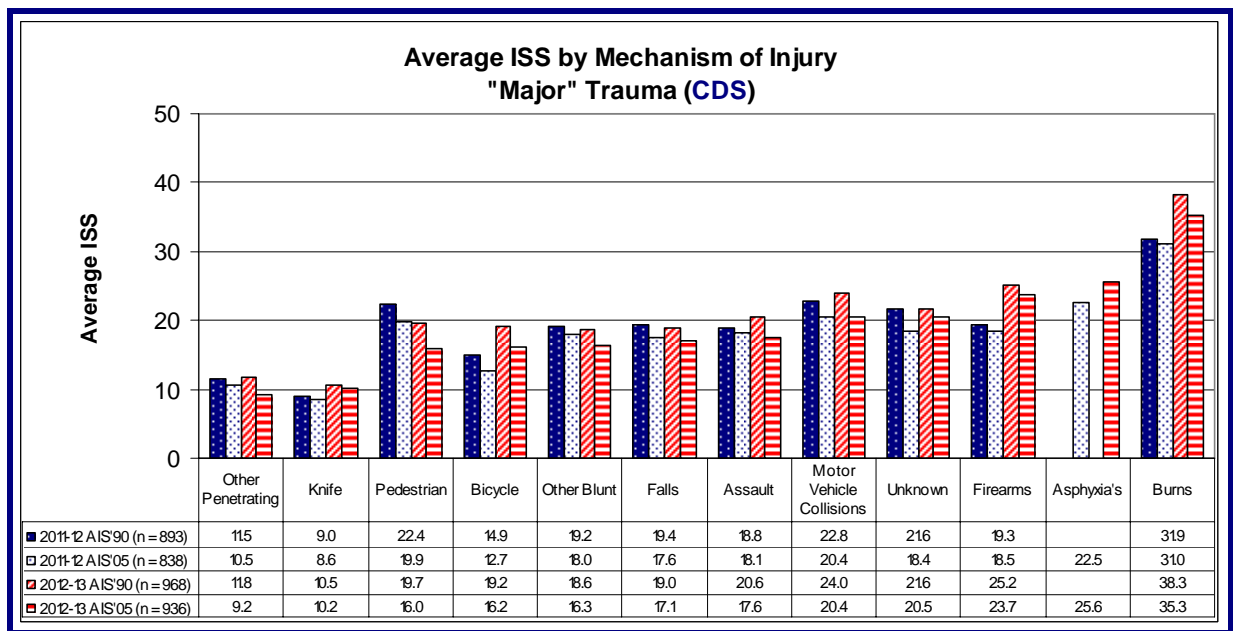
## Mechanism by Age Group



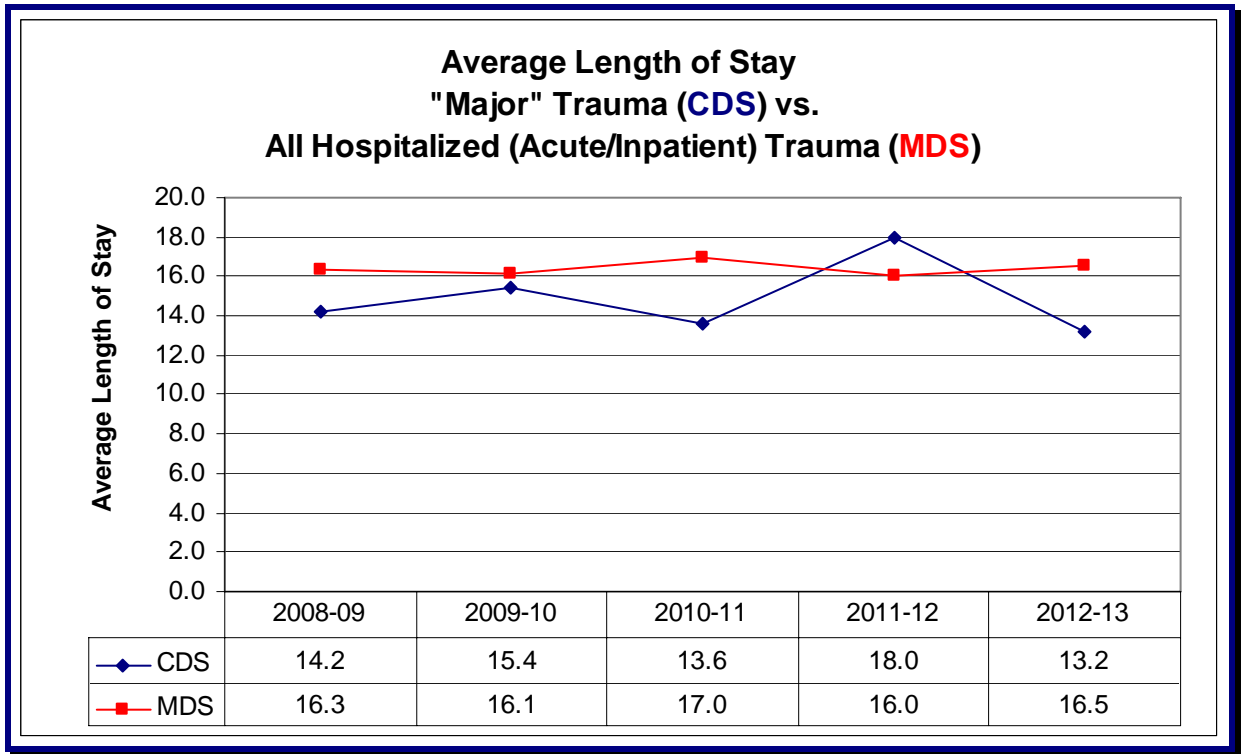
## Average Length of Stay by Mechanism of Injury



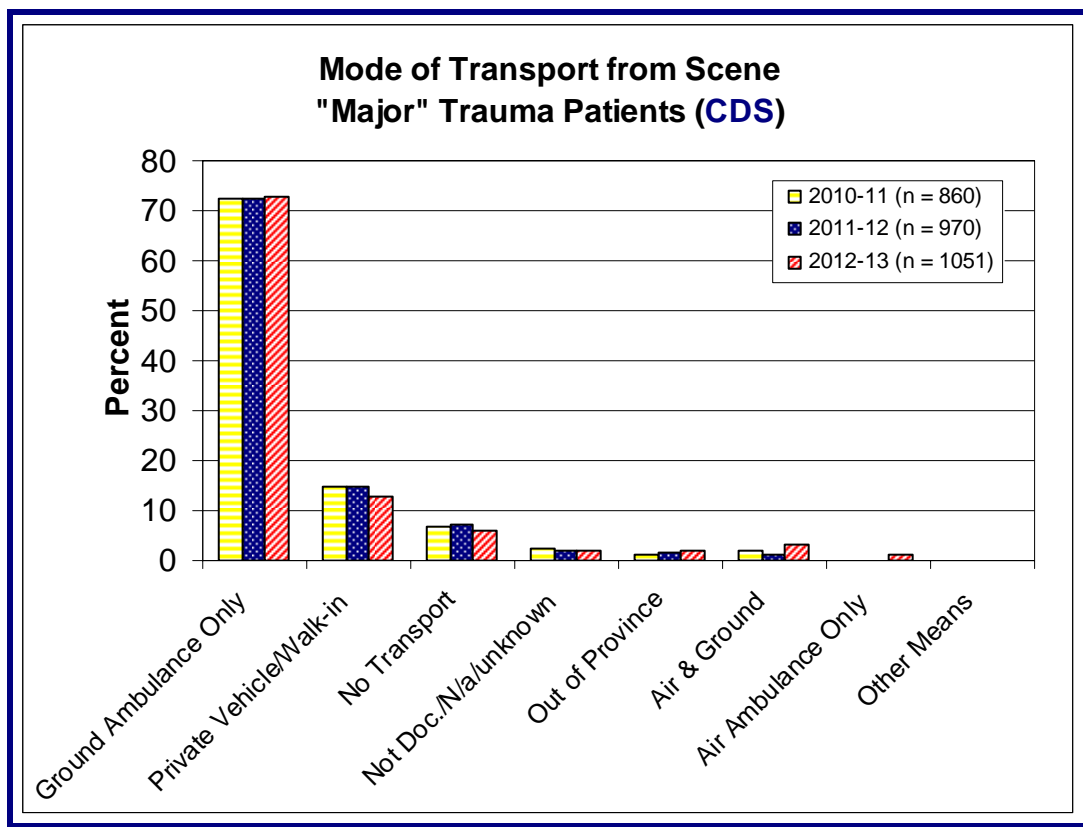
## Average ISS by Mechanism of Injury



## Average Length of Stay



## Method of Arrival from Scene of Injury to Hospital

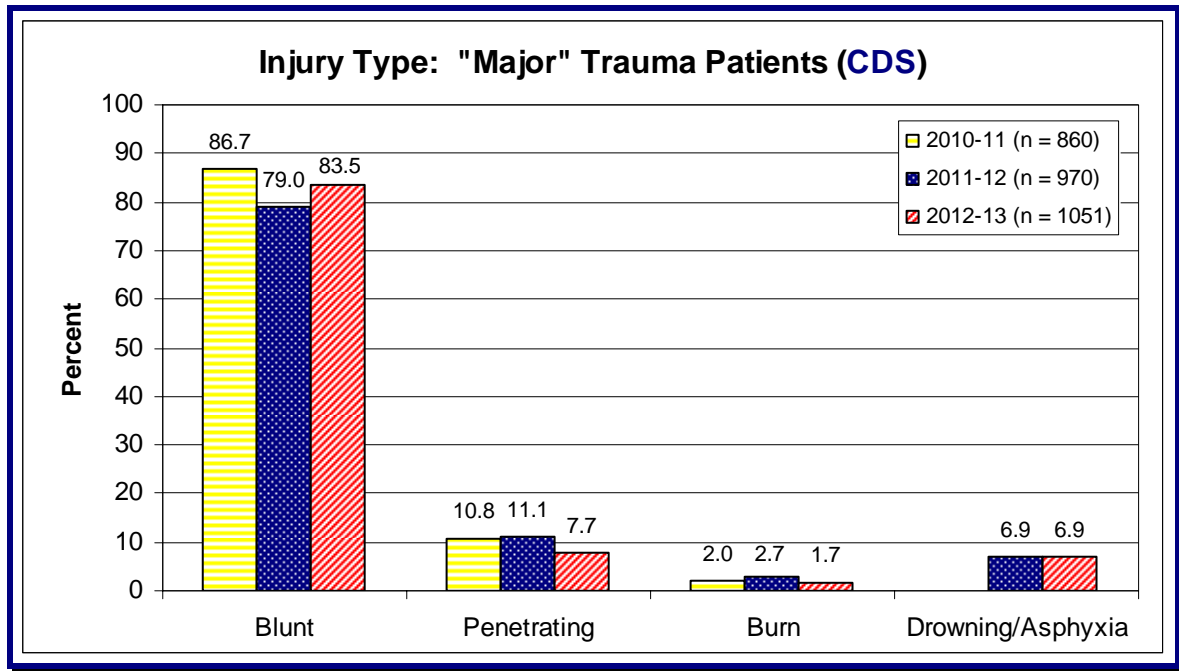


This data is unavailable for the Minimal Data Set.

Transport from Scene	2010-11	2011-12	2012-13
	%	%	%
Ground Ambulance Only	72.3	72.3	73.0
Private Vehicle/Walk-in	14.9	14.8	12.7
No Transport	6.9	7.3	6.0
Not Doc., N/A, unknown	2.3	2.2	1.8
Out of Province (OOP)	1.4	1.5	2.0
Air Ambulance Only	<5	<5	1.0
Air & Ground Ambulance	1.9	1.3	3.3
Other Means	<5	<5	<5
Total Cases	860	970	1051

## Injury Data

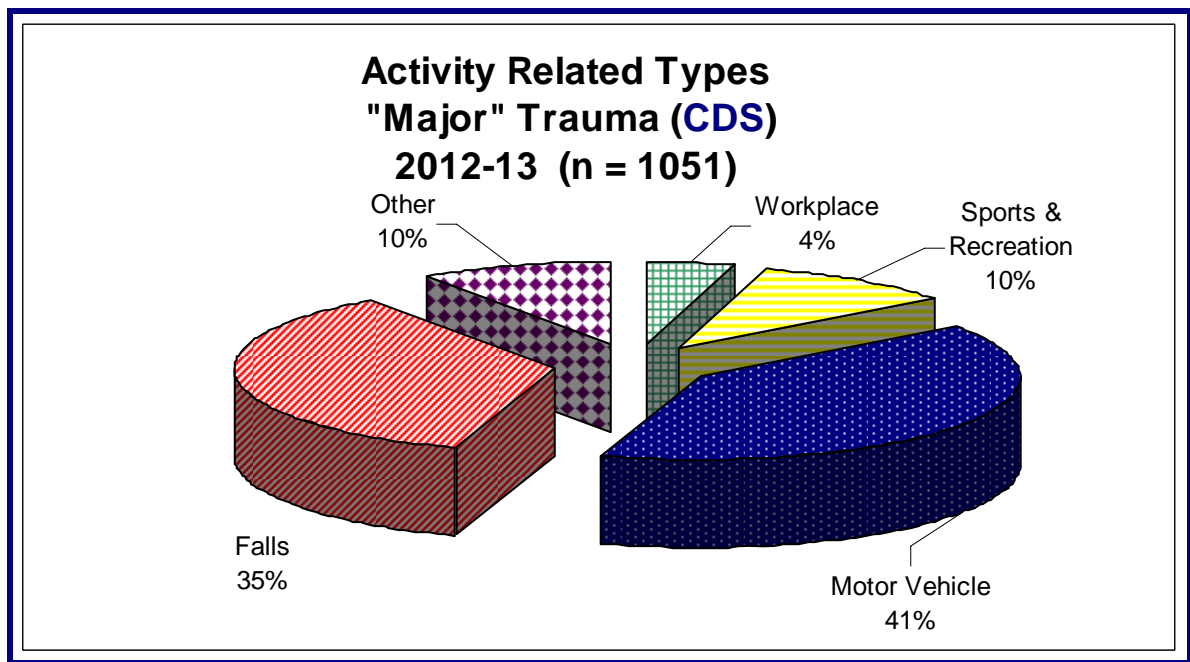
### Injury Types



(This data is unavailable from the Minimal Data Set).

Blunt injuries include those resulting from Motor Vehicle Collisions, Falls, etc. Penetrating injuries include those resulting from Gunshot Wounds, Stabbings, etc.

### Activity Related Types





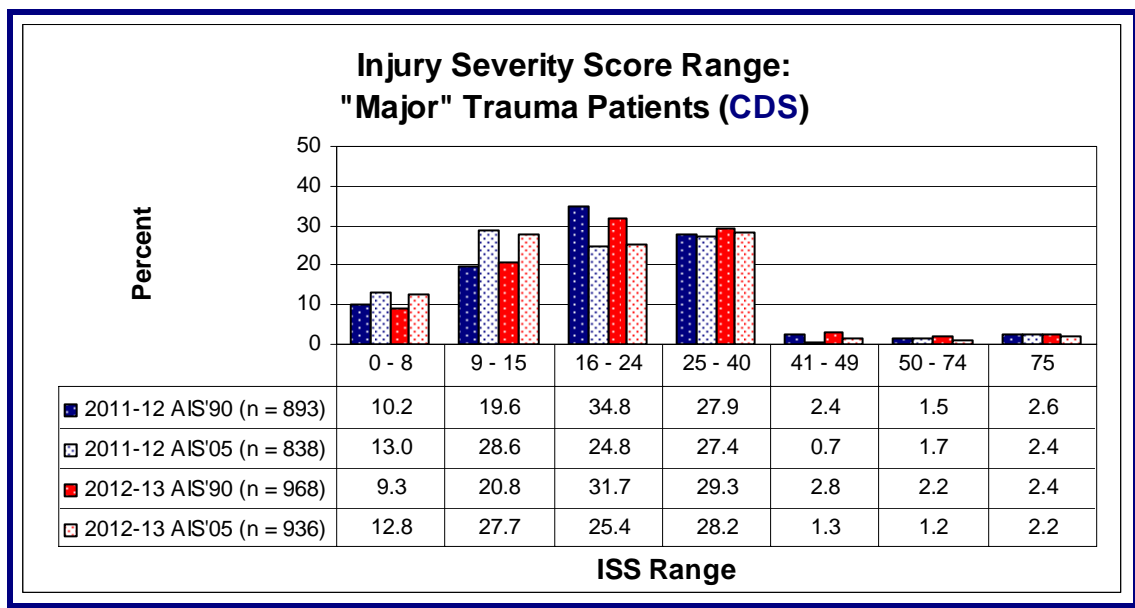
## Injury Severity

To determine injury severity and thus CDS inclusion (i.e., “Major” Trauma), all documented injuries are captured and coded. This coding process assigns each injury with a numerical value or score, using AIS<sup>7</sup>. Injury Severity Score (ISS) is calculated by squaring the score of the most severe injury from three different body regions. The ISS is then used as a tool to predict the patient’s probability of survival. ISS ranges from 1 – 75, 75 represents a non survivable injury.

“Major” Trauma Patients (CDS)

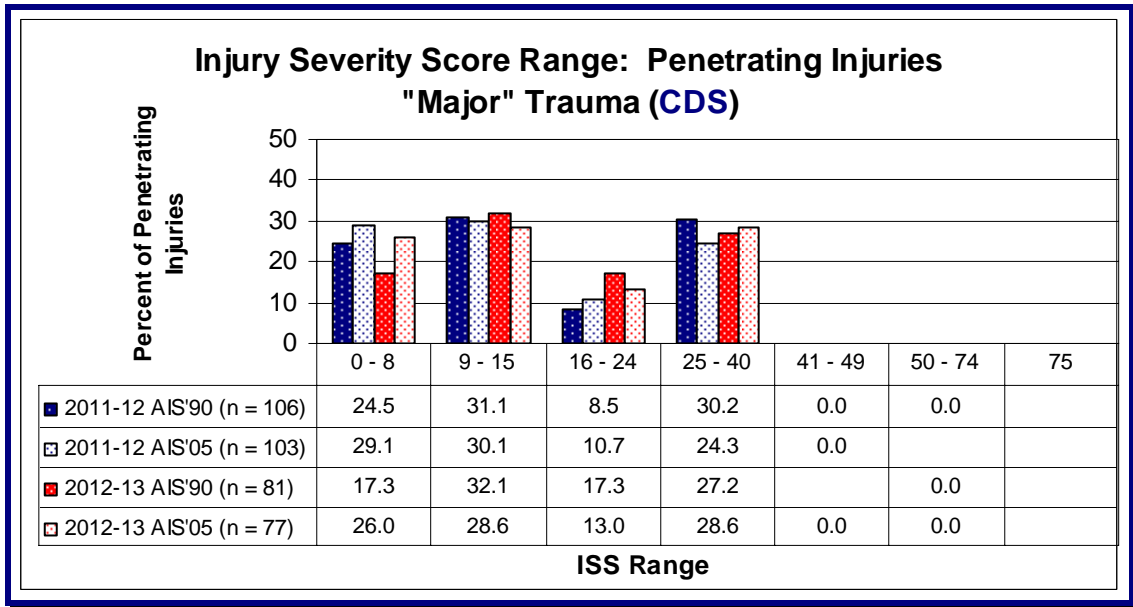
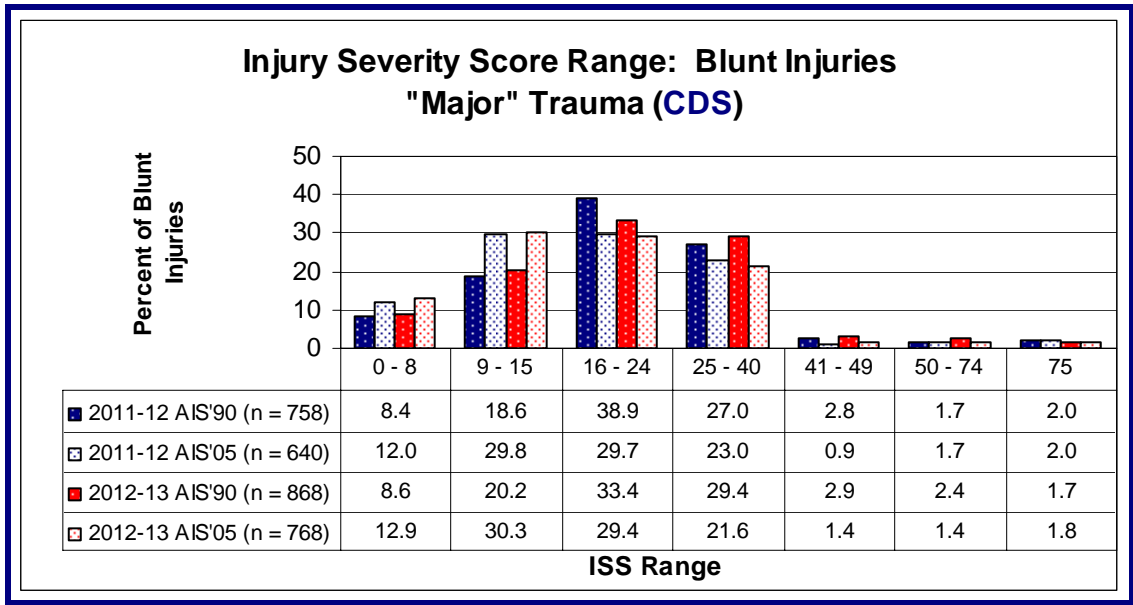
ISS Values	2011-12 AIS'90	2011-12 AIS'05	2012-13 AIS'90	2012-13 AIS'05
Total Number of Cases	893	838	968	936
Average/Mean ISS value	20.5	19.0	21.2	19.2
Standard deviation	13.3	13.2	13.6	12.8
Median ISS	17.0	17.0	19.0	17.0
Minimum ISS value	1.0	1.0	1.0	1.0
Maximum ISS value	75.0	75.0	75.0	75.0

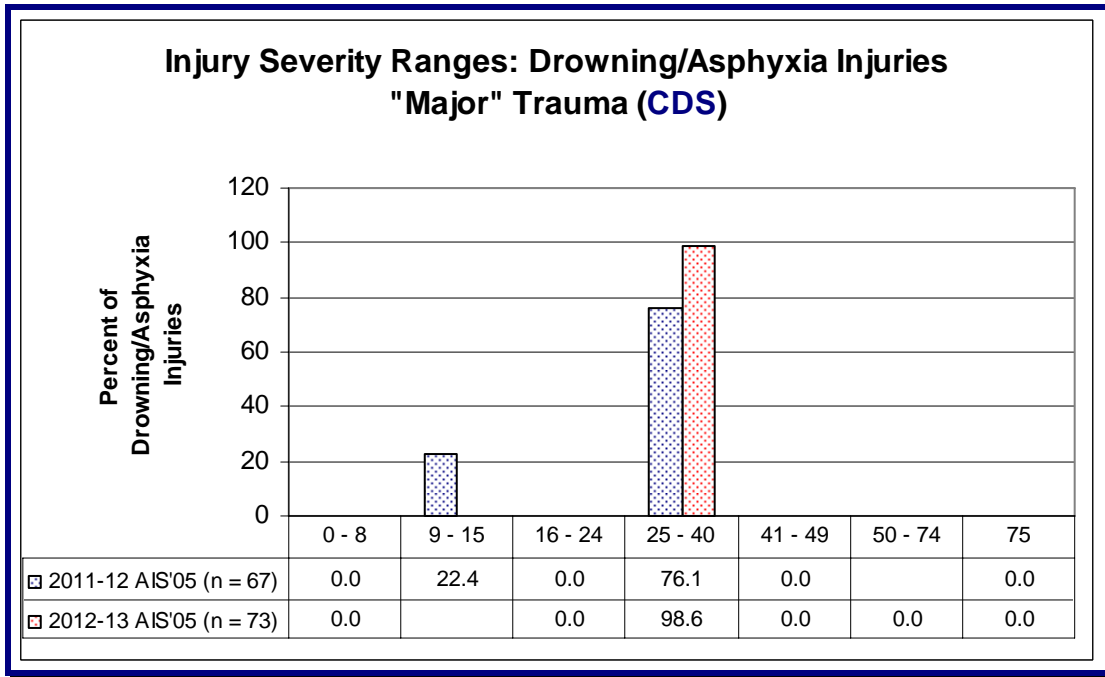
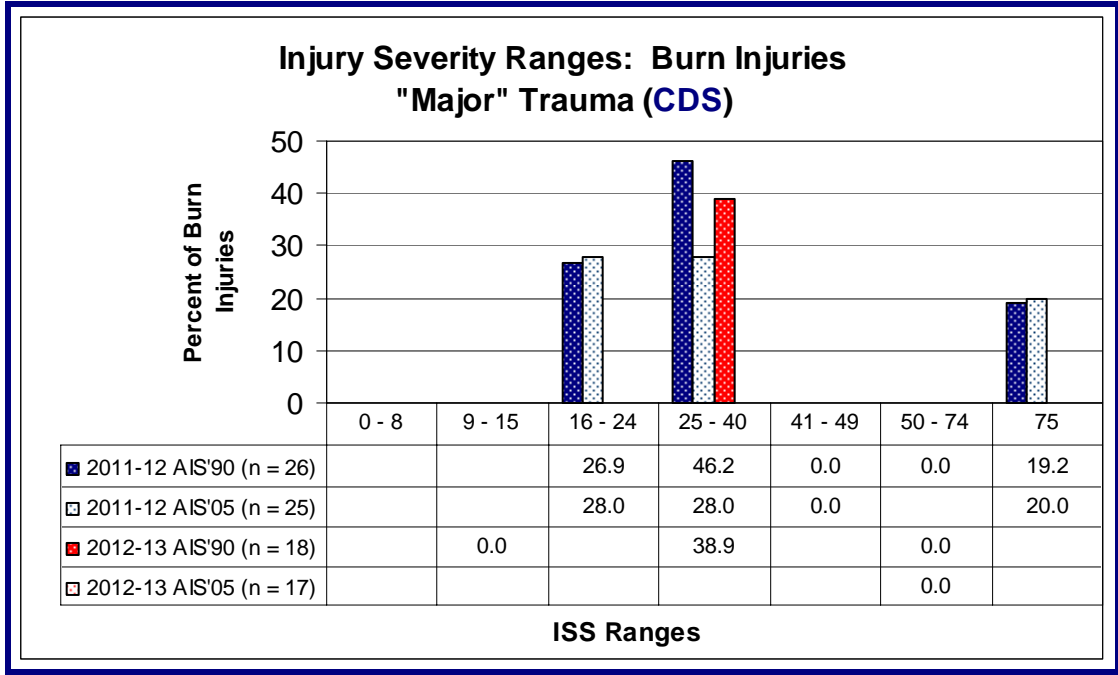
This data is not available in the Minimal Data Set.



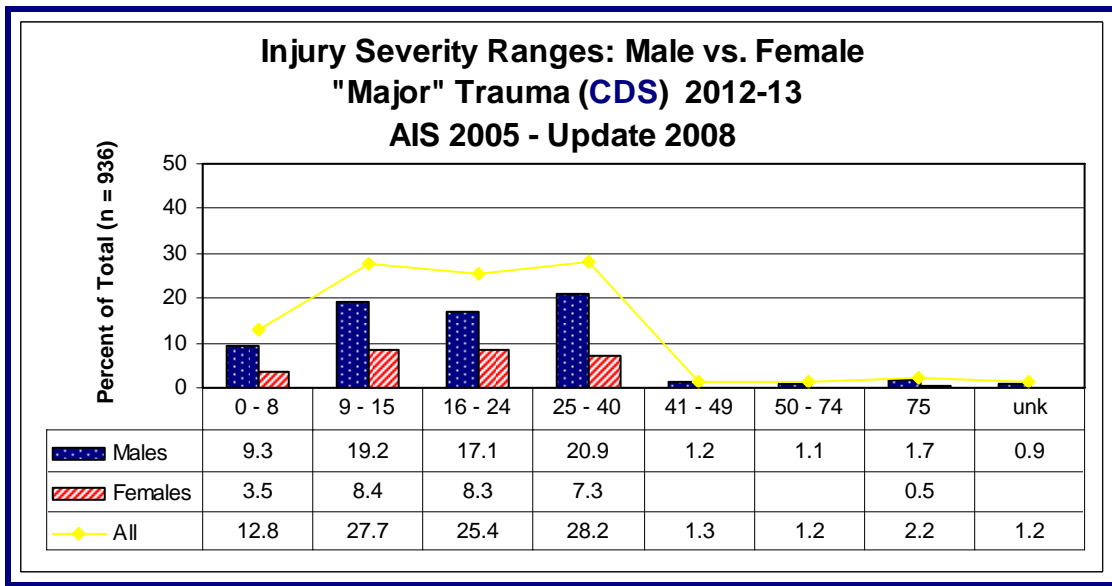
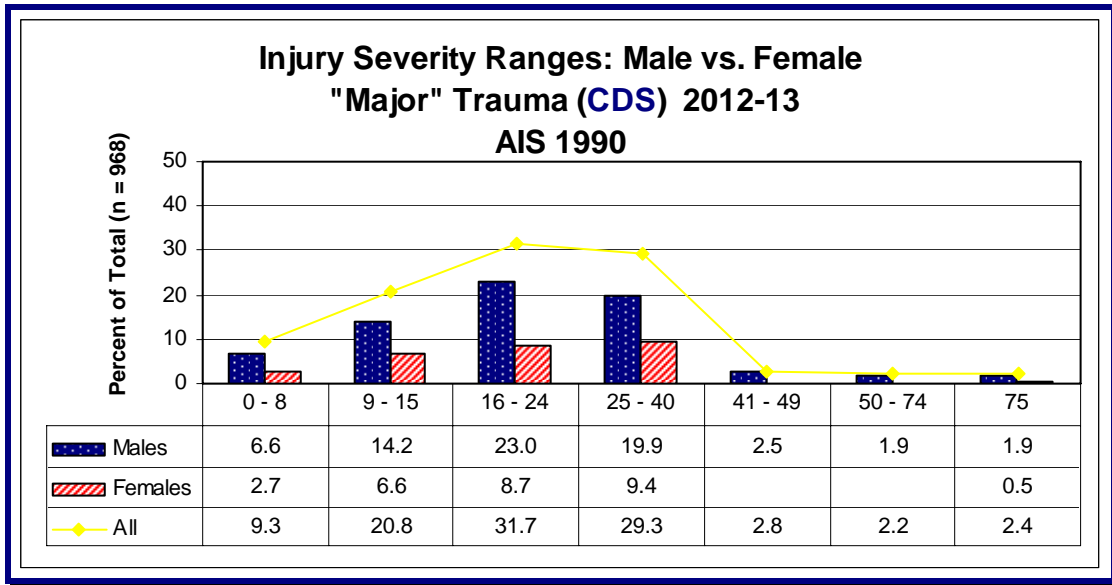
<sup>7</sup> AAAM Abbreviated Injury Scale, see glossary

## Injury Severity Score by Injury Type



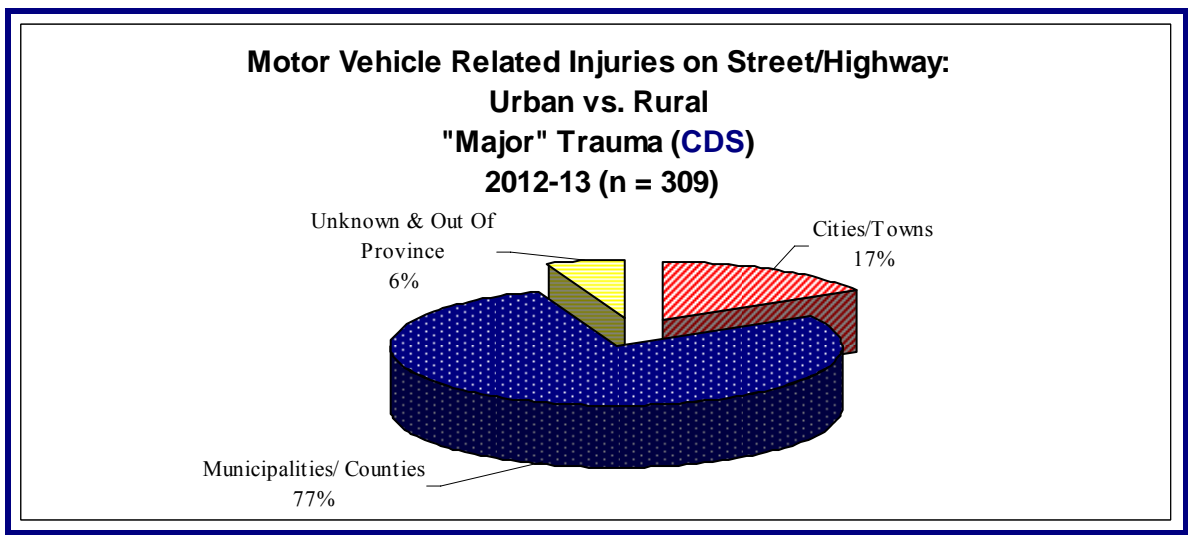
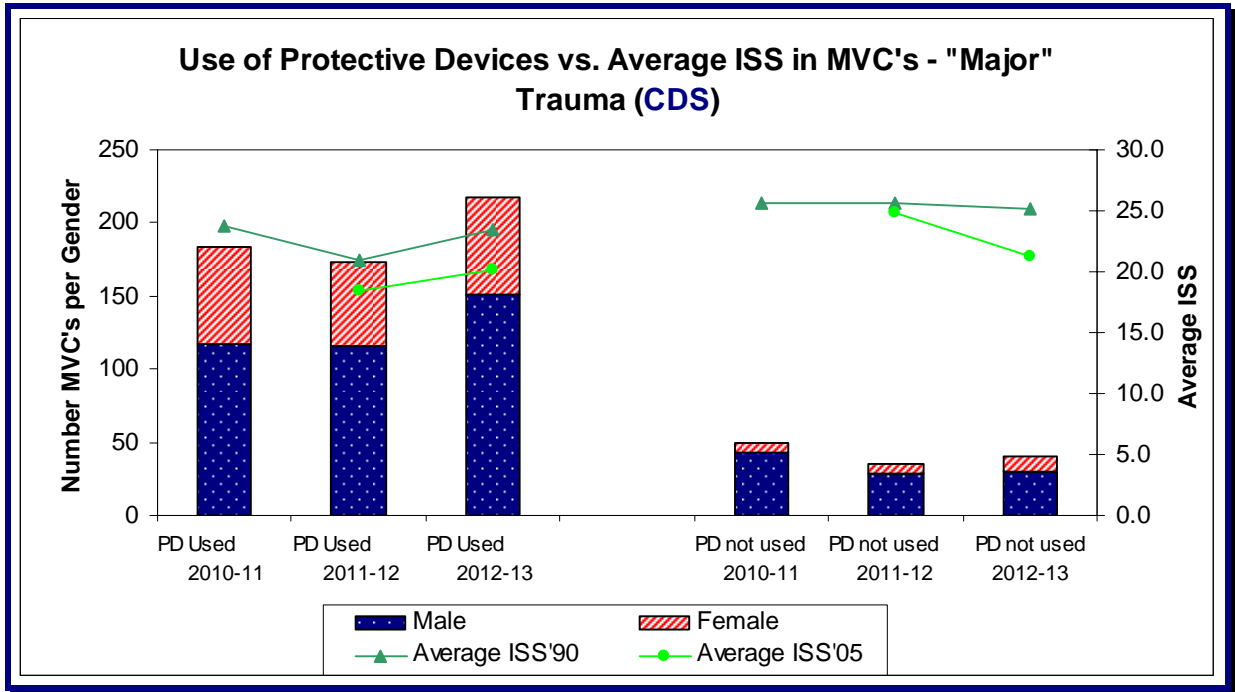


## Injury Severity Score by Gender



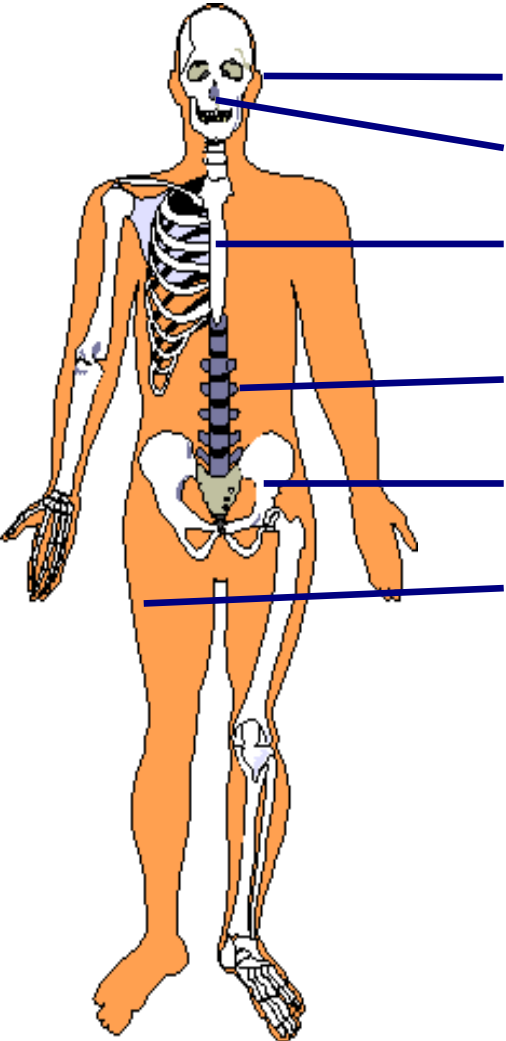
## Protective Device Use & Injury Severity

Use of Protective Devices, i.e., Air Bags, Child Safety Seats, Seat Belts, etc. is not always documented. However, in the documented cases, the average Injury Severity Score was higher in patients who did not use a Protective Device.



## Injury by AIS Body Region for All “Major” Trauma Patients

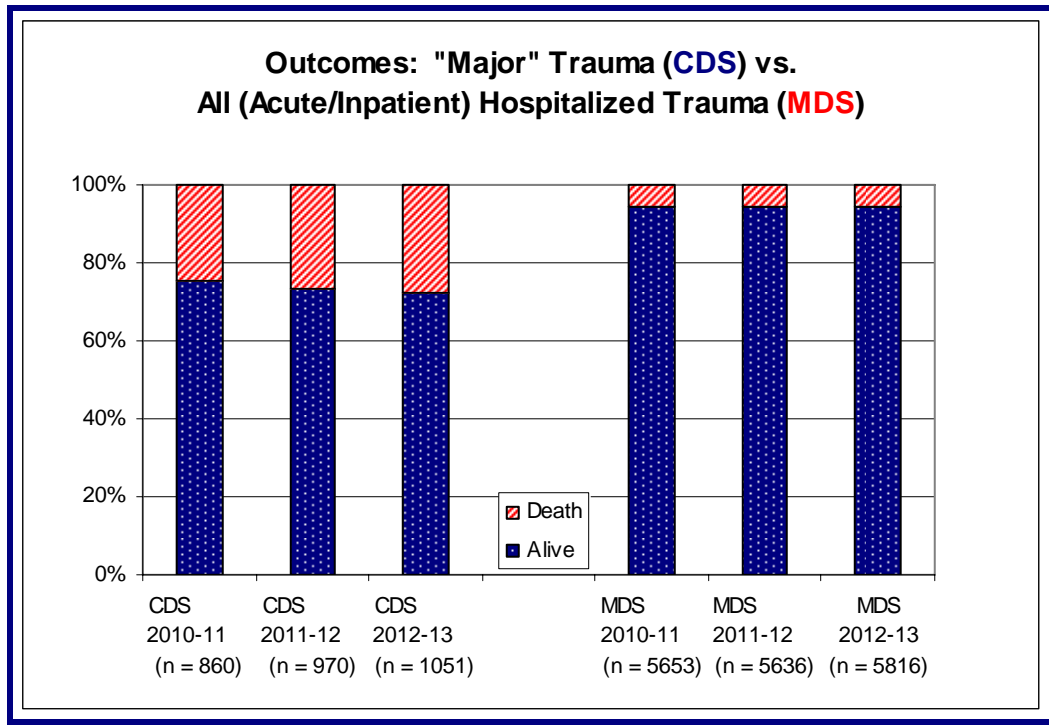
The Abbreviated Injury Scale (AIS), developed by AAAM<sup>8</sup>, is a consensus derived, anatomically based system that classifies individual injuries by six body regions on a 6-point ordinal severity scale ranging from AIS 1 (minor) to AIS 6 (currently untreatable).

AIS Body Region	Body Region	% of Cases with AIS Body Region injured (CDS)		
		2010-11 n = 860	2011-12 n = 970	2012-13 n = 1051
	1. Head and neck injury	59.7%	50.8%	53.4%
	2. Facial Injury	16.5%	14.3%	16.9%
	3. Chest and thoracic spine injury	44.1%	38.7%	38.6%
	4. Abdomen or pelvic contents & lumbar spine injury	23.8%	19.3%	18.8%
	5. Extremities or pelvic girdle	36.2%	30.9%	38.2%
	6. External/Burns	41.5%	46.6%	48.0%
	Poly-trauma - injury to 3 or more body regions	34.1%	27.9%	34.7%
<p><b>Note:</b> For patients with more than one body region injured, cases are counted in each of the body regions – therefore totals will add up to &gt; 100%.</p>				

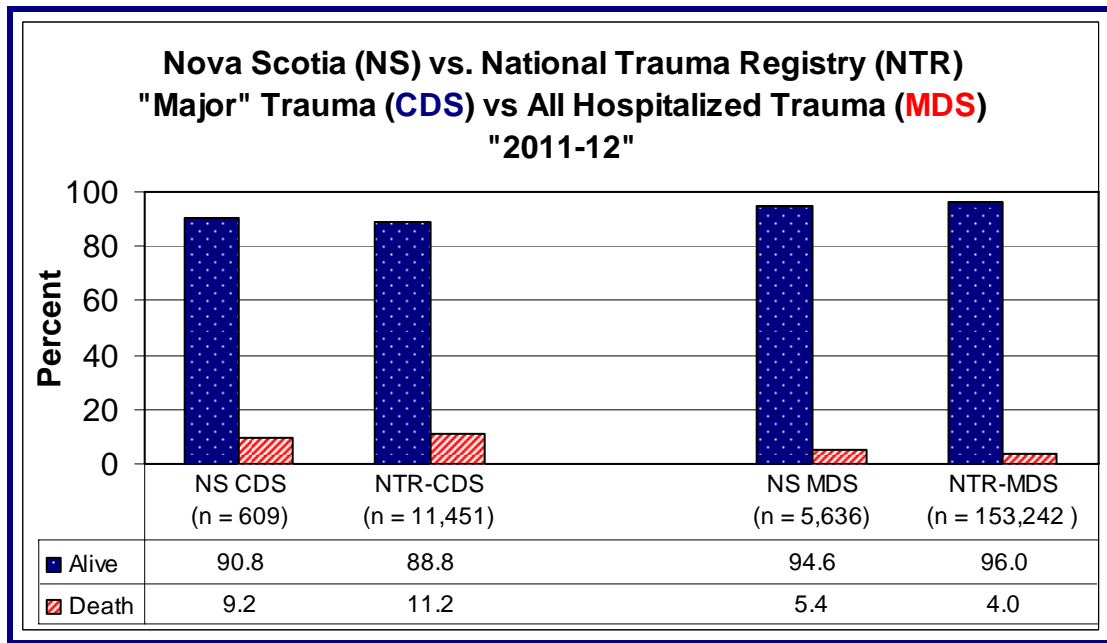
<sup>8</sup> AAAM – Association for the Advancement of Automotive Medicine

## Outcome Data

### Outcomes



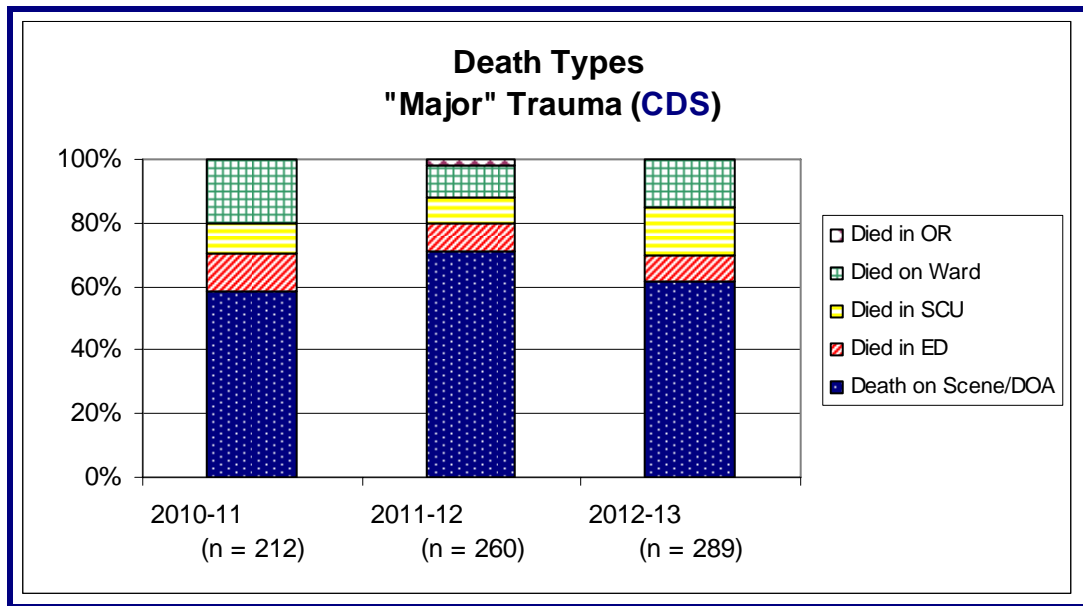
### Outcomes: Nova Scotia versus National Trauma Registry



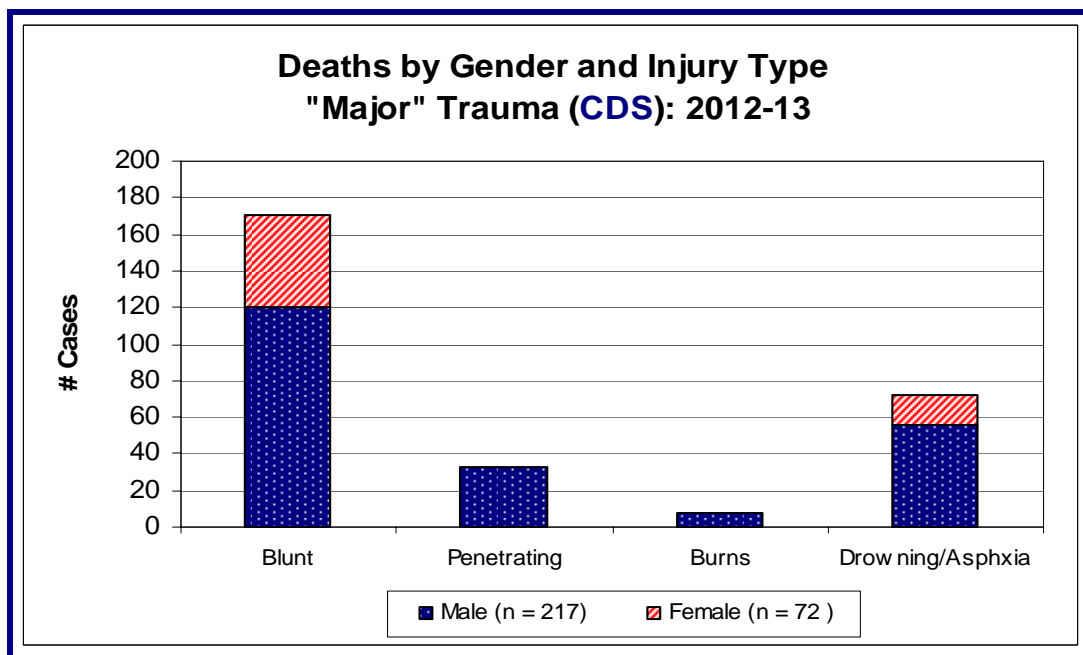
\*Note: 2011-12 is the most recent data available for the NTR-CDS, and excludes Quebec and Saskatchewan.

NS-CDS as per NTR data submission criteria

## Death Types

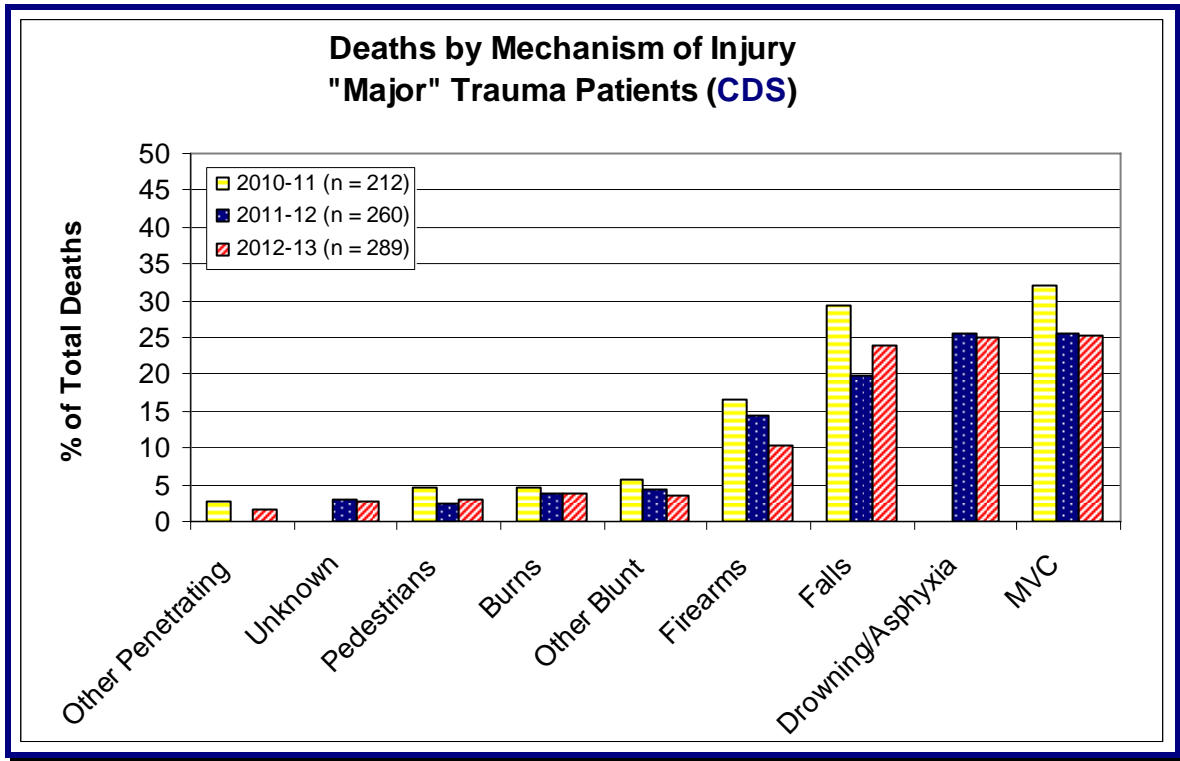


## Deaths by Gender and Injury Type

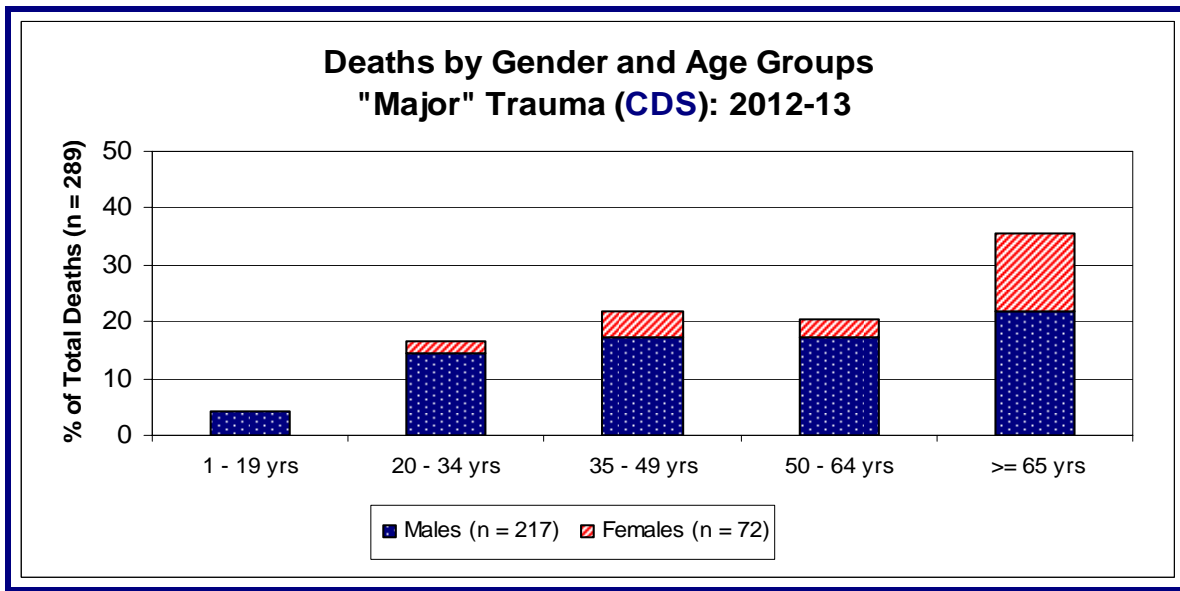




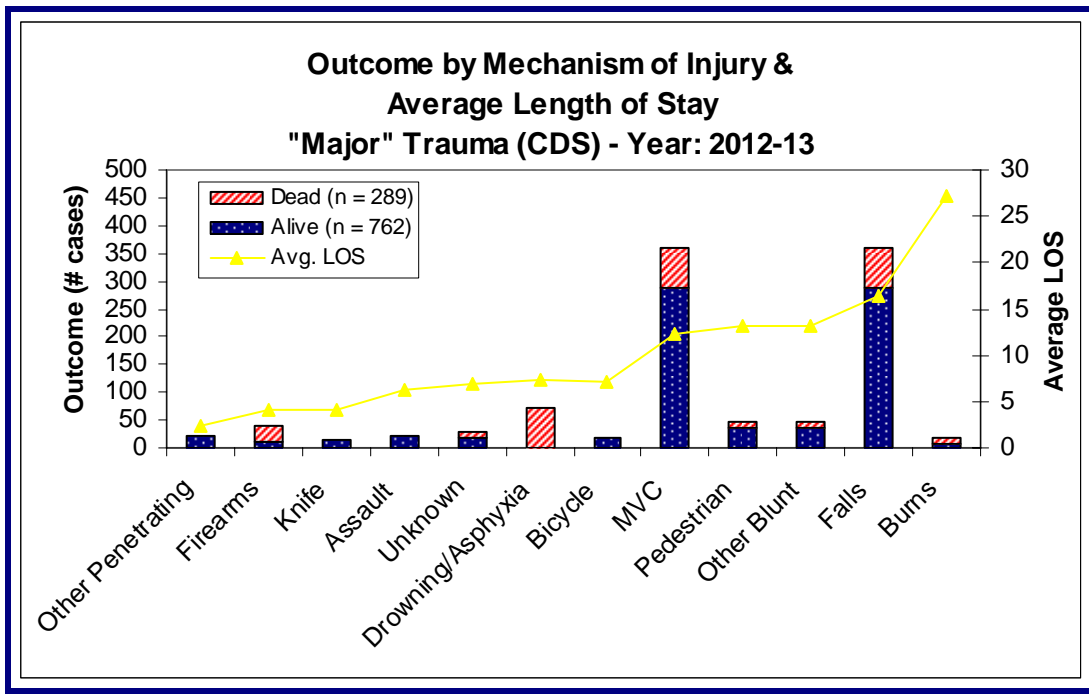
## Deaths by Mechanism of Injury



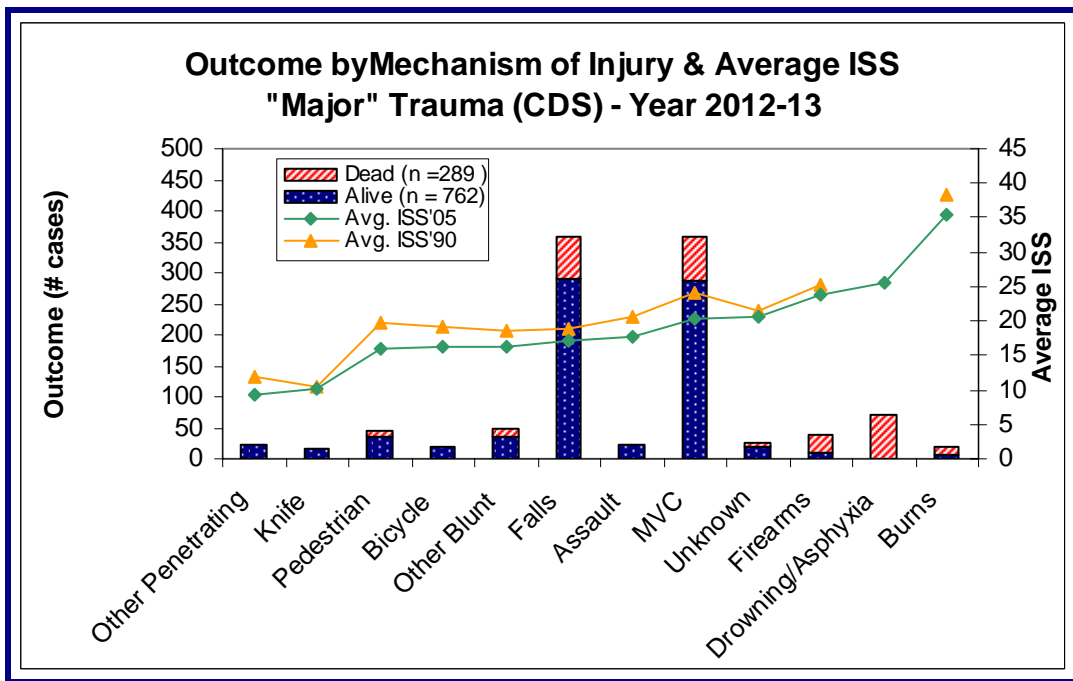
## Deaths by Gender and Age Groups



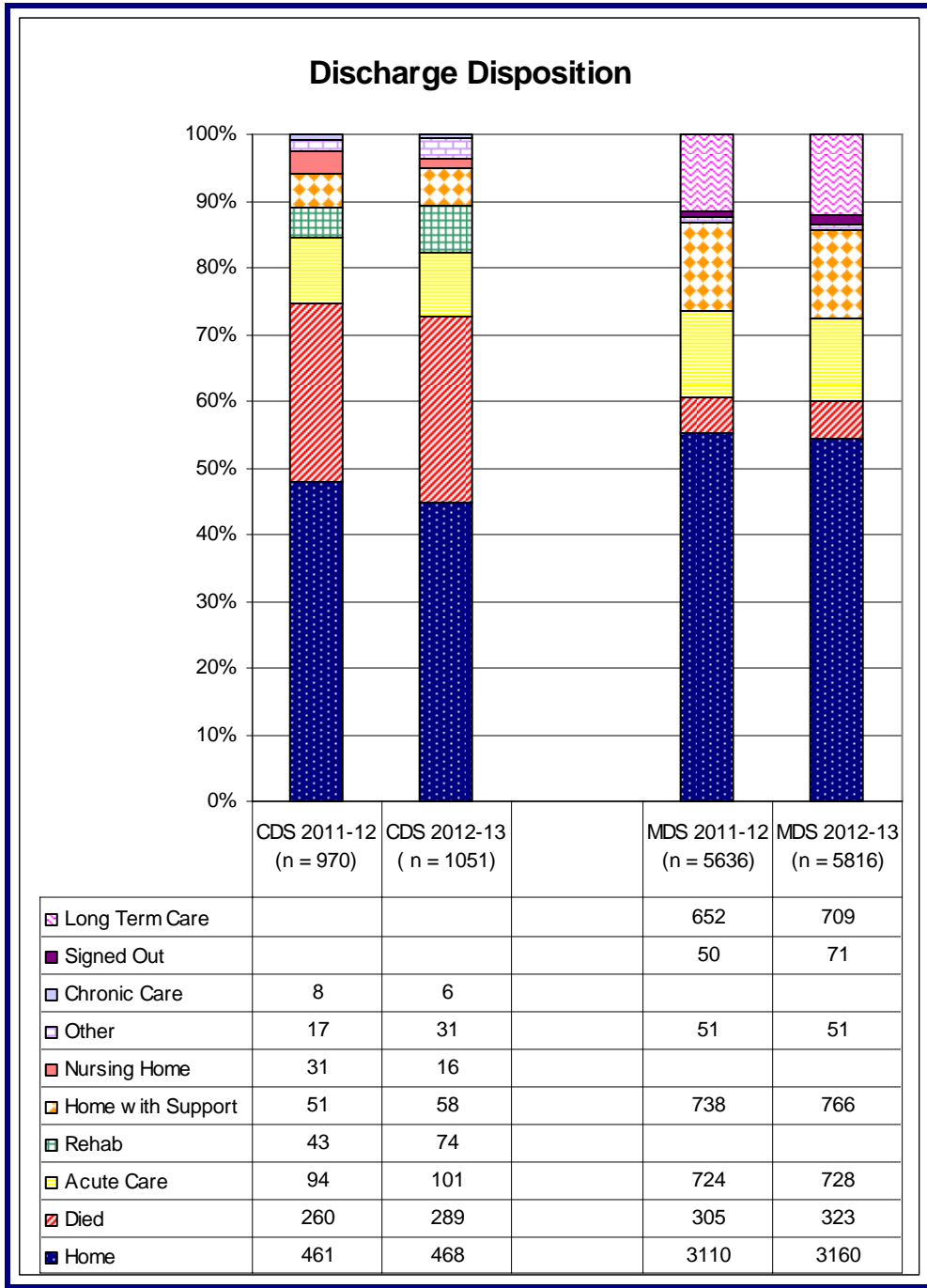
## Outcomes by Mechanism of Injury and Average LOS



## Outcomes by Mechanism of Injury and Average ISS

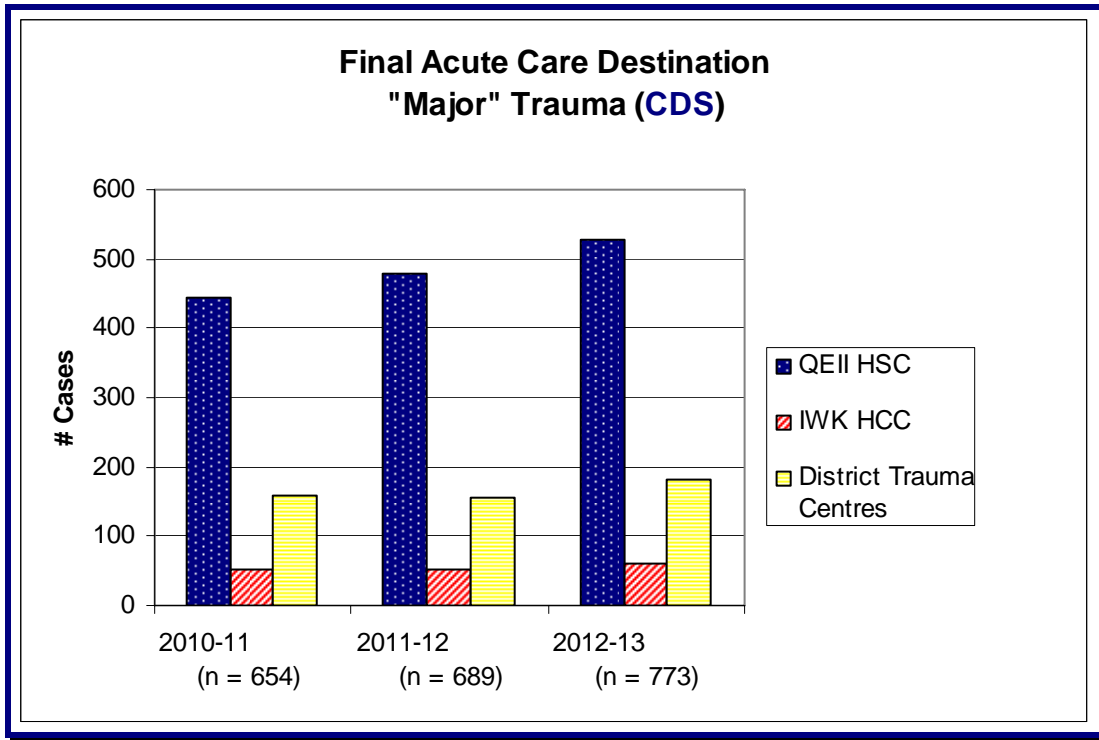


## Discharge Disposition

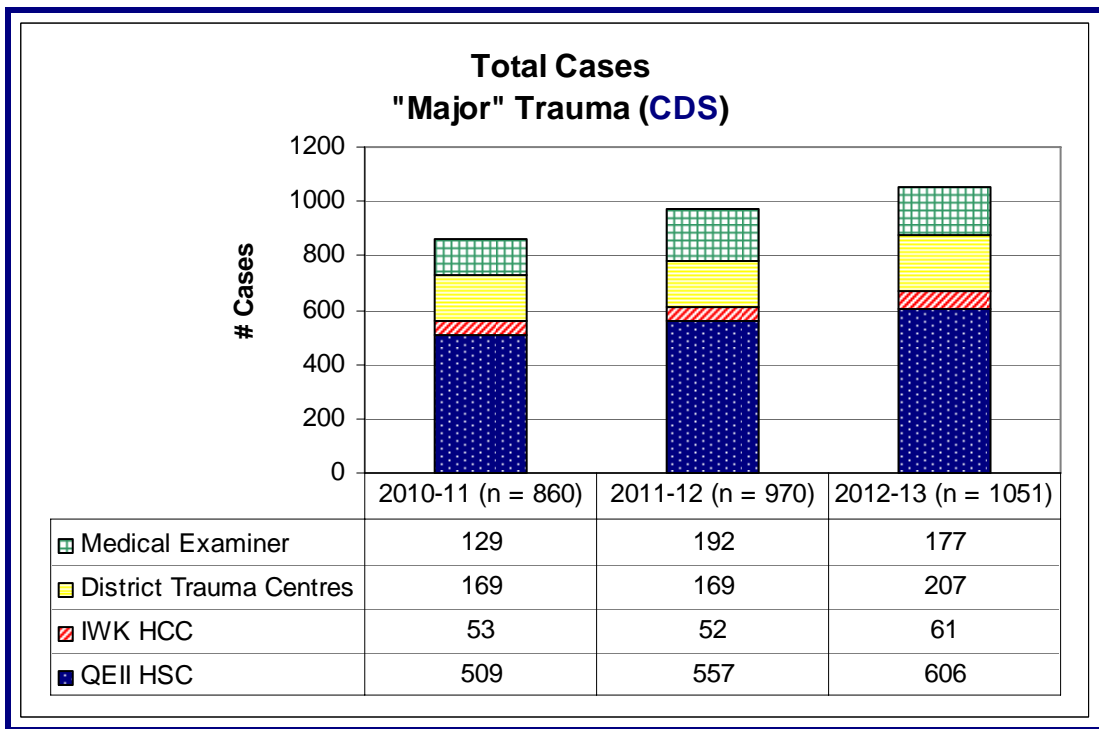


The method of data collection differs between the CDS and the MDS, therefore some categories are not available.

## Final Acute Care Facility Destination



## Total Cases



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## **APPENDICES**

## Appendix A: ICD-10-CA Inclusion/Exclusions for NS Trauma Registry

The following table is the list of appropriate mechanism of injury inclusions for the Nova Scotia Trauma Registry, based on the National Trauma Registry's definition of trauma and the identified ICD 10-CA External Cause of Injury Code categories<sup>9</sup>

ICD –10 CA Trauma Registry Inclusions, (Effective April 1, 2001)	
Code Category	Definition
V01 -V09	Pedestrian injured in transport accident
V10-V19	Pedal cyclist injured in transport accident
V20-V29	Motor cycle rider injured in transport accident
V30-V39	Occupant of 3 wheeled MV injured in transport accident
V40-V49	Car occupant injured in transport accident
V50-V59	Occupant of Pick-up truck or van injured in transport accident
V60-V69	Occupant of Heavy transport vehicle injured in transport accident
V70-V79	Bus occupant injured in transport accident
V80-V89	Other land transport accidents (includes ATV)
V90-V94	Water transport accidents
V95-V97	Air and space transport accidents
V98-V99	Other and unspecified transport accidents
W00-W19	Falls
W20-W49	Exposure to inanimate mechanical forces (including noise)
W50-W64	Exposure to animate mechanical forces
W65 – W70, W73, W74	Accidental drowning and submersion (only with anatomical lesion and AIS score >1)
W75, W76, W77, W81, W83, W84	Other accidental threats to breathing except due to inhalation of gastric contents, food, or other objects
W85-W99	Exposure to electrical current, radiation and extreme ambient air temperature & pressure
X00-X09	Exposure to smoke, fire and flames
X10-X19	Contact with heat and hot substances
X30-X39	Exposure to forces of nature (includes heat, cold, volcanoes and floods)
X50	Overexertion and strenuous or repetitive movements
X52	Prolonged stay in weightless environment
X58 – X59	Accidental exposure to other and unspecified factors
X70, X71, X72-X84	Intentional self-harm, excluding poisoning
X86	Assault by corrosive substance
X91, X92	Assault by hanging, strangulation, suffocation, drowning and submersion
X93-Y05	Homicide and injury purposely inflicted by others
Y07-Y09	Other maltreatment syndromes, including physical abuse.
Y20, Y21, Y22-Y34	Event of undetermined intent, excluding poisonings
Y35.0 -.1, Y35.2, Y35.3 -.7	Legal interventions
Y36	Operations of war

<sup>9</sup> Canadian Institute for Health Information. National Trauma Registry Report – Hospital Injury Admissions 1995/96. Canadian Institute for Health Information, Toronto, Ontario, 1998.

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**ICD –10 CA Trauma Registry Exclusions**

(Effective April 1, 2001)

<b>Code</b>	<b>Definition</b>
W78-W80	Inhalation of gastric contents; Inhalation & ingestion of food causing obstruction of respiratory tract; Inhalation and ingestion of other objects causing obstruction of respiratory tract
X20-X29	Contact with venomous animals and plants
X40-X49	Accidental poisoning and exposure to noxious substances
X51	Travel & Motion
X53, X54, X57	Lack of food, water, unspecified privation
X60-X69	Intentional self-harm by poisoning
X85, X87-X90	Assault by poisoning
Y06	Neglect and abandonment
Y10-Y19	Poisonings by undetermined intent
Y40-Y84	Complications of medical/surgical care (including adverse effects of medications).
Y85-Y89	Sequelae of external causes of morbidity and mortality
Y90-Y98	Supplementary factors related to causes of morbidity and mortality classified elsewhere

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## ***Appendix B: Designated Trauma Centres for Nova Scotia***

The list below is the designated Trauma Centres for Province of Nova Scotia and the Facility where the Trauma Registry collects data.

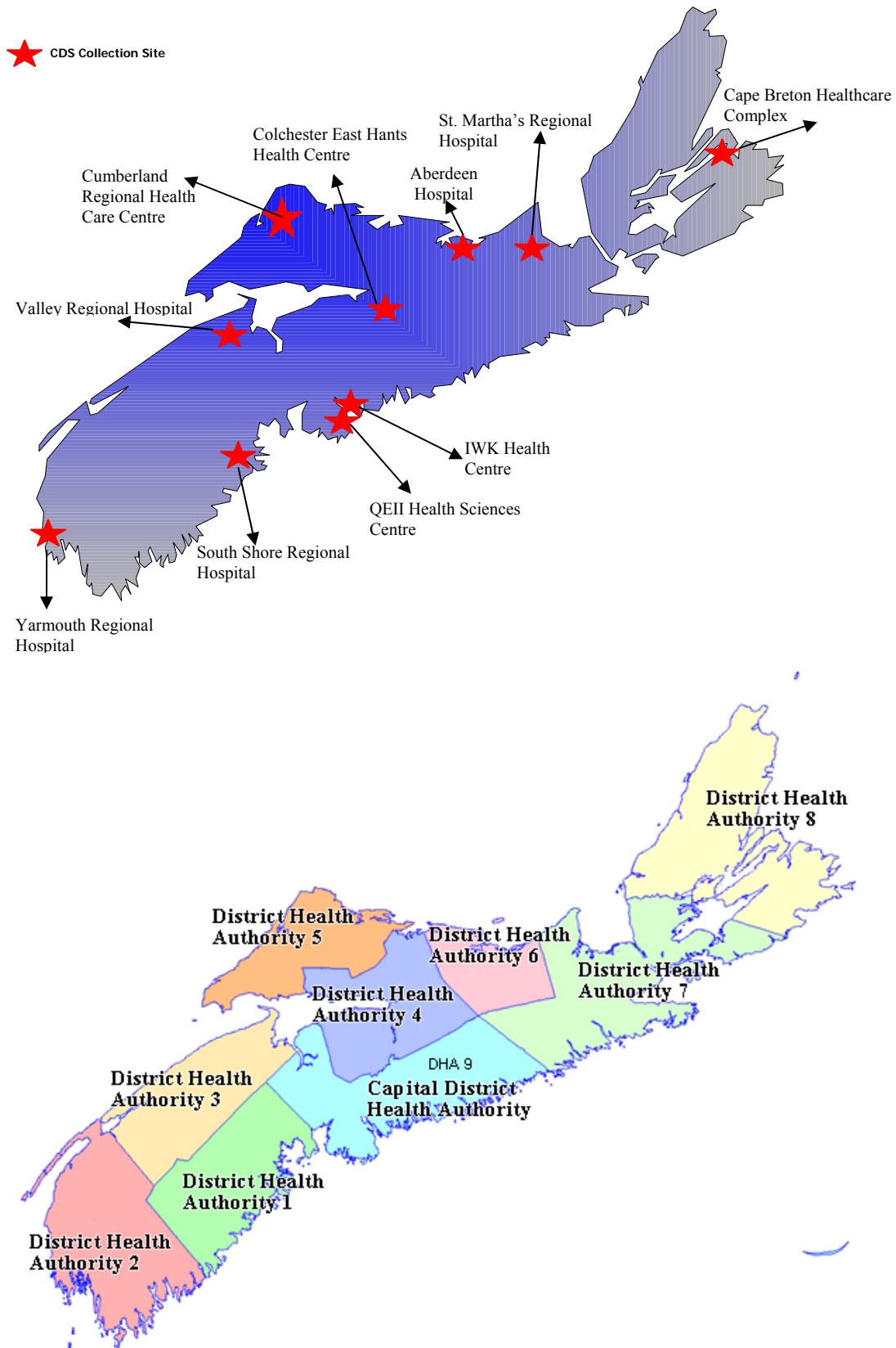
<u>Region</u>	<u>Facility/Facilities</u>
<b><u>Tertiary Trauma Centres</u></b>	
Halifax	Queen Elizabeth II Health Sciences Centre, DHA 9 IWK Health Centre, DHA 9 Office of the Chief Medical Examiner <sup>10</sup>
<b><u>District Trauma Centres</u></b>	
Bridgewater	South Shore Regional Hospital, DHA 1
Yarmouth	Yarmouth Regional Hospital, DHA 2
Kentville	Valley Regional Hospital, DHA 3
Truro	Colchester East Hants Health Centre, DHA 4
Amherst	Cumberland Regional Health Care Centre, DHA 5
New Glasgow	Aberdeen Hospital, DHA 6
Antigonish	St. Martha's Regional Hospital, DHA 7
Sydney	Cape Breton Healthcare Complex, DHA 8

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<sup>10</sup> The Office of the Chief Medical Examiner is considered a trauma centre for the purposes of the Nova Scotia Trauma Registry, where death data is collected.



## Appendix C: Nova Scotia Trauma Registry Data Collection Sites



## *Appendix D: Nova Scotia Trauma Advisory Council Membership*

Name:		Title/Occupation:
Allen	Dr. Maureen	ER Physician, Antigonish DHA7
Asbridge	Dr. Mark	Assistant Professor, Community Health & Epidemiology, Dal.
Avery	Bud	Manager, NS Trauma Program and Atlantic Health Training & Simulation Centre
Bauer	Dr. Chris	ER Physician AVR – DHA 3
Beltran	Dr. Carlos	Physician, Amherst DHA
Bowes	Dr. Matthew	Chief Medical Examiner, Chief Medical Examiner's Office
Braha	Dr. Richard	Project Manager, NS Rehabilitation Centre
Brisseau	Dr. Guy	Medical Director EHS, NSTP
Brown	Bobby	Director of Field Operations, EHS
Caiger	Lisa	PEI DOH Liaison, QEII Health Sciences Centre
Cathcart	Darlene	Informatics Nurse, NS Trauma Program
Chisholm	Judy	Clinical Nurse Specialist, IWK
Clarke	Dr David	Neurosurgeon QEII Health Sciences Centre
Colwell	Dr. Randy	ER Physician, South Shore Regional
Currie	Dr. Thomas	ER Physician, Cape Breton Regional Hospital
Davis	Angela	CAST Coordinator, Cdn Mental Health Assoc NS
Dobson	Tom	Clinical Quality Improvement Coordinator, EHS
Fenerty	Lynne	Research Manager, Division of Neurosurgery QEII HSC
Goddard	Dr. Tom	ER Physician AVR – DHA 3
Hartlen	Kathy	Coordinator, Education & ATLS, NS Trauma Program
Heatley	Jennifer	Executive Director, Atlantic Collaborative on Injury Prevention
Jones	Krise	Coordinator, Transportation and Infrastructure Renewal
Kelloway	Fran	Program Manager, NS Rehabilitation Centre
Kennedy	Arminta	Community Safety Manager, Safety Services NS
Killen-Maillet	Robyn	Public Health Services, Annapolis Valley Health
Lake	Janet	Trauma Coordinator, IWK
MacKay	Debbie	Manager, LifeFlight
MacIntyre	Angie	Public Health Services, Colchester East Hants Health
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*Appendix E: List of Mandatory Data Elements*



Appendix: A	PDN: TBD	Last Updated: January 2014	Subject: NS Trauma Registry Database Mandatory Fields	Page 1 of 2
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Table of all Mandatory Fields in Collector <sup>TM</sup>

Section I: Demographics	All fields, including - Registrar ID initials Date & Time of admission to Facility Full Name, Gender, Chart Number, Health Card Number DOB, and Weight for pediatrics under 16 years of age Patient Residence City, Province, Postal Code, Municipality Code
Section II: Injury Data	Date & Time of Incident, City, Province, Municipality Code Location Consistency Place of Injury (U98.x) with text to accompany ICD –10 CA: Cause of Injury Code with text description; Primary and Secondary, if applicable Injury Type, Mechanism of Injury, Extrication, Intentionality, Protective Devices Fields applicable to each injury type (i.e., Work-related; sports & recreation related; motor vehicle related, falls related)
Section III: Pre-hospital	All fields that apply, including - Transportation Modes, Operator MIN/Flight Numbers if applicable, Pre-hospital transportation times information Transport rationale; Scene interventions Scene Vital Signs time recorded, Vital Signs & GCS
Section IV: Referring Facility	# of intermediate facilities involved prior to arrival at facility where data is being collected. Arrival date & time, facility number, city, province, admitted? Vital signs & GCS; interventions Procedure Codes (CCI), Dates and Times of each procedure Transport information from referring facilities
Section V: District Trauma Centres/Tertiary Trauma Centres Emergency Dept.	Presentation Time Level of ED assessment Vital signs including Date and Time first set of vitals were recorded. Interventions CT scans performed, Time spent in the Radiology department. BAC level in mmol/l if taken with Date and Time taken; Drug screen ED care providers, including appropriate PMB Numbers, if applicable. Post ED destination; if a Special Care Unit (SCU), then SCU type must be documented. Admitting service and admitting physician If patient previously in registry for another injury If patient already in registry for same injury. Date & Time Vital signs taken prior to discharge from ED.

Section VI: Inpatient	Blood Products given Non OR Procedures Operative procedures (CCI), dates & times
	All Services that the patient was transferred to <i>after initial admission service</i> and appropriate dates of transfers.
	Special Care Unit transfers. If patient was ever admitted to a SCU, then the admission and transfer dates must all be entered.
	Consults
	All Co-morbid Diagnoses documented. Enter from ICD-10 CA table.
Section VII: Diagnosis	All Anatomical Injuries, based on free-text as obtained from the patient records, Coded in ICD-10-CA, AIS'90 and AIS2005, update 2008 ISS and TRISS scores
Section VIII: Discharge	Date & Time of Separation from Facility Discharge Status Total Special Care Unit Days Total ICU Days Total Ventilator Days Total Acute Care Hospital Days Complications as per ICD-10 CA table. If discharge of death, Death Type must be entered.
	Discharge disposition ALC date, Post discharge services recommended, discharge GCS Functional Status at Discharge (FIM)
Section X: QA indicators	Quality Assurance Indicators

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## ***Appendix F: Research***

### **Peer Reviewed Publications:**

1. Hinkewich C, Green RS, Butler M. The impact of etomidate on mortality in trauma patients. *Can J Anesth*. Published online: 11 April 2014.
2. Green R, Hutton B, Lorette J, Bleskie D, McIntyre L, Fergusson D. Incidence of postintubation hemodynamic instability associated with emergent intubations performed outside the operating room: a systematic review. *CJEM*. 2014 Jan 1;16(1):69-79.
3. Yanchar NL, Woo K, Brennan M, Palmer CS, Zs Ee M, Sweeney B, Crameri J. Chest x-ray as a screening tool for blunt thoracic trauma in children. *J Trauma Acute Care Surg*. 2013 Oct;75(4):613-9.
4. Asbridge M, Mann R, Cusimano MD, Trayling C, Roerecke M, Tallon JM, Whipp A, Rehm J. Cannabis and traffic collision risk: findings from a case-crossover study of injured drivers presenting to emergency departments. *Int J Public Health*. 2013 Sept 24.
5. Vu EN, Schlamp RS, Wand RT, Kleine-Deters GA, Vu MP, Tallon JM. Prehospital use of tranexamic acid for hemorrhagic shock in primary and secondary air medical evacuation. *Air Med J*. 2013 Sept-Oct;32(5):289-92.
6. Evans CC, Tallon JM, Bridge J, Nathens AB. An inventory of canadian trauma systems: opportunities for improving access to trauma care. *CJEM*. 2013;15(0):1-7.
7. Gray SH, Ross JA, Green RS. How to safely extubate a patient in the emergency department: a user's guide to critical care. *CJEM*. 2013 Sep 1;15(5):303-6.
8. Tallon JM, Flowerdew G, Stewart R, Kovacs G. Outcomes in seriously head-injured patients undergoing pre-hospital tracheal intubation vs. emergency department tracheal intubation. *Int J Clin Med*. 2013;4(2):78-85.
9. Yanchar NL, Warda LJ, Fuselli P. Child and youth injury prevention: A public health approach. *Paediatr Child Health*. 2012 Nov;17(9):511-2.
10. Warda L, Yanchar NL, and the Canadian Paediatric Society. Skiing and snowboarding injury prevention. *Paediatrics and Child Health*. 2012;17(1):35-36.
11. Fuselli P, Yanchar NL; Canadian Paediatric Society, Injury Prevention Committee. *Paediatric Child Health*. 2012 Jun;17(6):328-30.
12. Yanchar NL, Kirkland SA, Leblanc JC, Langille DB. Discrepancies Between Knowledge and Practice of Childhood Motor Vehicle Occupant Safety in Nova Scotia - a Population-Based Study. *Accident Analysis & Prevention*. 2012;45(2):326-33.
13. McDonald LA, Yanchar NL. Management of pediatric splenic injuries in Canada. *J Pediatr Surg*. 2012 Mar;47(3):473-6.

- 
14. Yanchar NL, Kirkland SA, LeBlanc JC, Langille DB. Discrepancies between knowledge and practice of childhood motor vehicle occupant safety in Nova Scotia - a population-based study. *Accid Anal Prev.* 2012 Mar;45:326-33.
  15. Tallon JM, Fell DB, Karim SA, Ackroydstolarz S, Petrie D. Influence of a province-wide trauma system on motor vehicle collision process of trauma care and mortality: a 10-year follow-up evaluation. *Can J Surg.* 2012 Feb;55(1):8-14.
  16. Warda LJ, Yanchar NL; Canadian Paediatric Society, Injury Prevention Committee. Skiing and snowboarding injury prevention. *Paediatr Child Health.* 2012 Jan;17(1):35-8.
  17. Asbridge M, Hayden JA, Cartwright JL. Acute cannabis consumption and motor vehicle collision risk: systematic review of observational studies and meta-analysis. *BMJ.* 2012; Feb 9:34.
  18. Sih K, Campbell SG, Tallon JM, Magee K, Zed PJ. Ketamine in adult emergency medicine: controversies and recent advances. *Ann Pharmacother.* 2011 Dec;45(12):1525-34.
  19. Ahn H, Singh J, Nathens A, MacDonald RD, Travers A, Tallon JM, Fehlings MG, Yee A. Pre-hospital care management of a potential spinal cord injured patient: a systematic review of the literature and evidence-based guidelines. *J Neurotrauma.* 2011 Aug;28(8):1341-61.
  20. Green RS, McIntyre J. The provision of critical care in emergency departments at Canada. *J Emerg Trauma Shock.* 2011;4(4):488-93.
  21. Chung S, Mikrogianakis A, Wales PW, Dirks P, Manohar S, Singhal A, Grant V, Hancock BJ, Creery D, Atkinson J, St-Vil D, Crevier L, Yanchar N, Hayashi A, Mehta V, Carey T, Danani S, Siemens R, Singh S, Price D. Trauma Association of Canada Pediatric Subcommittee National Pediatric Cervical Spine Evaluation Pathway: Consensus Guidelines. *J Trauma* 2011;70(4):873-884.
  22. Burns E, Yanchar NL. Using C-spine clearance guidelines in a pediatric population: A survey of physician practices and opinions. *Can J Emerg Med.* 2011;13(1):1-6.
  23. Thibault-Halman G, Tallon JM, Ackroyd-Stolarz S, Fenerty L, Karim SA, Sealy B, Clarke DB. Major traumatic brain injury: time to tertiary care and the impact of a clinical guideline. *J Trauma.* 2011 May;70(5):1134-40.
  24. Epidemiologic Analysis of Head Injury in Nova Scotia; Master's Thesis by Sheila Datta, Dalhousie University, Community Health and Epidemiology, Defense: March 2011.
  25. Hameed SM, Schuurman N, Razek T, Boone D, Van Heest R, Taulu T, Lakha N, Evans DC, Brown DR, Kirkpatrick AW, Stelfox HT, Dyer D, van Wijngaarden-Stephens M, Logsetty S, Nathens AB, Charyk-Stewart T, Rizoli S, Tremblay LN, Brenneman F, Ahmed N, Galbraith E, Parry N, Girotti MJ, Pagliarello G, Tze N, Khwaja K, Yanchar N, Tallon JM, Trenholm JA, Tegart C, Amram O, Berube M, Hameed U, Simons RK;

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Research Committee of the Trauma Association of Canada. Access to trauma systems in Canada. *J Trauma* 2010 Dec;69(6):1350-61; discussion 1361.

26. Thomas S, Judge T, Lowell MJ, MacDonald RD, Madden J, Pickett K, Werman HA, Shear ML, Patel P, Starr G, Chesney M, Domeier R, Frantz P, Funk D, Greenberg RD. Airway Management Success and Hypoxemia Rates in Air and Ground Critical Care Transport: a Prospective Multicenter Study. *Prehospital Emergency Care*. 2010 Jul-Sep;14(3):283-291.
27. Kirkpatrick A, Britt LD, Kortbeek J, Tallon JM. Evidence-Based Reviews in Surgery Group: Use of computed tomography for cervical spine clearance in trauma patients. *J Am Coll Surg*. 2010 Jun;210(6):1008-11.
28. Pike I, Piedt S, WardaL, Yanchar N, MacArthur C, Babul S, MacPherson A. Developing injury indicators for Canadian children and youth: a modified-Delphi approach. *Injury Prevention*. 2010;16:154-160.
29. Valani R, Hancock BJ, Grant V, Yanchar NL. The Development of a National Pediatric Trauma Curriculum. *Medical Teacher*. *Med Teach* 2010;32(3):e115-9.
30. Jensen JL, Cheung KW, Tallon JM, Travers AH. Comparison of tracheal intubation and alternative airway techniques performed in the prehospital setting by paramedics: a systematic review. *CJEM*. 2010 Mar;12(2):135-40.
31. McVey J, Petrie DA, Tallon JM. Air versus ground transport of the major trauma patient: a natural experiment. *Prehosp Emerg Care*. 2010 Jan-Mar;14(1):45-50.
32. Valani RA, Yanchar NL, Grant V, Hancock BJ. The development of a national pediatric trauma curriculum. *Med Teach*. 2010;32(3):e115-9.
33. Green RS, McIntyre J. Critical Care in the Emergency Department: An assessment of the length of stay and invasive procedures performed on critically ill ED patients. *Scand J Trauma, Resusc and Emerg Med*. 2009 Sept 24;17:47.
34. Jensen JL, Petrie DA, Travers AH; PEP Project Team. The Canadian prehospital evidence-based protocols project: knowledge translation in emergency medical services care. *Acad Emerg Med*. 2009 Jul;16(7):668-73.
35. Li D, Yanchar NL. Management of pediatric blunt splenic injuries in Canada--practices and opinions. *J Pediatr Surg*. 2009 May;44(5):997-1004.
36. Tallon JM, Ackroyd-Stolarz S, Karim SA, Clarke DB. The epidemiology of surgically treated acute subdural and epidural hematomas in patients with head injuries: a population-based study. *Can J Surg*. 2008 Oct;51(5):339-45.
37. Thompson J, Petrie DA, Ackroyd-Stolarz S, Bardua DJ. Out-of-hospital continuous positive airway pressure ventilation versus usual care in acute respiratory failure: a randomized controlled trial. *Ann Emerg Med*. 2008 Sep;52(3):232-41.

- 
38. Yang G, Brisseau G, Yanchar NL. Infantile hypertrophic pyloric stenosis: An association in twins? *Paediatr Child Health*. 2008 May;13(5):383-5.
  39. Yanchar NL. When treating is not enough: The roles of health care providers in prevention and control of childhood motor vehicle crash injuries. *Paediatr Child Health*. 2008 Apr;13(4):277-8.
  40. Hebb MO, Clarke DB, Tallon JM. Development of a provincial guideline for the acute assessment and management of adult and pediatric patients with head injuries. *Can J Surg*. 2007 Jun;50(3): 187-94.
  41. Mitchell AD, Tallon JM, Sealy B. Air versus ground transport of major trauma patients to a tertiary trauma centre: a province-wide comparison using TRISS analysis. *Can J Surg*. 2007 Apr;50(2):129-33.
  42. Tallon JM, Ahmed JM, Sealy B. Airway management in penetrating neck trauma at a Canadian tertiary trauma centre. *CJEM*. 2007 Mar;9(2):101-4. Review. Erratum in: *CJEM*. 2007 May;9(3):181.
  43. Bergeron E, Simons R, Linton C, Yang F, Tallon JM, Stewart TC, de Guia N, Stephens M. Canadian benchmarks in trauma. *J Trauma*. 2007 Feb;62(2):491-7.
  44. Petrie DA, Tallon JM, Crowell W, Cain E, Martell P, McManus D. Medically appropriate use of hospital EMS: the mission acceptance/triage process. *Air Med J*. 2007 Jan-Feb;26(1):50-4.
  45. Ahmed JM, Tallon JM, Petrie DA. Trauma management outcomes associated with nonsurgeon versus surgeon trauma team leaders. *Ann Emerg Med*. 2007 Jul;50(1):7-12.
  46. Campbell SG, Magee KD, Kovacs GJ, Petrie DA, Tallon JM, McKinley R, Urquhart DG, Hutchins L. Procedural sedation and analgesia in a Canadian adult tertiary care emergency department: a case series. *CJEM*. 2006 Mar;8(2):85-93. Erratum in: *CJEM*. 2006 May;8(3):147.
  47. Tallon JM, Fell DB, Ackroyd-Stolarz S, Petrie DA. Influence of a new province-wide trauma system on motor vehicle trauma care and mortality. *J Trauma*. 2006 Mar;60(3):548-52.
  48. Yanchar NL, Kennedy R, Russell C. ATVs: motorized toys or vehicles for children? *Inj Prev*. 2006 Feb;12(1):30-4.
  49. Sibley AK, Tallon JM, Day AL, Ackroyd-Stolarz S. Occupational injuries and stressors among Canadian air medical health care professionals in rotor-wing programs. *Air Med J*. 2005 Nov-Dec;24(6):252-7.
  50. Lawless J, Tallon JM, Petrie DA. Aborted air medical missions: a 4-year quality review of a Canadian province-wide air medical program. *Air Med J*. 2005 Mar-Apr;24(2):79-82. Review.
  51. Murphy N, Yanchar NL. Yet more pediatric injuries associated with all-terrain vehicles:



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should kids be using them? J Trauma. 2004 Jun;56(6):1185-90.

52. Yanchar NL. All-terrain vehicle injuries in children - It's time for advocacy. Paediatr Child Health. 2004 May;9(5):303-5.
53. Petrie DA. Termination-of-resuscitation guidelines in a basic life support-defibrillation system. Acad Emerg Med. 2002 Dec;9(12):1460.
54. LeBlanc CH, Tallon JM, Ackroyd-Stolarz S. Geriatric air medical transport: a program review. Air Med J. 2002 Jul-Aug;21(4):38-40.
55. Sibley AK, Tallon JM. Major injury associated with all-terrain vehicle use in Nova Scotia: a 5-year review. CJEM. 2002 Jul;4(4):263-7.
56. Mitchell AD, Tallon JM. Air medical transport of suspected aortic emergencies. Air Med J. 2002 May-Jun;21(3):34-7.
57. Petrie DA, De Maio V, Stiell IG, Dreyer J, Martin M, O'Brien JA. Factors affecting survival after prehospital asystolic cardiac arrest in a Basic Life Support-Defibrillation system. CJEM. 2001 Jul;3(3):186-92.

#### **Recent Presentations:**

1. Green RS, Butler MB, Erdogan M. Is hockey the most dangerous pediatric sport? An evaluation of pediatric sport-related injuries treated in Nova Scotia. Canadian Association of Emergency Physicians Annual Meeting. Ottawa 2014, May 31-Jun 4, 2014. Abstract, oral.
2. Green RS, Kuca T, Butler MB. The impact of normal saline versus ringers lactate on patient outcomes in high-risk vascular surgery patients. Canadian Association of Emergency Physicians Annual Meeting. Ottawa 2014, May 31-Jun 4, 2014. Abstract, poster.
3. Green RS, Butler MB. A characterization of trauma patients who have undergone PSA. Canadian Association of Emergency Physicians Annual Meeting. Ottawa 2014, May 31-Jun 4, 2014. Abstract, poster.
4. Green RS, Butler MB. The impact of peri-intubation physiologic adverse events on long-term patient outcomes in high-risk vascular surgery patients. Canadian Association of Emergency Physicians Annual Meeting. Ottawa 2014, May 31-Jun 4, 2014. Abstract, poster.
5. Sowers N, Froese P, Green RS. Impact of the age of stored blood on trauma patient mortality: a systematic review. Canadian Association of Emergency Physicians Annual Meeting. Ottawa 2014, May 31-Jun 4, 2014. Abstract, poster.
6. Green RS, Butler MB, Campbell S. The association of adverse events during procedural sedation with airway assessment. Canadian Association of Emergency Physicians Annual Meeting. Ottawa 2014, May 31-Jun 4, 2014. Abstract, moderated poster.

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7. Green RS, Butler MB, Gu H. The incidence and factors associated with the development of PIHI in high-risk vascular surgery patients. Canadian Association of Emergency Physicians Annual Meeting. Ottawa 2014, May 31-Jun 4, 2014. Abstract, poster.
  8. Green RS, Butler MB. A characterization of trauma patients who have undergone PSA. Trauma Association of Canada Scientific Meeting. Montreal 2014, April 10-11. Abstract, poster.
  9. Green RS, Butler MB, Erdogan M. Is hockey the most dangerous pediatric sport? An evaluation of pediatric sport-related injuries treated in Nova Scotia. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, poster.
  10. Green RS, Kuca T, Butler MB. The impact of normal saline versus ringers lactate on patient outcomes in high-risk vascular surgery patients. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, poster.
  11. Green RS, Butler MB. The impact of peri-intubation physiologic adverse events on long-term patient outcomes in high-risk vascular surgery patients. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, poster.
  12. Green RS, Butler MB. The impact of post-intubation hypotension on patient outcomes in vascular surgery patients. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, oral.
  13. Green RS, Turgeon AF, McIntyre LARobichaud AF, Fergusson DA, Butler MB, Erdogan M. Post-intubation hemodynamic instability in critically ill intensive care unit patients: a multicenter cohort study. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, oral.
  14. Sowers N, Froese P, Green RS. Impact of the age of stored blood on trauma patient mortality: a systematic review. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, poster.
  15. Green RS, Butler MB, Gu H. The incidence and factors associated with the development of PIHI in high-risk vascular surgery patients. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, poster.
  16. Green RS, Butler MB. A characterization of trauma patients who have undergone PSA. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, poster.
  17. The use of etomidate as an induction agent in trauma patients. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, oral.
  18. Green RS, Butler MB, Campbell S. The association of adverse events during procedural sedation with airway assessment. Maritime Trauma and Emergency Medicine Conference. Moncton 2014, April 3-5, 2014. Abstract, poster.
  19. Green RS, Butler MB. A Characterization of Trauma Patients Who Have Undergone PSA. 5th Annual EMS Research Day. Halifax 2013, October 28.

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20. Butler MB, Froese P, Campbell S. Is Propofol for Emergency Department Procedural Sedation Any Less Safe in Older Teenagers Than in Older Patients? 5th Annual EMS Research Day. Halifax 2013, October 28.
  21. Green RS, Butler MB. The Impact of Post-Intubation Hemodynamic Instability on Patient Outcomes in High Risk Vascular Surgery Patients. European Society of Intensive Care Medicine 26th Annual Congress. Paris 2013, October 5-9. Abstract #0653.
  22. Green RS, Butler MB. The Impact of Normal Saline and Lactated Ringers Solution on Patient Outcomes in High Risk Vascular Surgery Patients. European Society of Intensive Care Medicine 26th Annual Congress. Paris 2013, October 5-9. Abstract #0289.
  23. Green RS, Butler MB. Peri-Intubation Physiologic Adverse Events in High Risk Vascular Surgery Patients. European Society of Intensive Care Medicine 26th Annual Congress. Paris 2013, October 5-9. Abstract #0203.
  24. Yanchar NL, Murphy N. Legislating All-terrain Vehicle Access by Children: Effects on Injury Rates and Severity. American Pediatric Surgical Association Meeting, Palm Desert, CA, May 2011.
  25. Yanchar NL, Brennan M, Palmer C, Bettoli M, Cramer J, Sweeney B. Chest xray is an excellent screening tool for blunt thoracic trauma in children. Trauma Association of Canada Scientific Meeting, Banff, April 2011. Can J Surg 2011;54 (Suppl): S26-7.
  26. Hynick N, Brennan M, Schmit P, Noseworthy S, Bettoli M, Yanchar NL. Identification of blunt abdominal injuries in children. Trauma Association of Canada Scientific Meeting, Banff, April, 2011. Can J Surg 2011;54 (Suppl): S27.

### **Current Research Studies & Partnerships at the Nova Scotia Trauma Program:**

Sports-related injuries in Nova Scotia, Dr. Robert Green

Procedural sedation and analgesia in trauma patients, Dr. Robert Green

Intoxicated drivers and the role of mandatory reporting, Dr. Robert Green

Trauma System Development in Canada: Overcoming the challenges of geography through an evaluation of structure and process.

Principle Investigator: Dr. Avery Nathens (St. Michael's Hospital);

Co-Investigator: Dr. John Tallon Emergency Medicine, QEII HSC

CIHR Grant

Critical Care Transport Collaborative Outcomes Research Effort The CORE Open Fracture Project

Dr. Dave Petrie, Division of EMS, Dalhousie University; Nova Scotia Trauma Program QEII-HSC

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Evaluation of 48-Hour Mortality Post Trauma Team Activation: Does Time in the Field Matter? Dr. Alfin Mukhi

The Effect of Etomidate on Mortality and Morbidity in the Adult Trauma Patient, Dr. Robert Green

Total Brain Injury care pathways in Nova Scotia, Department of Neurosurgery

The Costs of Trauma related to Walking, Cycling and ATVing in Nova Scotia, Dr. Bissix, Acadia University

Frequency of Alcohol Testing in the Trauma Department at the QEII-HSC: A Missed Opportunity for Intervention. Saleema Karim, Dr. John M. Tallon, Dr. Mark Asbridge  
CIHR Team in Child and Youth Injury Prevention: Pediatric Trauma Systems in Canada, Yanchar NL

Who is the right patient for a pediatric trauma center? Yanchar NL

Establishing an injury indicator for severe pediatric injury, Yanchar NL

Access to trauma care among school-aged children in Canada, Yanchar NL

Discrepancies Between Knowledge and Practice of Childhood Motor Vehicle Restraint Use in Nova Scotia – Part II: Effectiveness of legislation and social marketing on uptake of new childhood motor vehicle legislation in Nova Scotia, Yanchar NL

Legislating All-terrain Vehicle Access by Children: Effects on Injury Rates and Severity, Yanchar NL

Management of pediatric splenic injuries in Canada, Yanchar NL

A National Needs Assessment by Delphi Method for Pediatric Advanced Trauma Life Support Training, Yanchar NL

Identification of blunt abdominal injuries in children, Yanchar NL

Can CXR be used as a Screening Tool for Blunt Thoracic Trauma in Children, Yanchar NL

Establishing an injury indicator for severe pediatric injury access to trauma care among school-aged children in Canada

All-terrain vehicle versus Motor vehicle injuries in Canada

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