



# **REGIONAL TRAUMA PROGRAM ANNUAL REPORT**

**FY2012/13 - FY2014/15**

**LEVEL 1 TRAUMA CENTRES: VANCOUVER GENERAL HOSPITAL  
and BC CHILDREN'S HOSPITAL**

**LEVEL 3 TRAUMA CENTRES: ST. PAUL'S HOSPITAL  
and LIONS GATE HOSPITAL**



## Table of Contents

1. Executive Summary .....	5
Program Priorities in 2015-16 .....	5
Regional Program Highlights.....	5
Regional Report Data Highlights.....	6
2. Regional Trauma Program Organizational Chart .....	7
RTP Membership .....	8
3. Regional Trauma Program (RTP) .....	11
Regional Trauma System .....	11
Hospital Services.....	11
Pre-hospital Care.....	12
Trauma Centre Access.....	12
Disaster/Mass Casualty Planning .....	12
4. BC Trauma Registry.....	13
BCTR GENERAL INCLUSION/EXCLUSION CRITERIA .....	13
Inclusion of Trauma Patients:.....	13
Exclusion of Trauma Patients:.....	14
REPORT SPECIFIC INCLUSION/EXCLUSION CRITERIA.....	14
TRAUMA CENTRE REGISTRY COMPLETION RATES* .....	14
BCTR FLOWCHART .....	15
5. Injury Epidemiology.....	16
Major Trauma Caseload.....	29
6. Performance Improvement and Patient Safety (PIPS).....	35
Regional PIPS Program.....	35
Trauma Services BC (TSBC) PIPS Program.....	35
6.17.2: COMPLICATIONS BY FACILITY (Version 2).....	40
7. Excellence and Innovation Project.....	42
8. Accreditation Canada Indicators .....	43



9. Trauma System Optional Indicator ..... 51

10. Accreditation Canada Trauma Centre Optional Indicators..... 53

11. Education and Training Initiatives ..... 55

    UBC undergraduate, postgraduate trauma training programs ..... 55

    Advanced Trauma Life Support (ATLS): ..... 55

    Canadian Forces Trauma Training Centre (West):..... 55

    In Situ Trauma Simulations: ..... 55

    Pediatric Advanced Trauma Simulation (PATS) Course: ..... 55

    Postgraduate Surgical Trauma Training Program: ..... 56

    Regional Trauma Rounds: ..... 56

    Simulated Trauma Resuscitation Update Course (STRUC):..... 56

    Educational Outreach Programs:..... 56

        Trauma Nurse Core Course (TNCC)..... 56

        VCH Rural Trauma Update:..... 56

12. Injury Prevention ..... 57

    Screening, Brief Intervention, and Referral to Treatment (SBIRT)..... 57

    Action Mini-Grants ..... 57

    Seniors’ Falls Prevention Initiative ..... 57

12. Research Activities..... 59

    Multicentre Randomized Clinical Trials..... 59

    Epidemiology: Trauma Systems and Access to Care..... 59

    Global Health..... 59

    Clinical Research ..... 59

    Emergency General Surgery ..... 59

    Trauma Association of Canada Accepted Abstracts May 2016..... 60

13. Summary and Future Goals..... 61

14. Appendix A: Organizational Charts ..... 62

..... 62

..... 63



15. Appendix B – Site Level PIPS Programs..... 66

    Site PIPS Programs..... 66

        Vancouver General Hospital ..... 66

        BC Children’s Hospital PIPS Program..... 67

        Lions Gate Hospital ..... 68

        St. Paul’s Hospital ..... 69

16. Appendix C – Site Mortality Review Processes..... 70

17. Appendix D- Complication Definitions..... 72

18. Appendix E – Patient Flow Initiatives ..... 73

    Vancouver General Hospital (Vancouver Acute)..... 73

    Lions Gate Hospital ..... 73

    St. Paul’s Hospital ..... 74

19. Appendix F: Injury Prevention Action Mini-Grants..... 75

20. Appendix G: AIS Codes for Quaternary Cases ..... 76

Appendix H: BC Coroners Service Geographical Definitions..... 77



## 1. Executive Summary

This is the Regional Trauma Program Report, which includes: BC Children's Hospital (PHSA), St. Paul's Hospital (PHC), and VCH (VGH and LGH). This report is respectfully submitted on behalf of the Regional Trauma Program (RTP), made up of the trauma co-leads from each of our designated trauma sites within VCH, PHSA, and PHC. This report will reflect injury epidemiology data spanning the fiscal years 2012/13 to 2014/15 for the major trauma population (ISS  $\geq$  13). This report includes updates on injury epidemiology, Regional Trauma System Activity, and performance with thanks to the BC Trauma Registry, BC Coroner's Office, and Statistics Canada for the data support.

BCTR data has been used extensively in this report without which our activity and performance could not accurately be reported on. Our sincere thanks to the BCTR manager and staff from the contributing hospital sites (VGH, LGH, SPH and BCCH) for their support. For more information on the BCTR, please contact Mr. Jaimini Thakore, Manager BCTR, at [Jaimini.Thakore@phsa.ca](mailto:Jaimini.Thakore@phsa.ca) and/or Mr. Recep Gezer, BCTR Bio-Statistician, at [Recep.Gezer@phsa.ca](mailto:Recep.Gezer@phsa.ca). In addition, our acknowledgements to each of the operational and medical leaders at our Level 1, 3, 4, and 5 sites across urban, rural, and remote sites and to our internal and external partners for their commitment to enhancing trauma patient care.

### Program Priorities in 2015-16

The Regional Trauma Program priorities are determined through collaborative discussions with stakeholders represented at the Regional Trauma Program meetings:

Regional Trauma Program priorities are:

1. Achieving Trauma Program Distinction through Accreditation Canada.
2. Clinical and Systems Transformation.
  - a. Provide Subject Matter Experts in program development
  - b. Develop regional order sets and documentation

### Regional Program Highlights

A number of initiatives have been implemented across the region, including:

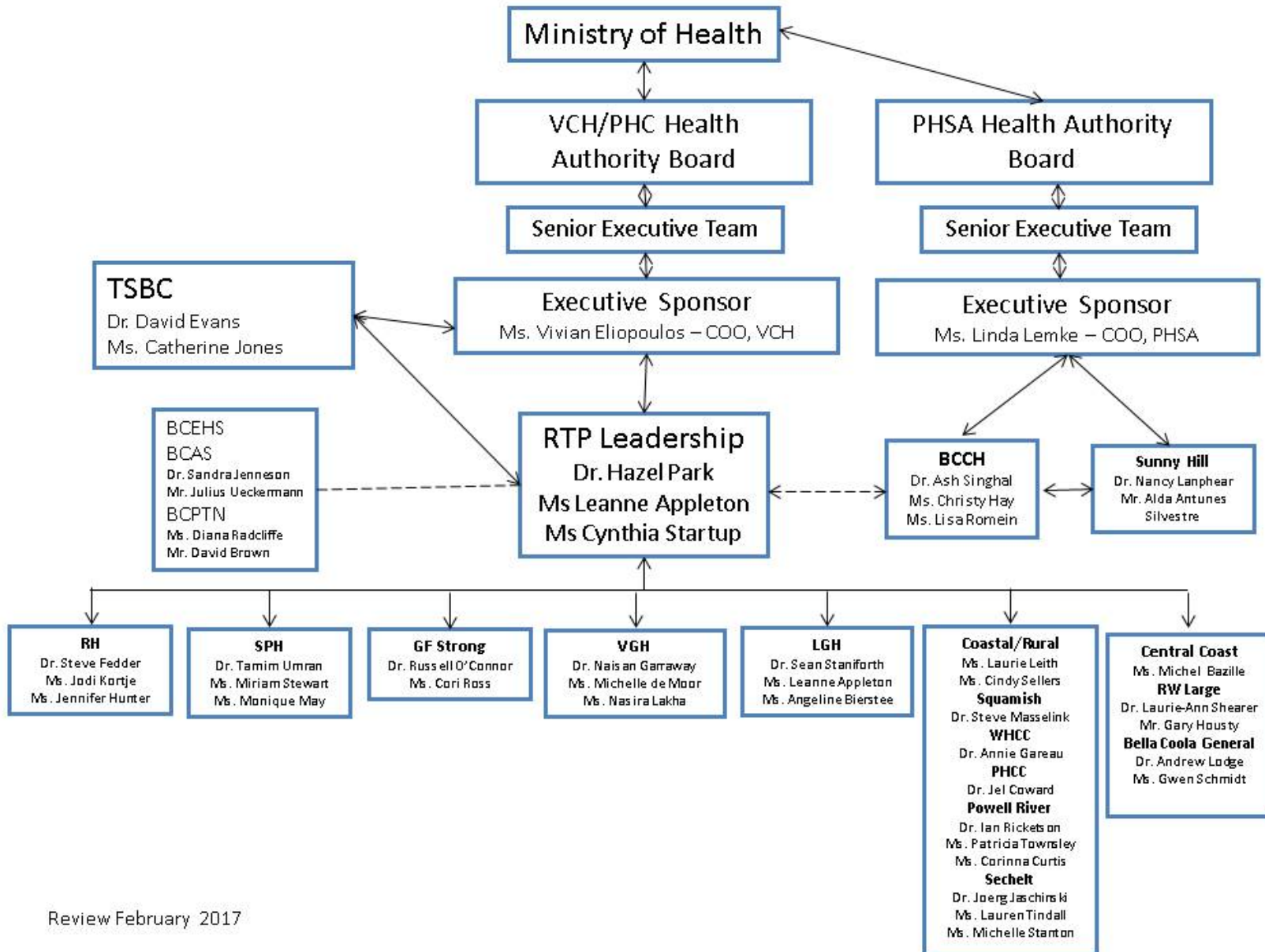
1. Innovative Education Initiatives
2. Injury Prevention Projects
3. Trauma Clinical Practice Guideline Updates
4. Successful implementation and ongoing review of the Management of the Pregnant Major Trauma Patient Clinical Practice Guideline
  - a. MOU renewed annually
  - b. Ongoing quality improvement reviews



## Regional Report Data Highlights

- Metro Vancouver has some of the lowest MVC death rates in the Province of BC, this could be attributed to rapid access to pre-hospital care and proximity to high level trauma centres (time to definitive care), and robust destination protocols
- Recreational and commuter cycling is on the increase in the region and a rise in cycling related injuries has been noted, improvements are being made to support enhanced safety for cyclists.
- Data suggests pedestrian related injuries are on the rise
- Falls from standing height are the highest mechanism of injury in the elderly while assault appears to be a significant mechanism in the young to mid adult age group
- Decreases in the numbers of alcohol related injuries have been noted, which may be related to more stringent drinking and driving laws
- The overall number of total patient trauma hospitalizations ISS 13-15 have remained stable; however there have been observations of a slightly higher number of admissions with moderate to severe trauma.
- There have been significant increases year by year in the VGH quaternary trauma hospitalizations mostly due to spinal cord, pelvic, and liver/pancreas injuries; however burn related trauma hospitalizations have decreased.
- One third of all transfers within the VCH region come from the Whistler Health Care Centre
- Northern Health is the second leading referral region for trauma transfers to VCH for higher level of care
- Severely injured trauma patients (ISS greater than 24) have a higher ICU Length of stay and at the same time the mortality has improved in this patient group.
- Overall the complications are generally decreasing across the sites. The efforts to try and reduce complications such as DVT/VTE, UTI, and pneumonia through site initiatives are minimizing these complications.

## 2. Regional Trauma Program Organizational Chart



Review February 2017

The Regional Trauma Program involves 3 different Health Organizations (VCH, PHC, and PHSA) and 2 Health Authorities (VCH and PHSA). Please refer to Appendix A for detailed Organizational Charts.



## RTP Membership

### VCH RTP Leadership :

Ms. Vivian Eliopoulos, Executive Sponsor VCH/PHC RTP  
Dr. Hazel Park, Medical Director -  
Regional Trauma Program, VCH/PHC,  
Clinical Associate Professor, Department of  
Emergency Medicine, UBC, Emergency Physician/Trauma  
Team Leader, Lions Gate Hospital  
Ms. Leanne Appleton, Regional Director - Trauma Program VCH  
Ms. Cynthia Startup, Director, Regional Planning  
Emergency/Trauma VCH, Emergency Team Director –  
Clinical and Systems Transformation, VCH, PHSA, PHC  
Ms. Heather Wong, Regional Planning Lead –  
Trauma Accreditation, ATLS® Course Coordinator

### BC Children's Hospital

Dr. Ash Singhal, Medical Director – Trauma Program  
Ms. Christy Hay, Program Manager – Emergency and Trauma  
Services  
Ms. Lisa Romein, Trauma Program Manager

### Lions Gate Hospital

Dr. Sean Staniforth, Medical Director – Trauma Program  
Ms. Leanne Appleton - Director – Acute Services Coastal CoC,  
Trauma and Perioperative Services  
Ms. Angeline Bierstee – Program Manager – Emergency &  
Trauma Services, ICU, and Respiratory Therapy  
Ms. Lori Baker, Trauma Clinician Coastal CoC

### Richmond Hospital

Dr. Steve Fedder, Trauma Medical Director  
Ms. Jodi Kortje, Director Critical Care, Emergency,  
& Medicine Services  
Ms. Jennifer Hunter, Manager – Emergency, Pediatrics,  
Cardiopulmonary, & Neurodiagnostics

### St. Paul's Hospital

Dr. Tamim Umran, PHC Trauma Medical Director/  
Physician Lead  
Ms. Miriam Stewart, Interim Chief Clinical Planning  
Officer – Redevelopment  
Ms. Janice Leonard, Interim Acute & Access Services  
Program Director  
Ms. Monique May, Trauma Coordinator





### **Vancouver General Hospital**

Dr. Naisan Garraway, Medical Director - Trauma Program,  
Clinical Assistant Professor of Surgery and Critical Care  
Medicine, UBC,  
Medical Director Canadian Forces Trauma Training Centre (W)  
BC Chair ACS committee on Trauma  
Ms. Michelle de Moor, Operations director, Vancouver Acute  
Critical Care, Emergency, Trauma Services, Access and Flow  
Regional Director Emergency Program, VCH  
Ms. Nasira Lakha, Trauma Program Manager  
Ms. Angie Brisson, Trauma Program Coordinator  
Ms. Zahra Hussein, Injury Prevention Leader

### **BC Emergency Health Services**

Dr. Sandra Jennesen, Regional Medical Director  
Mr. Julius Ueckermann, Director Critical Care Programs

### **Rehabilitation**

Dr. Russell O'Connor, Medical Manager – Neuromuscular  
Program – GF Strong, Clinical Assistant Professor –  
UBC Division of Physical Medicine and Rehabilitation  
Ms. Cori Ross – Director ambulatory Care, Volunteer Resources  
GF Strong Rehab Centre, Mary Pack Arthritis Program, and  
Patient Health Education Materials

### **Rural Sites**

#### **Bella Bella**

Dr. Laurie-Ann Shearer, Medical Director  
Ms. Michel Bazille, Health Services Administrator  
Mr. Gary Housty, Manager – Clinical Services

#### **Bella Coola**

Dr. Andrew Lodge, Medical Director  
Ms. Michel Bazille, Health Services Administrator  
Ms. Gwen Schmidt, Manager – Clinical Services

#### **Powell River**

Dr. Ian Ricketson, Medical Director – Emergency Department  
Ms. Corinna Curtis, Manager – Acute Services



**Sea to Sky**  
**(Squamish General Hospital,**  
**Whistler Health Care Centre,**  
**and Pemberton Health Centre)**

Dr. Richard Cudmore, Medical Director –  
Squamish General Hospital  
Dr. Steve Masselink, Medical Director – Emergency  
Department, Squamish General Hospital  
Dr. Annie Gareau, Medical Director – Whistler Health Care  
Centre  
Dr. Jel Coward, Medical Director – Pemberton Health Centre  
Ms. Laurie Leith, Director - Coastal Community of Care  
Ms. Cindy Sellers, Manager – Acute Services Sea to Sky

**Sechelt Hospital**

Dr. Joerg Jaschinski, Medical Director – Emergency  
Department  
Ms. Lauren Tindall, Director – Sechelt Hospital  
Ms. Michelle Stanton, Manager – Acute Services



### 3. Regional Trauma Program (RTP)

#### Regional Trauma System

Vancouver Coastal Health (VCH) is one of 5 geographical Health Authorities in BC that have developed independent trauma systems and services with designated quaternary trauma centres serving the major-trauma needs of the population and supported by other hospitals in the system. The RTP has close linkages to provincial partners, including: BC Emergency Health Services (BCEHS) and Trauma Services BC (TSBC). RTP leadership participates in bimonthly TSBC meetings.

The Regional Trauma Program involves three distinct health organizations: Vancouver Coastal Health, Providence Health Care, and Provincial Health Services Authority.

The Provincial Health Services Authority (PHSA) has a dual role in supporting BC Children's Hospital as the Provincial Pediatric Trauma Centre as well as providing oversight and coordination of trauma services province-wide through TSBC.

Vancouver General Hospital and Lions Gate Hospital (VGH), St. Paul's Hospital (PHC), and BC Children's Hospital (PHSA) comprise the Level 1 and Level 3 Trauma Centres within the Regional Trauma Program. Trauma care encompasses the entire spectrum of trauma from injury control/prevention, through pre-hospital response, to acute care and rehabilitation. Our region experiences challenges of geography, logistics, resources and the significant and often critical nature of injury/trauma are met with a systematic and dedicated way.

A unique partnership with BC Women's Hospital, a PHSA Facility, brings Maternal Fetal Medicine (MFM) expertise to Vancouver General Hospital (VGH) to co-manage the care of a pregnant major trauma patient. This partnership is the first of its kind in BC bringing nurses and physicians with maternal-fetal expertise across health authorities and hospital sites in collaborative care.

#### Hospital Services

Vancouver General Hospital (VGH) and BC Children's Hospital (BCCH) are the designated tertiary trauma centres for the Regional Trauma system and are the Level 1 adult/pediatric provincial trauma centres. They have a central role in the region and the province including:

- Tertiary trauma care for adult patients from VCH and Northern Health Authority (NHA) to VGH; for pediatric patients from across the entire province of BC (BCCH)
- Quaternary trauma services (i.e. burn, spinal cord, complex orthopedic, endovascular, and complex hepatobiliary trauma care) for BC
- Trauma leadership through the clinical and academic programs

The other large urban hospitals (LGH and SPH) within the region have a crucial role in providing a large volume of secondary trauma care and a supportive role in tertiary care. LGH is unique in that it is the only



Level 3 centre in the province that has neurosurgical services. All of the smaller acute care facilities in VCH are involved in early resuscitation and stabilization of trauma patients with coordinated transport to the most appropriate facility.

## Pre-hospital Care

BC Emergency Health Services (BCEHS) is responsible for the delivery, coordination and governance of out of hospital emergency health services and inter-facility patient transfer planning and coordination services through the BC Ambulance Service (BCAS) and BC Patient Transfer Network (BCPTN).

Rapid identification and field triage of the major trauma patients within BC and transport to trauma centers has been a goal of BCEHS protocols. The BCAS Autolaunch Program has extended the radius of expedited primary transport of trauma patients throughout the region; ensuring the right patient arrives to the right place in the right time. The impending implementation of Early Fixed Wing Activation (EFWA) to the Central Coast will provide expedited transfers of critically injured patients from the Central Coast to a tertiary trauma centre.

## Trauma Centre Access

All patients meeting field triage, major trauma criteria, presenting by ground or helicopter transport are guaranteed immediate access to VCH/BCCH trauma centres under the Life, Limb, and Threatened Organ (LLTO) no refusal policies revised in March 2014. Inter-facility transfers for patients requiring a Higher Level of Care (HLOC) (revised in 2014) are coordinated by the BCPTN ensuring transfer to the appropriate level of trauma centre. Additionally, patients requiring transfer for urgent quaternary care are expedited through the BCPTN VCH Red Transfer Process for Spine, Burns, Plastics, and Trauma Policy revised in October 2015

## Disaster/Mass Casualty Planning

Each site has a code orange/disaster management plan in place. Sites have designated Health Emergency Management BC (HEMBC) representatives who work with site leadership and staff to coordinate the development and implementation of these plans, including training and exercises. HEMBC provides regional and provincial leadership in developing multi-site /multi-agency plans and procedures for mass casualty management.

## 4. BC Trauma Registry

The BCTR is a province-wide program, funded by the Provincial Health Services Authority (PHSA). It is currently operational in 12 sites around the province with its leadership located at the PHSA offices in Vancouver. The BCTR augments the hospital Discharge Abstract Data (CIHI-DAD) dataset by collecting detailed information on a subset of major trauma patients admitted to BC's trauma centres. As such it is an indispensable component of the hospital, regional and provincial trauma programs. The BCTR works in close collaboration with the local burn, spine and orthopedic registries.

### BCTR GENERAL INCLUSION/EXCLUSION CRITERIA

The BCTR has standardized inclusion and exclusion criteria that are used at all participating hospitals.

Inclusion of Trauma Patients:

In order to be included in the BC Trauma Registry, the hospital visit of a trauma patient must meet the following criteria:

- Treatment is given for a trauma diagnosis at a trauma registry facility, with the cause of injury being a BCTR included external cause.
- Admission is within 21 days (i.e.  $\leq 21$  days) of sustaining the injury.

**AND, one of the following criteria must be met:**

- The adult patient (age  $>15$  years old) is admitted as an inpatient and the total length of stay is  $\geq 48$  hours\* **OR** the pediatric patient (age  $\leq 15$  years old) is admitted as an inpatient regardless of length of stay.
- The patient is transferred out of the trauma registry facility for the purpose of providing trauma care, regardless of length of stay. This may include patients who are seen only in the emergency department and transferred to a higher level of care.
- The patient is transferred into the trauma registry facility and is admitted as an inpatient for the purpose of providing trauma care, regardless of length of stay.
- The patient dies in hospital. This includes all deaths due to injury, including those patients pronounced dead in the ED (even if no intervention is performed) and those pronounced dead after receiving any evaluation or treatment during the hospital visit.

**\*48 hours length of stay inclusion criteria was lifted in the mid 2014/15 fiscal year.**

### Exclusion of Trauma Patients:

A hospital visit should be excluded from the registry when any of the following apply:

- The cause of injury is a BCTR excluded external cause;
- Daycare and outpatient encounters;
- Psychiatric admissions for self-inflicted injuries - admission for underlying psychiatric disorder rather than for injuries sustained;
- Falls / injuries - admission for underlying problem (seizure, syncope, general debility, weakness) rather than for injuries sustained;
- Pathological fractures;
- Cellulitis / infection / abscess arising as complications of lacerations, animal bites, etc.;
- Poisonings / overdoses;
- Decompression sickness;
- Fractures that are old or indeterminate if a fall occurred;
- Foreign body in hollow viscus (esophagus, rectum, etc.);
- Chronic subdural/epidural hematomas – when admission date is beyond the 21-day interval from injury date;
- Isolated hip fractures from same level falls in elderly patients (*according to set standard*)\*;
- Planned readmissions  $\leq 21$  days of injury with definitive trauma treatment addressed in previous admission;
- Some readmissions.

**\*It is important to note that the BCTR excludes patients who are  $\geq 65$  years of age with an isolated hip fracture due to a same level fall; therefore the figures in this report do not represent the complete number of hospitalizations due to same level falls.**

### REPORT SPECIFIC INCLUSION/EXCLUSION CRITERIA

- Accepting trauma facility is Vancouver General Hospital, St. Paul's Hospital, BC Children's Hospital or Lions Gate Hospital.
- Date range is from April 1<sup>st</sup>, 2012 to March 31<sup>st</sup>, 2015.
- ISS $\geq 13$ .

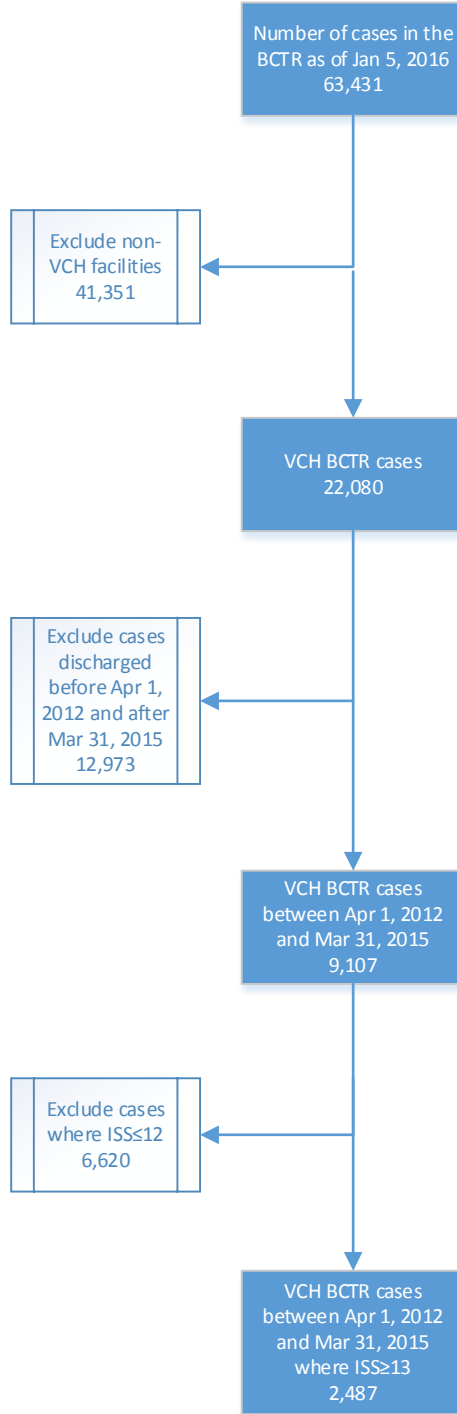
### TRAUMA CENTRE REGISTRY COMPLETION RATES\*

Site	Percent complete
Vancouver General Hospital	100
St Paul's Hospital	100
BC Children's Hospital	92
Lions Gate Hospital	77

**\*Completion rates represent the data available at the time of data extraction.**

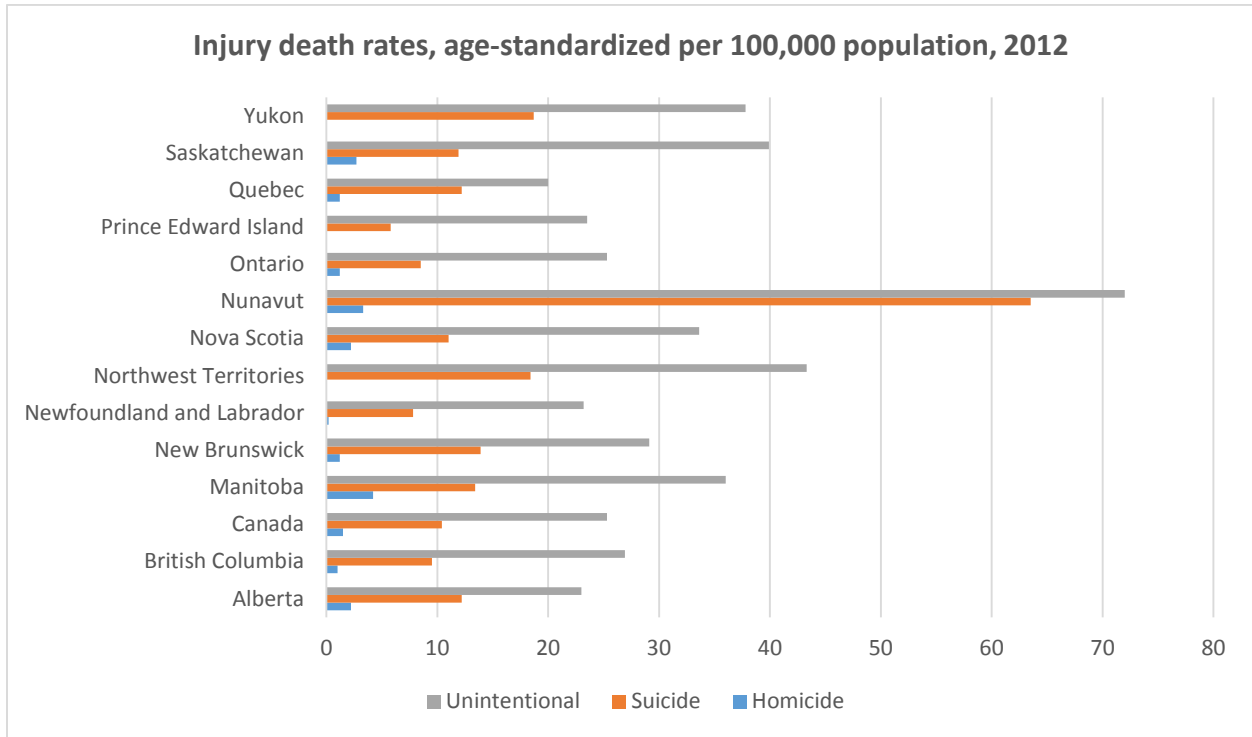
**Note:** At the time this report was written, Lions Gate is working to improve their completion rate

### BCTR FLOWCHART



## 5. Injury Epidemiology

### 5.1: INJURY DEATH RATES IN CANADA



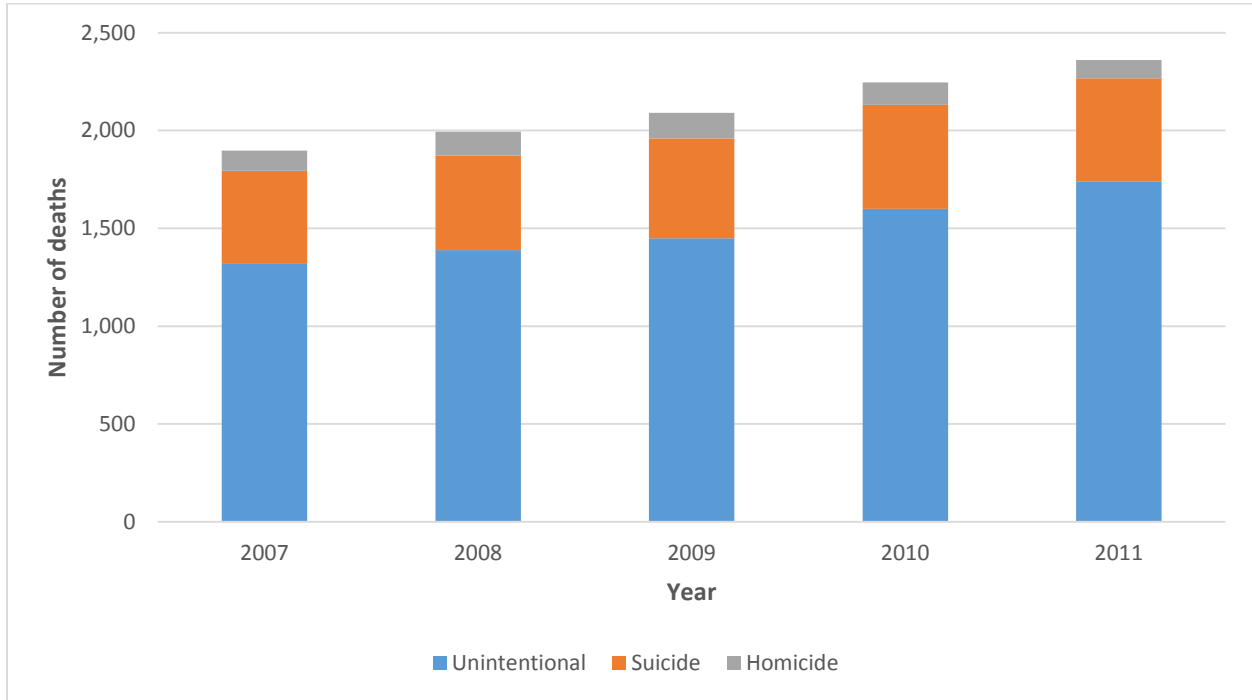
Source: Statistics Canada, Canadian Vital Statistics, Death Database (CANSIM: 102-0540)

Figure 5.1 references injury death rates in Canada. Unintentional injury includes falls, motor vehicle collisions (MVC), etc.

- BC (26.9) is slightly above the national average (25.3) for unintentional injury related deaths. However,
- Deaths as a result of suicide (9.5) in BC are below the national average (10.4)
- Homicide (1.0) rate in BC also remains below the national average (1.5).



**5.2.1: INJURY DEATH CLASS TYPE IN BC**

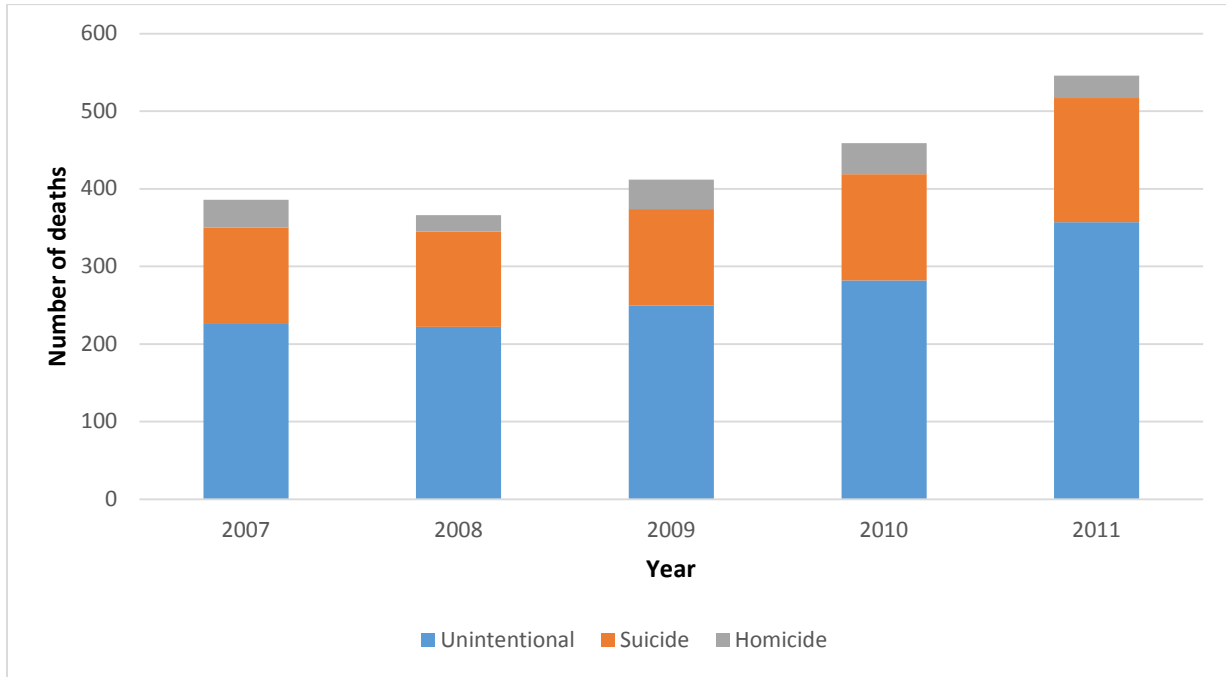


Source: BC Coroner's Service, 2007-2011 Annual Reports

Injury death classification refers to the intention behind or the party responsible for the traumatic incident. Figure 5.2.1 reflects a gradual trend of increasing deaths over a 5 year time frame in BC in relation to unintentional injury with near seventy-five percent of deaths in BC during 2011 resulting from an unintentional incident. Injuries related to intentional self-harm have seen year over year increases since 2007 and account for twenty-two percent of injury deaths in 2011.

- Most common motivation of injury is unintentional (Accidental)

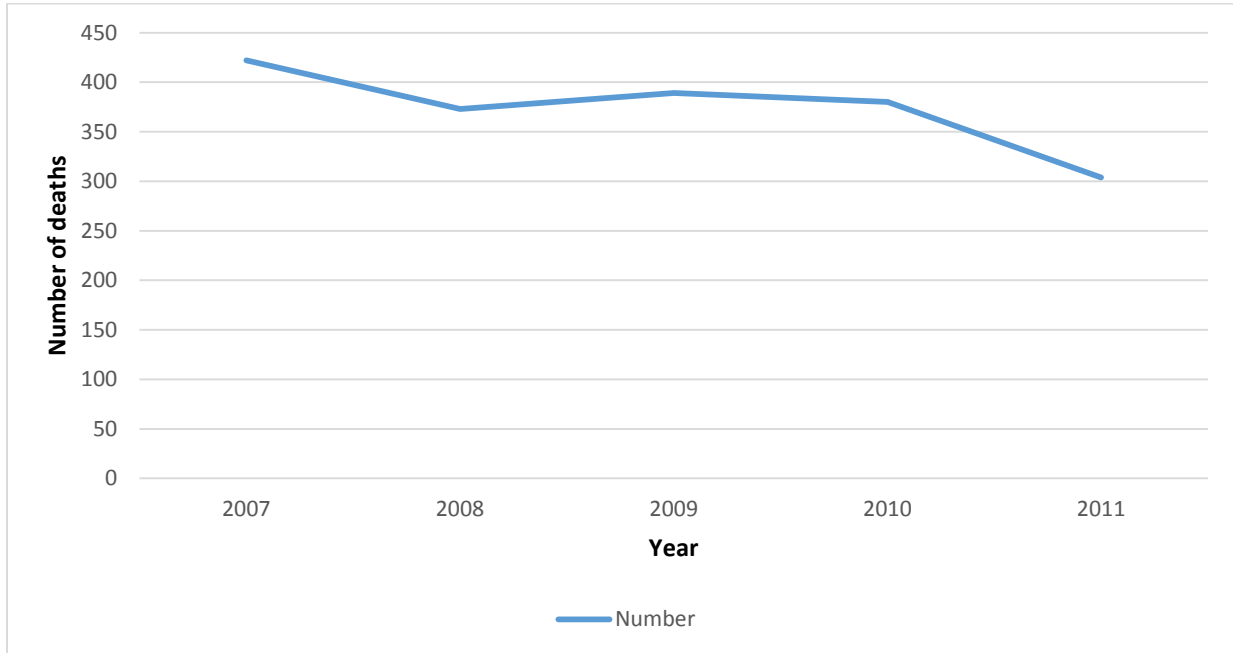
**5.2.2: INJURY DEATH CLASS TYPE IN METRO (Includes Sunshine Coast, Sea to Sky Corridor, North Shore, Vancouver, UBC, Richmond, and Delta)**



Source: BC Coroner's Service, 2007-2011 Annual Reports

VCH shows similar results to BC and Canada with the leading cause of death being unintentional (Accidental) injuries. Within VCH/BCCH, there have been year over year increases in unintentional injury deaths and intentional self-inflicted (suicidal intent) injuries. Nearly two-thirds of deaths are caused by unintentional injury and thirty percent of deaths are a result of intentional self-harm (suicide). The data shows reductions in the homicide rate to five percent of injury deaths.

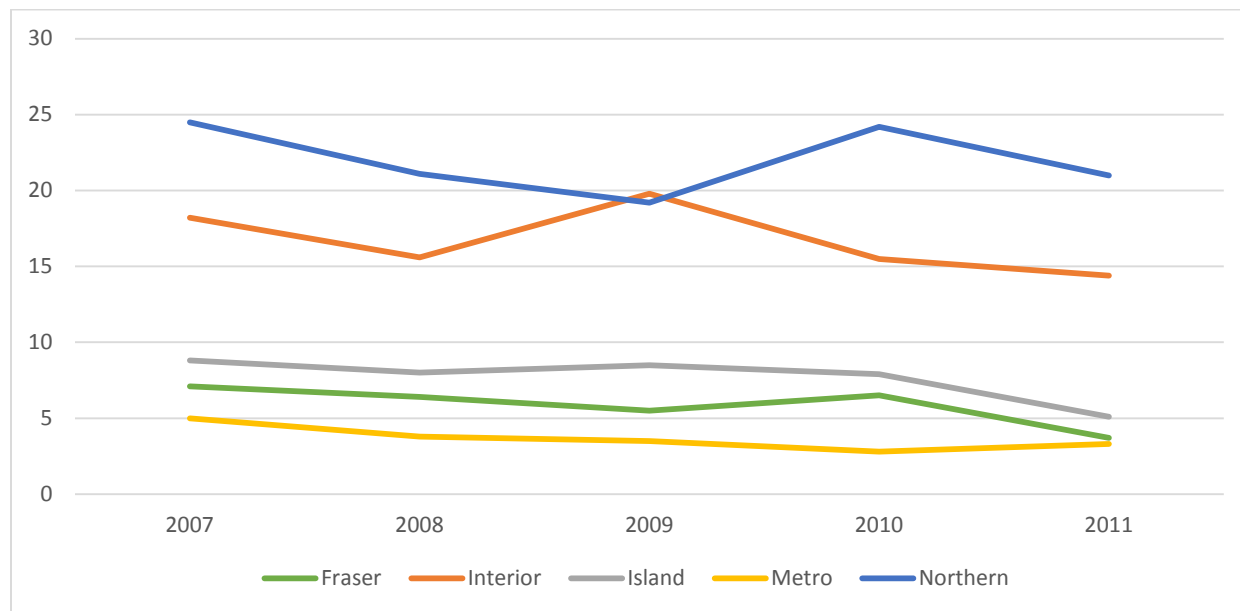
### 5.3.1: MVC DEATHS IN BC



Source: BC Coroner's Service, 2007-2011 Annual Reports

Figure 5.3.1 shows an improving trend in injury deaths related to motor vehicle collisions (MVC). The five year trend shows decreases in the incident numbers and deaths per 100, 000 population.

**5.3.2: MVC DEATH RATE PER 100,000 POPULATION BY REGION**



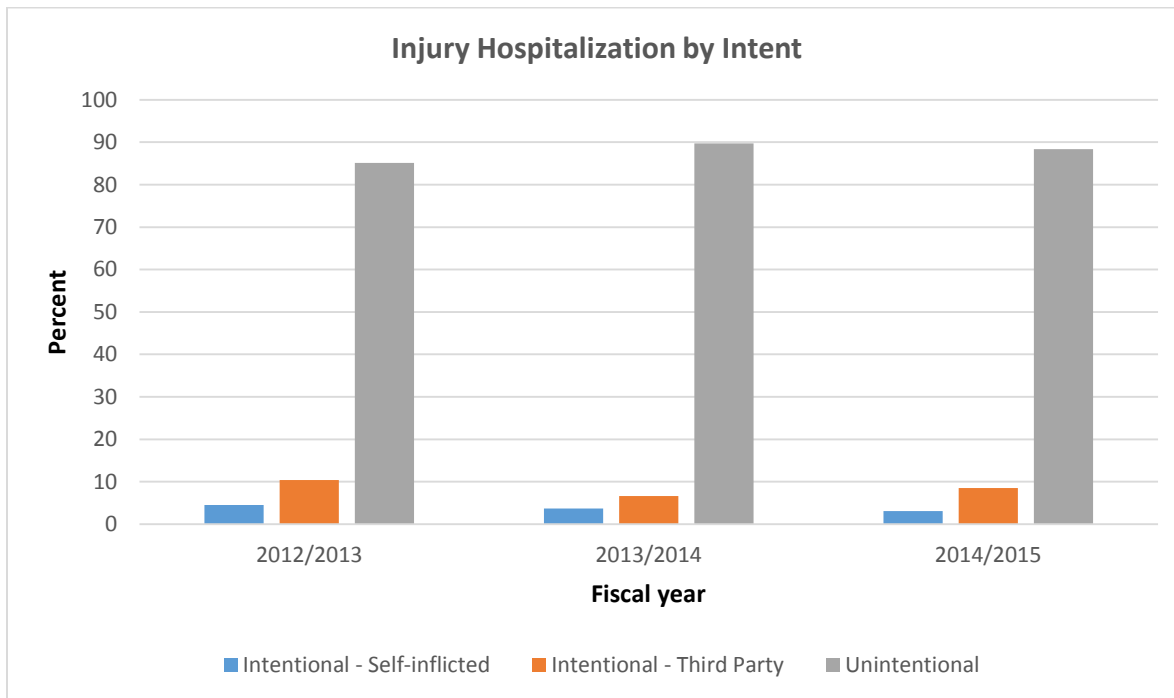
Source: BC Coroner’s Service, 2007-2011 Annual Reports

Injury death rates across BC vary by region. Figure 5.3.2 reflects the variation by health authority in injury related deaths because of the availability of higher level trauma centres in urban areas of the province.

Geographically, the NHA serves the largest area of the province with the highest level trauma centre, University Hospital of Northern BC (Level 3), located in Prince George. The mortalities reflected in this figure have a direct correlation to time to definitive care in a trauma centre. NHA’s geographic location and weather have a direct impact on transport times to definitive care.

**Note:** Metro region includes Sunshine Coast, Sea to Sky Corridor, North Shore, Vancouver, UBC, Richmond, and Delta. Delta is included within the Fraser Health region.

**5.4: VGH, SPH, LGH AND BCCH INJURY HOSPITALIZATION BY INTENT 2014/2015**



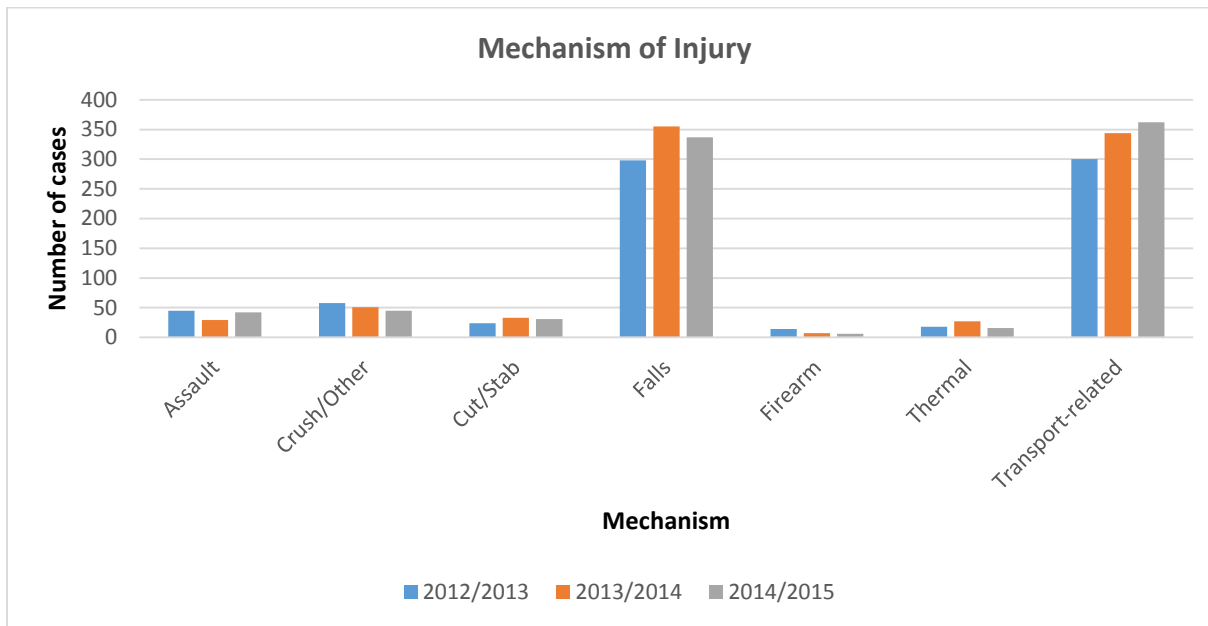
Source: BCTR

Injuries are globally defined as being intentional vs. unintentional (the preferred term over ‘accidental’ since most injuries are considered to be preventable to some degree and therefore not accidents). Intentional injury is further divided into self-inflicted (e.g. suicide) or third party (e.g. assault, homicide).

**Intentional Injury:** VCH continues to have low hospitalization rates (12%) for this type of injury (Figure 5.4). The relatively low rate of admission for self-inflicted intentional injury does not reflect the high suicide death rate reported by the Coroner’s Office.

**Unintentional Injury:** The VCH Trauma Program predominantly serves a population sustaining blunt force unintentional injury (88%), consistent with the experience of most Canadian Trauma Centres.

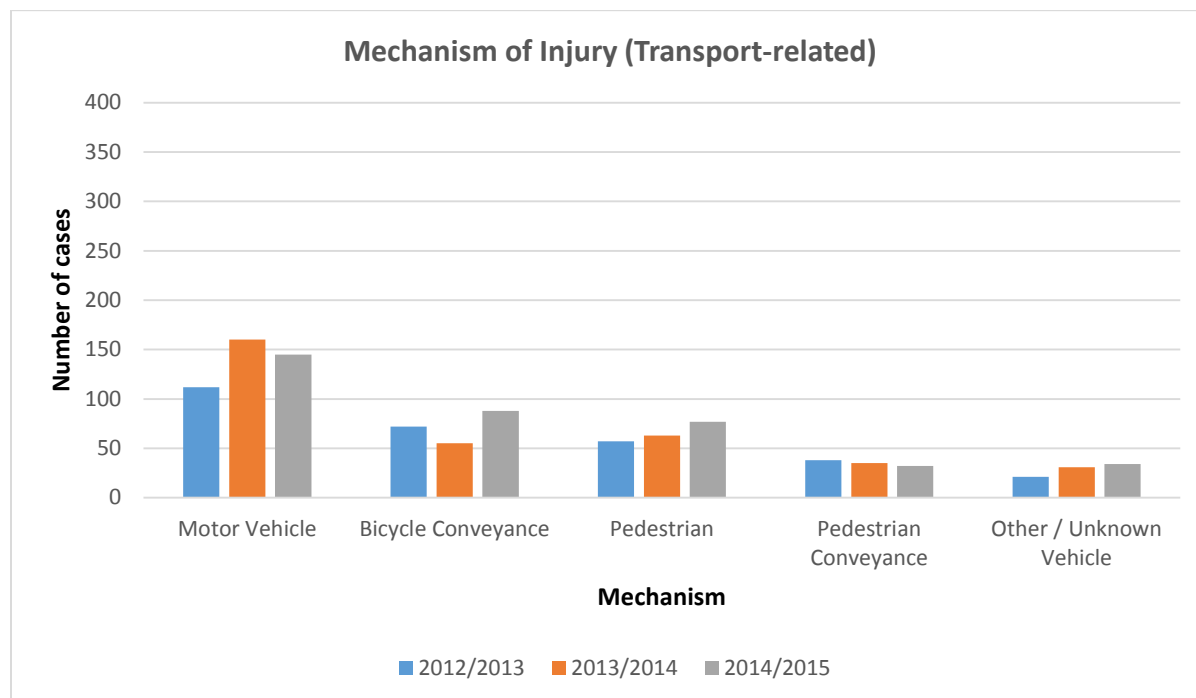
**5.5.1: VGH, SPH, LGH AND BCCH MECHANISM OF INJURY BY FISCAL YEAR**



Source: BCTR

Figure 5.5.1 shows that falls and transport related - including: motor vehicle, bicycle conveyance, pedestrian, pedestrian conveyance, and other/unknown vehicle are the leading cause of injury across the region.

**5.5.2: VGH, SPH, LGH AND BCCH MECHANISM OF INJURY (TRANSPORT-RELATED) BY FISCAL YEAR**



Source: BCTR

The region has seen minor decreases in the MVC population across the health authority representing the largest transport related mechanism.

***Cycling Injuries***

Data shows fluctuations in the number of bicycle injuries across VCH. Cycling injuries showed a moderate decrease in the 2013/14 fiscal year only to increase in 2014/15. These incidents may partially be related to the creation of cycling lanes prior to new road traffic regulations. Within the past year, traffic patterns have improved cyclist safety by: dedicated and separated cycling lanes, identified by visible green paint to both drivers and cyclists; increased traffic restrictions for turning through cycling lanes; and changes to curb-side parking in relation to cycling lanes. The increasing popularity of mountain biking, including Extreme Mountain biking in bike parks has also been associated with significant injuries.

***Pedestrian Injuries***

A significant number of pedestrian collisions occurred in the Downtown core and along primary arterial streets (City of Vancouver, 2012). BCTR data trended over the last three fiscal years shows an increase in the number of pedestrian related injuries and a slight decrease in pedestrian conveyance (skateboarding, long boarding, etc.) injuries. Significant steps have been taken to improve pedestrian

safety in recent years: separated bicycle and pedestrian lanes, longer timings on crosswalk signals, and lowering the speed limit in areas with increased incidence of pedestrian injury.

The two worst hotspots citywide are East Hastings Street midblock between Main and Columbia (49 recorded incidents in six years) and the intersection of Main Street and Hastings (18 incidents). The study flagged that important physical pedestrian safety countermeasures are missing from the Downtown Eastside (special crosswalks, signals, bulges, etc) and that traumatic pedestrian injuries were the result of "the interplay of modifiable or preventable environmental factors."

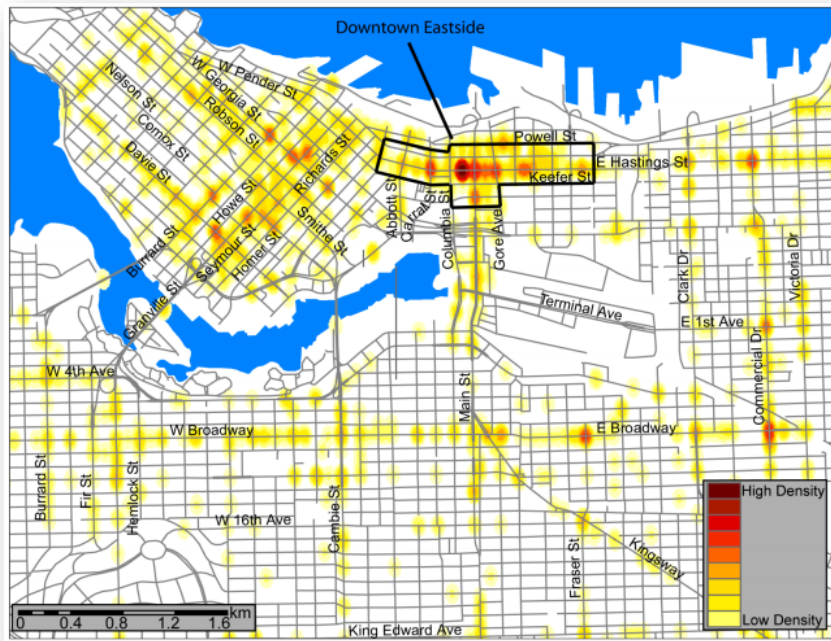
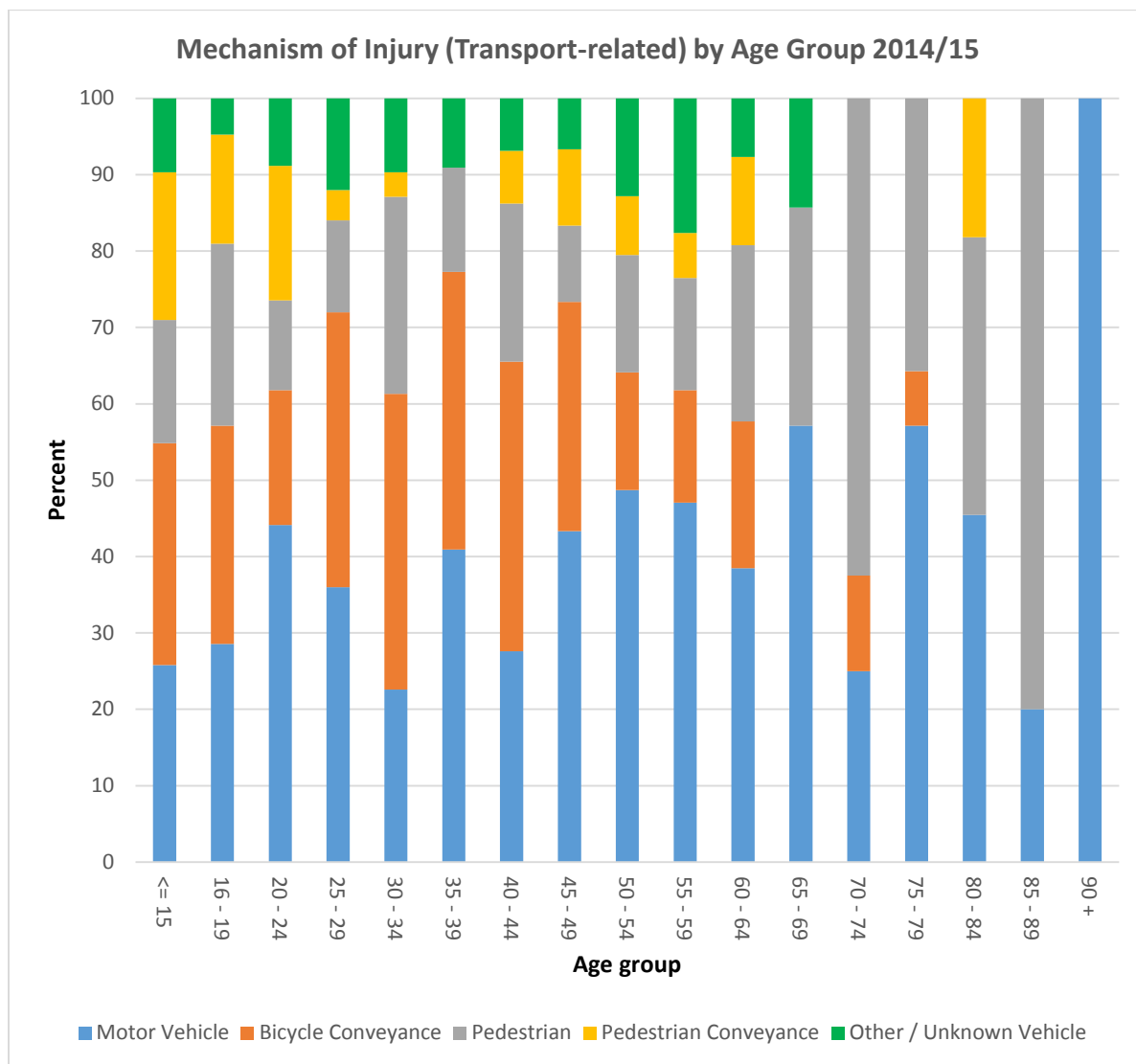


Figure 1: Kernal density map of select pedestrian injury hotspots in Vancouver. Reprinted from "We're All Pedestrians," Final Report of the Downtown Eastside Pedestrian Safety Project by Vancouver Area Network of Drug Users (VANDU), the City of Vancouver, and Vancouver Coastal Health, 2010, p. 20.



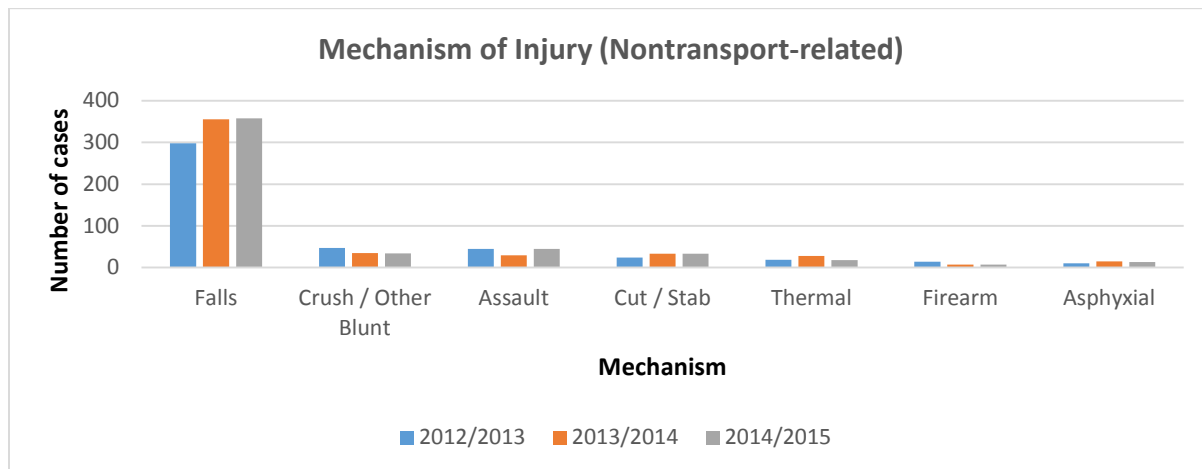
**5.5.3: VGH, SPH, LGH AND BCCH MECHANISM OF INJURY (TRANSPORT-RELATED) BY AGE GROUP 2014/15**



Source: BCTR

Figure 5.5.3 illustrates transport-related mechanisms of injury related to patient age. In younger age ranges, MVC and bicycle conveyance are the leading mechanisms of injury, with pedestrian related injuries being the leading cause of transport related injuries in the elderly.

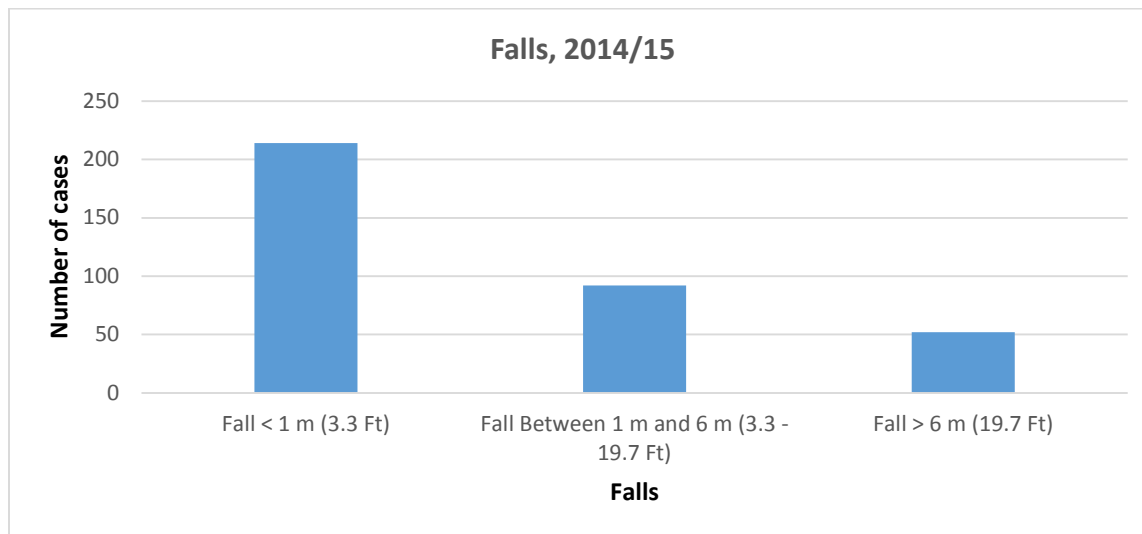
**5.6.1: VGH, SPH, LGH AND BCCH MECHANISM OF INJURY (NONTRANSPORT-RELATED) BY FISCAL YEAR**



Source: BCTR

Falls are the leading cause of non-transport related injury.

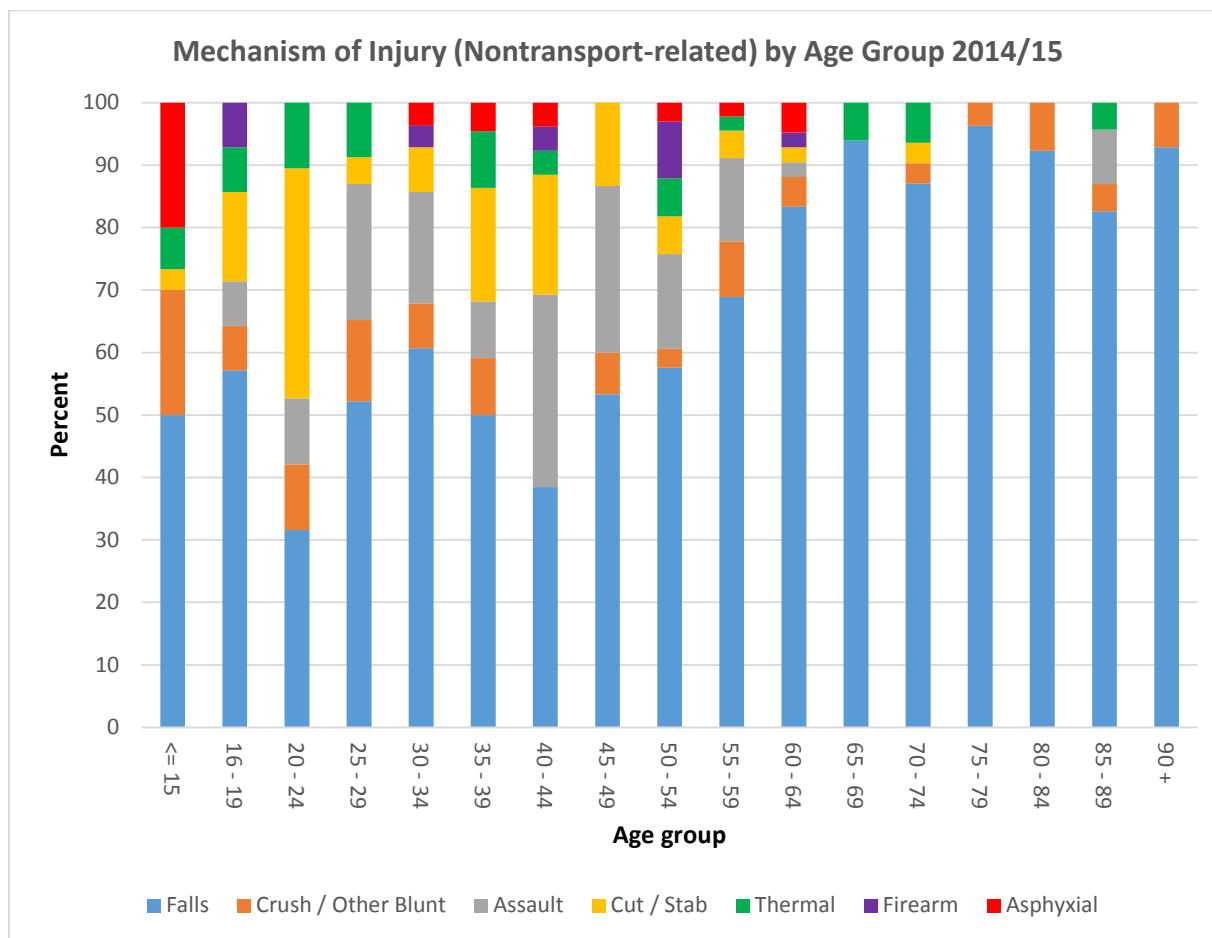
**5.6.2: VGH, SPH, LGH AND BCCH FALLS, 2014/15**



Source: BCTR

The majority of falls sustained in FY 2014/15 were falls from standing height, which is consistent with the types of patients that are seen in the ED. This data does not include isolated hip fractures in the  $\geq 65$  age range. Falls from standing can cause significant injury in particular for our older age group.

**5.6.3: VGH, SPH, LGH AND BCCH MECHANISM OF INJURY (NONTRANSPORT-RELATED) BY AGE GROUP 2014/15**

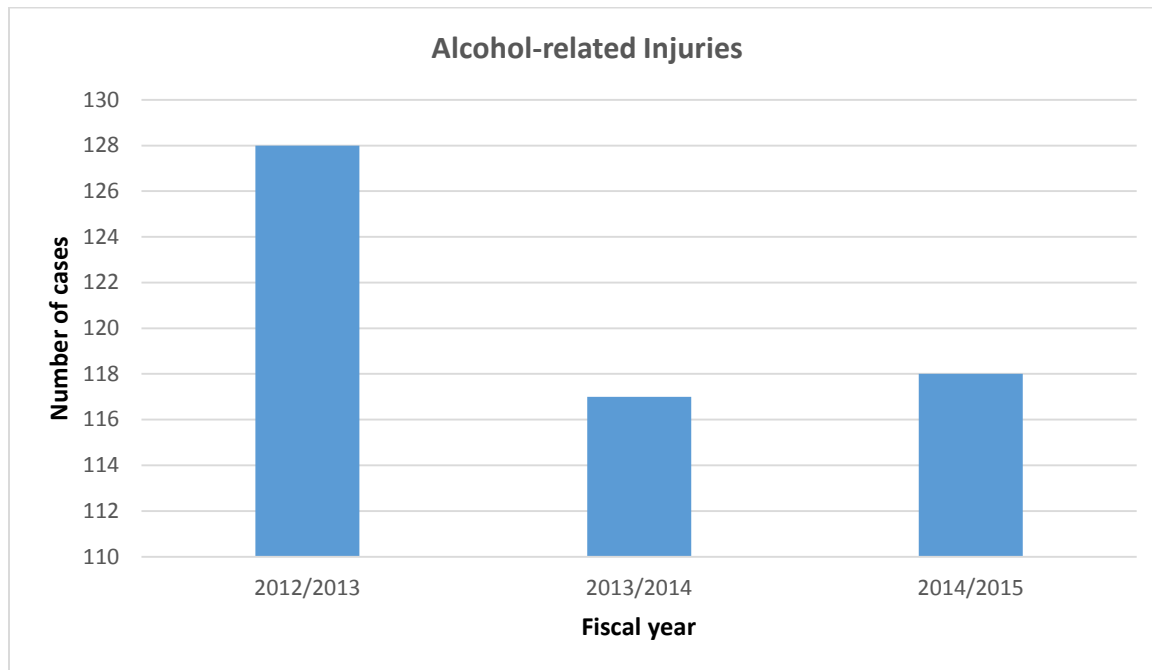


Source: BCTR

Common mechanisms of injury vary according to patient demographics with falls predominating in the elderly. Assault appears to be a significant mechanism in the young to mid adult age group.

Because of increasing incidents in falls across the various age ranges, VCH has Falls Prevention Strategy that includes: Assessment, Care Planning, and Ongoing evaluation of all patients at risk for falls. Providing a documented and coordinated approach coupled with individualized care planning ensures reduced risk and increased patient safety.

**5.7: VGH, SPH, LGH AND BCCH ALCOHOL RELATED INJURIES\***



Source: BCTR

\*Patients with blood alcohol level > 0.

Figure 5.7 illustrates trauma patients with a positive blood alcohol level recorded in the BCTR for all types of injuries. This trend shows decreasing numbers of trauma patients with a positive blood alcohol level; whether this is in relation to aggressive drinking and driving laws and/or other alcohol awareness programs still needs to be determined.

Drinking and driving remains the leading cause of death on BC roads. As a direct result of this, the BC ministry of Justice implemented tougher laws to combat impaired driving. In 2010, changes to the Impaired Driving Laws have resulted in the toughest penalties in Canada. If a police officer suspects a driver of being impaired, they can request a Breathalyzer test. Under the new laws, a driver with an alcohol content of 0.05 or higher can be issued an immediate driving suspension. Under this new law, a first offence to the impaired driving law results in a 3 day suspension and loss of licence. A second offence results in a 7 day suspension and loss of licence. A third offence results in a 30 day suspension and a fine.

## Major Trauma Caseload

The region uses several definitions for major trauma depending on circumstance, including:

VCH Decision Support Caseload reporting: Major Clinical category (MCC)

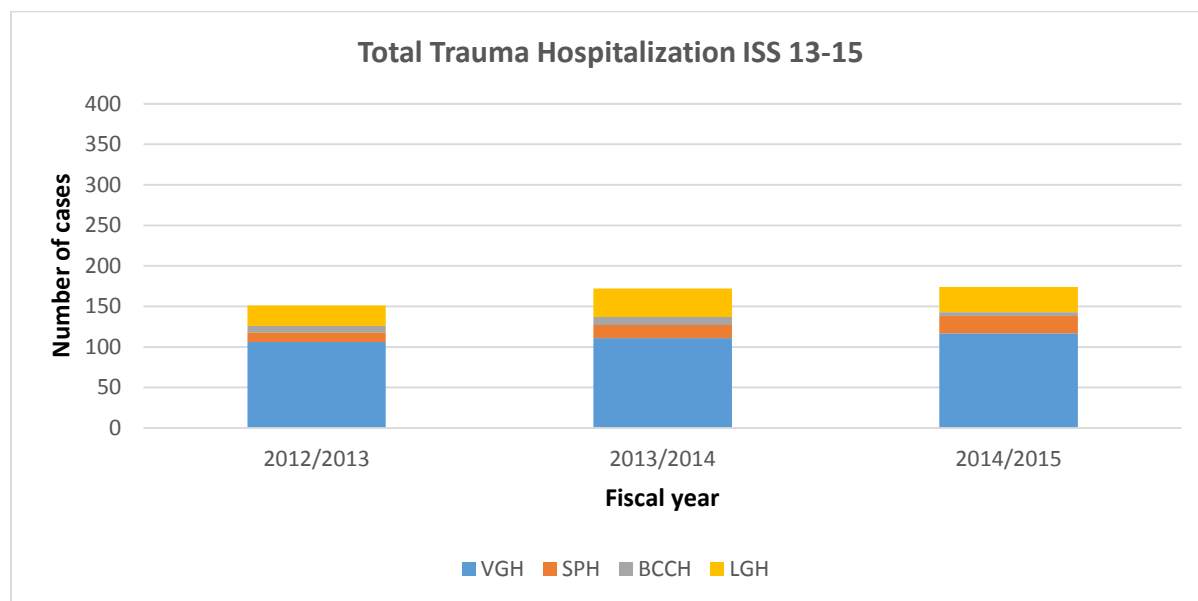
BC Trauma Registry Caseload reporting: ISS $\geq$ 13

This moderate and major trauma caseload in the region (as measured by Injury Severity Score (ISS) or ISS of  $\geq$ 16) has been stable with approximately 710 cases a year in the region including pediatric cases. The majority of adult major trauma patients (554 cases) were admitted to VGH; another 60 to LGH, 41 to SPH, and 55 pediatric cases admitted to BCCH.

**Non-major (Secondary) trauma caseload:** Unlike major trauma that is directed to VGH, the region's secondary trauma caseload remains distributed to all major acute care facilities. This distributed model is essential in order to maintain capacity at the tertiary trauma centres for major trauma patients, maintain system flexibility and surge capacity as well as optimally utilizing specialty services at each site.

Note: there has only been a modest increase in activity despite population growth.

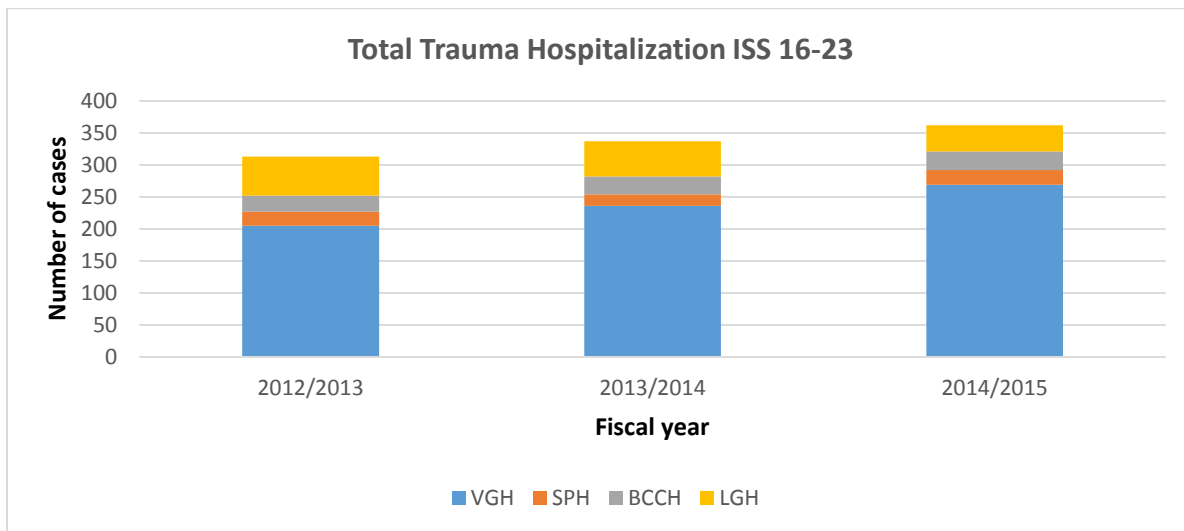
### 5.8.1: VGH, SPH, LGH AND BCCH TOTAL TRAUMA HOSPITALIZATION BY FISCAL YEAR (ISS 13-15)



Source: BCTR

Figure 5.8.1 shows total trauma hospitalizations for our minor-moderate trauma population. Admission numbers across all four sites remain steady with very little fluctuation in numbers over the time period.

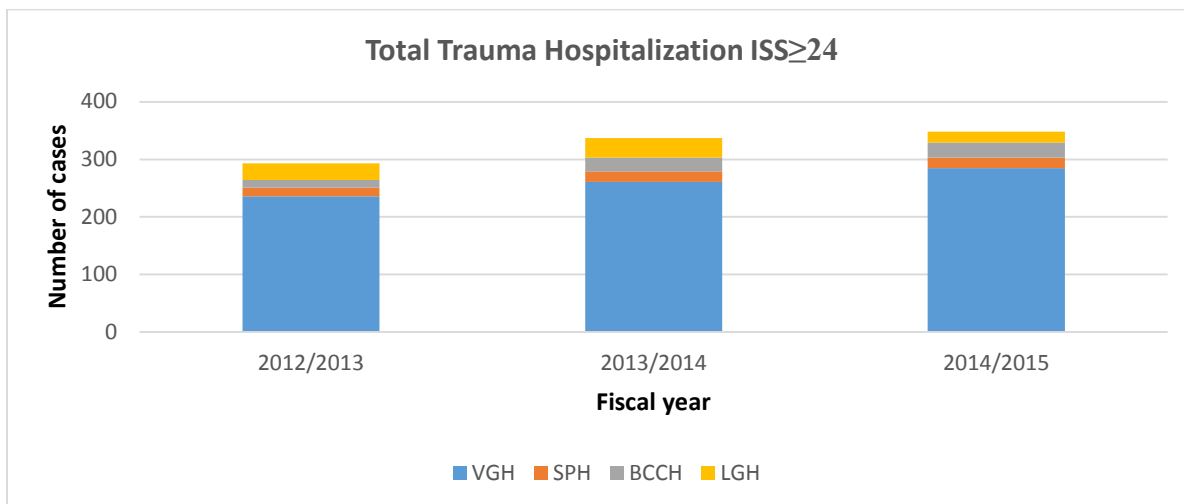
**5.8.2: VGH, SPH, LGH AND BCCH TOTAL TRAUMA HOSPITALIZATION BY FISCAL YEAR (ISS 16-233)**



Source: BCTR

Figure 5.8.2 shows small increases in the moderate-severe trauma patients across the region; with the majority of the moderate-severely injured adult patients being treated at VGH.

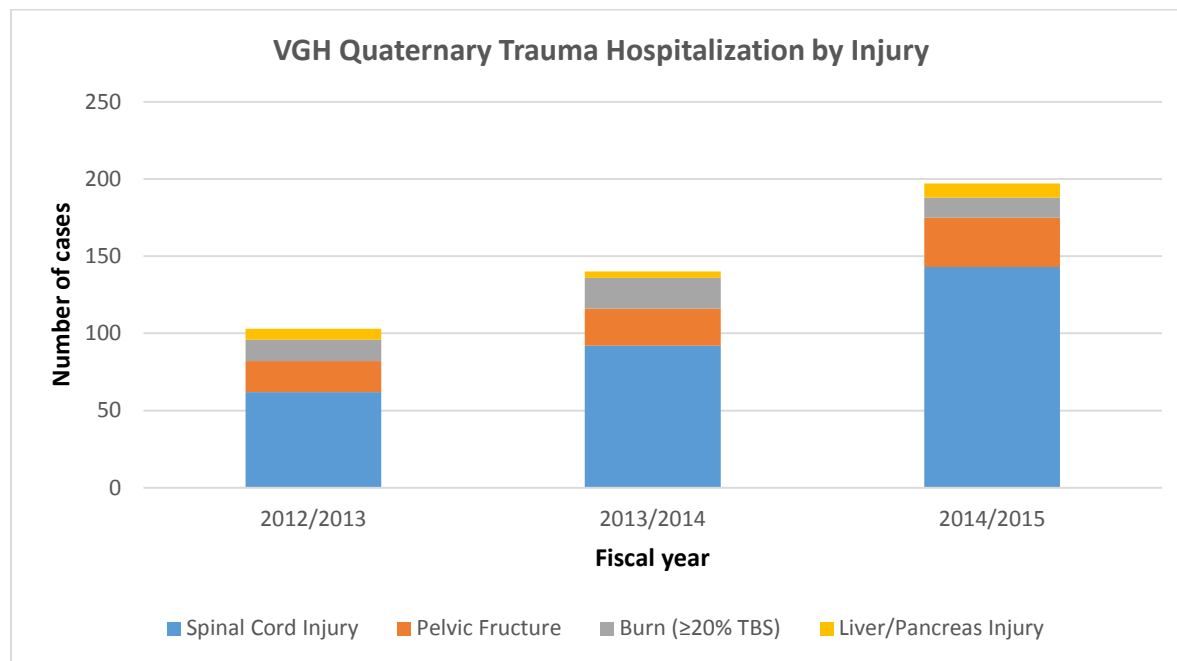
**5.8.3: VGH, SPH, LGH AND BCCH TOTAL TRAUMA HOSPITALIZATION BY FISCAL YEAR (ISS≥24)**



Source: BCTR

Figure 5.8.3 shows small increases in the total number of severely injured patients across the region with the majority of severely injured patients appropriately being admitted to the Level 1 sites.

**5.9: QUATERNARY TRAUMA HOSPITALIZATION BY FISCAL YEAR – VGH**



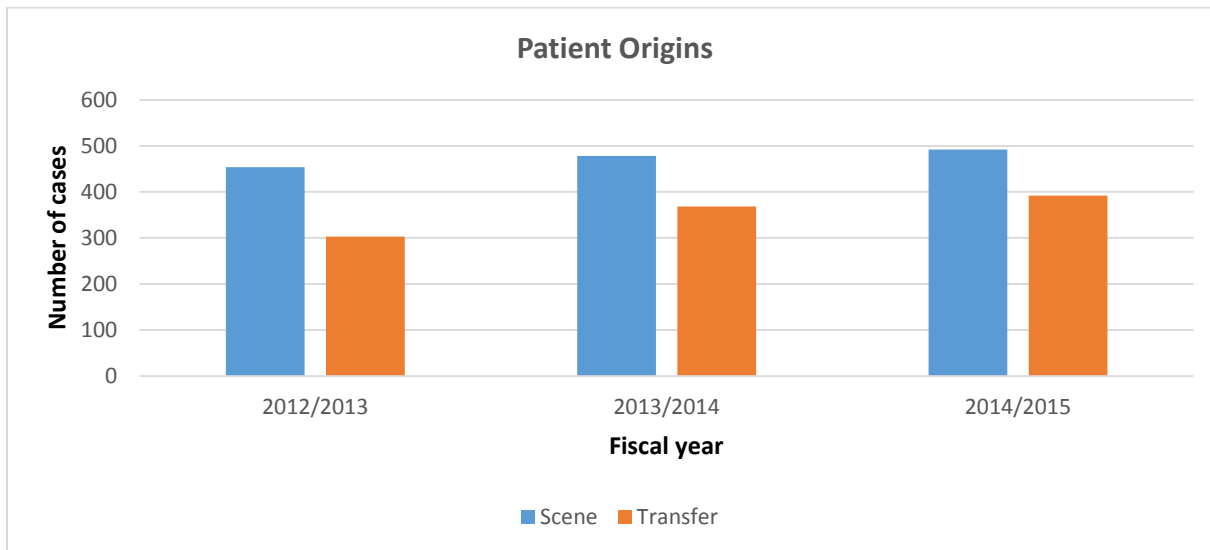
Source: BCTR

1. **Quaternary trauma caseload:** Some low incidence, high acuity or complex injuries are uniquely provided by the adult (VGH) and pediatric (BCCH) provincial trauma centers. This subset of the tertiary caseload, or quaternary care, includes spinal cord injury, burns, and endovascular services, along with complex orthopedic, plastic and torso trauma and neuro-interventional services. Access for these patients is guaranteed by the VCH Life Limb and Threatened Organ policy. Quaternary admissions to VGH are shown in Figure 5.10 and account for a large proportion of major trauma.

Fiscal year 2014/2015 saw an increase in spinal cord injury patients. This increase was noted both on the admitting spine and trauma services with an almost 50% increase in case load. This corresponds to the increase in moderate-severe and severe trauma patient admissions noted in figures 5.8.2 and 5.8.3. The quaternary case load at BCCH was 10 cases for the last fiscal year (Fiscal Year 2014/15 BCCH admitted 1 burn, 2 liver injuries, and 1 spine injury)..

This quaternary case load does not reflect the major chest trauma population. VGH is a referral centre for assessment and management of major chest trauma with some patients receiving operative fixation of their rib fractures. At this time, the BCTR is unable to adequately capture this population for measurement.

**5.10.1: VGH, SPH, LGH AND BCCH PATIENT ORIGINS – SCENE VS. TRANSFER**

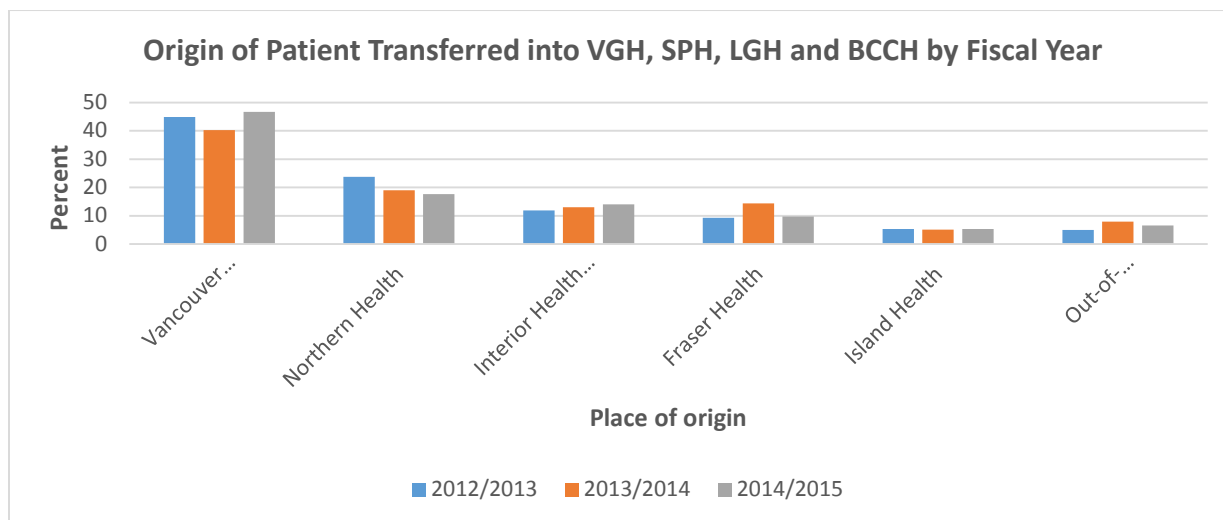


Source: BCTR

Figure 5.10.1 represents trauma admissions that are direct from scene or transferred from other facilities. The majority of trauma patients admitted to the regional trauma system arrive by direct transport from the scene by BCAS ground transport. Approximately 45% arrive by transfer from another institution.



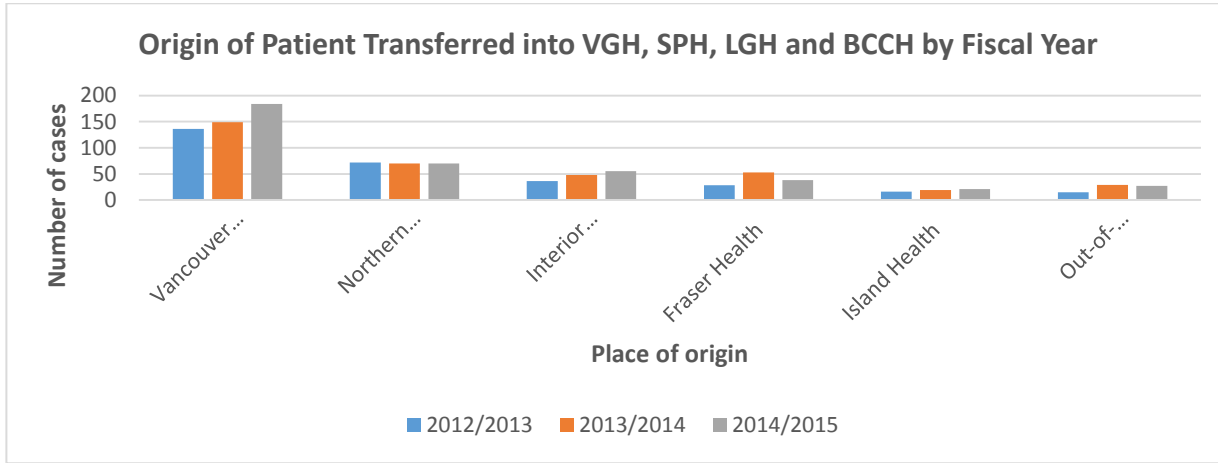
**5.10.2: ORIGIN OF PATIENTS TRANSFERRED INTO VGH, SPH, LGH AND BCCH BY FISCAL YEAR**



Source BCTR

Figure 5.10.2 is a representation of the number of patients transferred into the region from the various health authorities. Nearly 50% of all transfers to a tertiary centre are from within the region. Northern Health represents the second largest referral health authority, with many patients transferred for higher level of care.

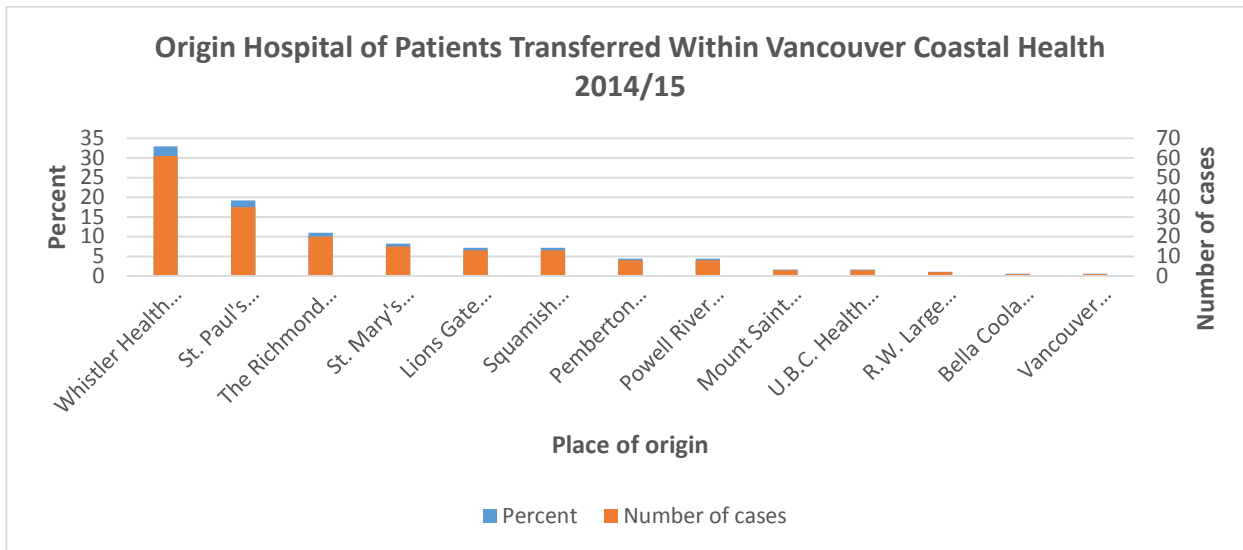
**5.10.3: ORIGIN OF PATIENTS TRANSFERRED INTO VGH, SPH, LGH, AND BCCH BY FISCAL YEAR**



Source: BCTR

Figure 5.10.3 shows a gradual increase in the number of patients transferred from within the region

**5.10.4: ORIGIN HOSPITAL OF PATIENTS TRANSFERRED WITHIN VANCOUVER COASTAL HEALTH, 2014/15**



Source: BCTR

Figure 5.10.4 represents the origin hospital of all transfers within the region. One-third of all transfers within the region originate at the Whistler Health Care Centre (WHCC). WHCC sees high volume minor to moderate trauma that is transferred to HLOC. Moderate-severe and severe trauma patients from WHCC are often transported by helicopter directly to VGH or BCCH. SPH is the second referral leader across the region, with 19 percent of overall transfers coming from St. Paul's to VGH for higher level of care

## 6. Performance Improvement and Patient Safety (PIPS)

The Regional Trauma Program is committed to establishing best practice in trauma care throughout the system and has implemented an integrated Performance Improvement and Patient Safety (PIPS) Program. Clinical practice guidelines have been developed by both Level 1 sites and are shared across the region and province. Clinical Practice Guidelines are utilized based on site resources and need.

(See web site - <http://vghtrauma.vch.ca/> or <http://childhealthbc.ca/?drawer=Pediatric%20Trauma%20Guidelines> for a full list of the adult and pediatric guidelines).

### Regional PIPS Program

The Regional PIPS program relies on the vision and hard work of Trauma Centre Leaders (Trauma Program Managers, Trauma Medical Directors and Trauma Coordinators). Site and regional PIPS programs are supported by the BC Trauma Registry and site Pre-registry data. For detailed information on Site Level PIPS Programs, please refer to Appendix B: Site Level PIPS Programs.

The RTP monthly meeting is a forum for: case review, discussion of any system related issues, and reviews all trauma mortalities. It provides an opportunity for individual site leaders to bring forward trends and themes that may require a standardized response across all sites. The committee will discuss the quality and efficiency of medical care rendered and will make recommendations either to the provider organization or EMS agency, as appropriate, for improved trauma care or system performance.

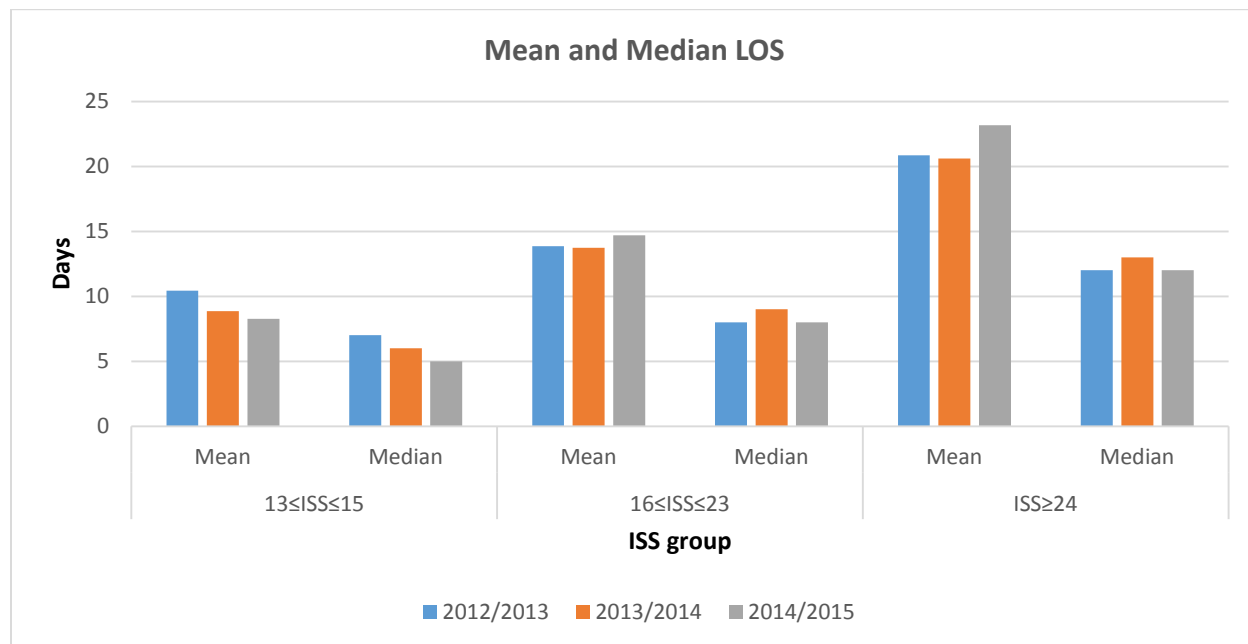
### Trauma Services BC (TSBC) PIPS Program

Trauma Services BC is in the process of developing a provincial PIPS committee with a goal to monitor and evaluate specific information capturing system-level performance of the B.C. Trauma System and to advance recommendations to the TSBC Council for system modification to improve performance objectives and desired outcomes. As there currently only a fledgling province-wide performance improvement process to drive improvement in B.C.'s integrated trauma system, the design and implementation of the program will be an opportunity to ensure a baseline performance standard for quality of care in all phases of management across the continuum

**Outcome measures** are chosen to measure how well patients do after injury (e.g. survival, discharge disposition) or how efficiently the system is able to care for them (ALOS). Outcome measures currently routinely collected include:

1. Average Length of stay (ALOS) Figure 6.13
2. Average ICU length of stay Figure 6.14
3. Discharge disposition (an indicator of functional status at discharge) Figure 6.15
4. Crude mortality rates (by ISS) Fig 6.16

**6.13: VGH, SPH, LGH AND BCCH MEAN AND MEDIAN LENGTH OF HOSPITAL STAY**



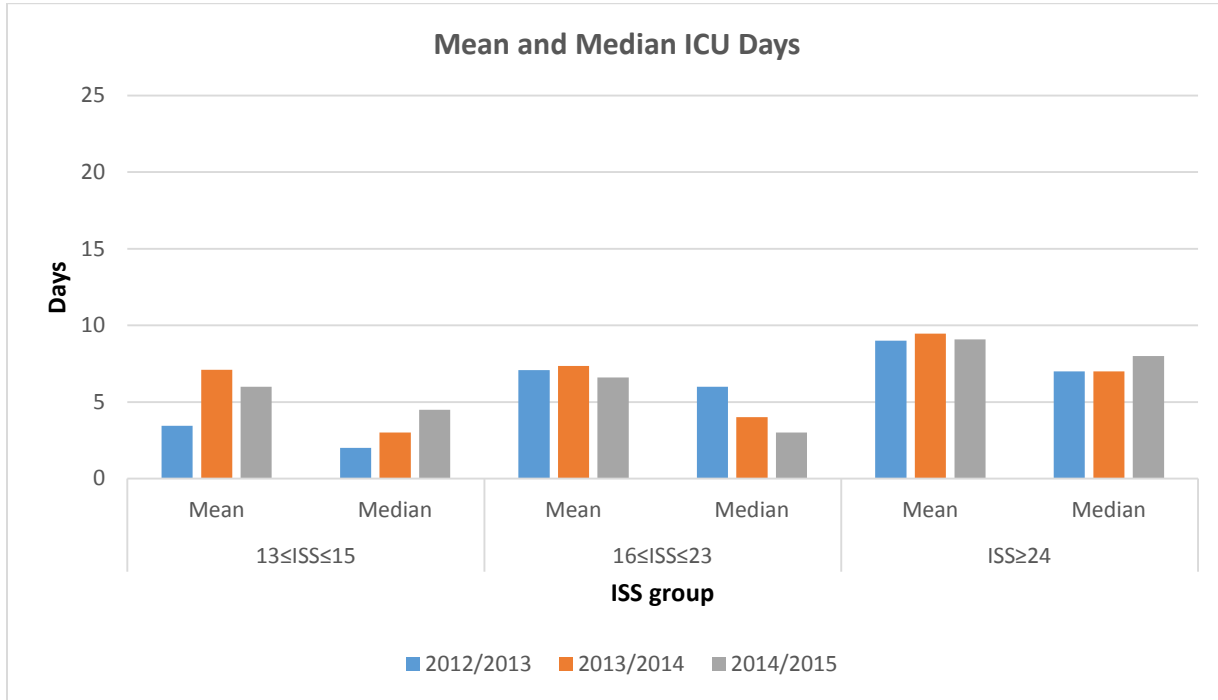
Source: BCTR

The median length of hospital stay for all injury severity groups has slightly decreased in the past year. The mean length of stay for moderate-severe and severely injured patients appears to have increased; this most likely reflects the outliers with a higher length of stay.

**Note 1:** ALOS is excluding Alternate Level of Care Days (ALC)

**Note 2:** 65 years and over injured from a ground level fall with isolated hip fracture population not included

**6.14: VGH, SPH, LGH AND BCCH MEAN AND MEDIAN ICU DAYS**

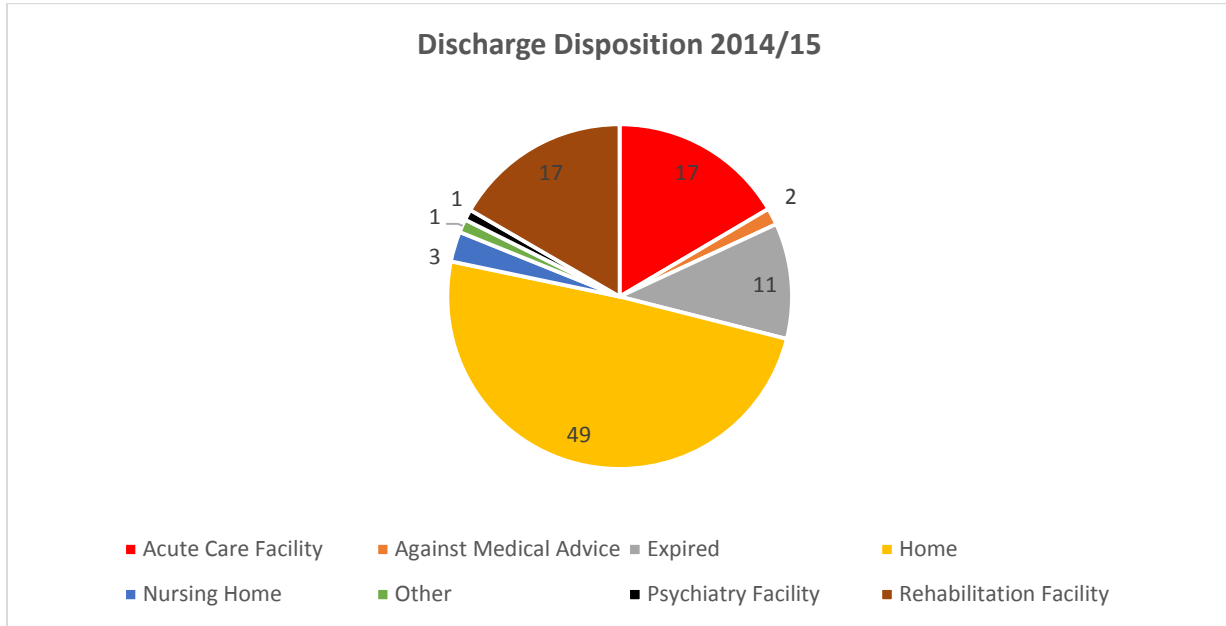


Source: BCTR

ICU LOS has slightly increased in the minor and most severely injured patients and has decreased in the moderate-severe trauma population. The improvement in ICU LOS may be the result of efforts by the Regional Critical Care Council to implement processes and procedures to reduce length of stay, such as: tracheostomy weaning pathways, bedside percutaneous tracheostomy, ventilator associated pneumonia (VAP) bundles, early mobilization, and in unit physiotherapy.

At VGH, post-ICU follow-up is provided by the Critical Care Outreach Team (CCOT) and an expansion of High Acuity Beds at VGH.

**6.15: VGH, SPH, LGH AND BCCH DISCHARGE DISPOSITION\* 2014/15**

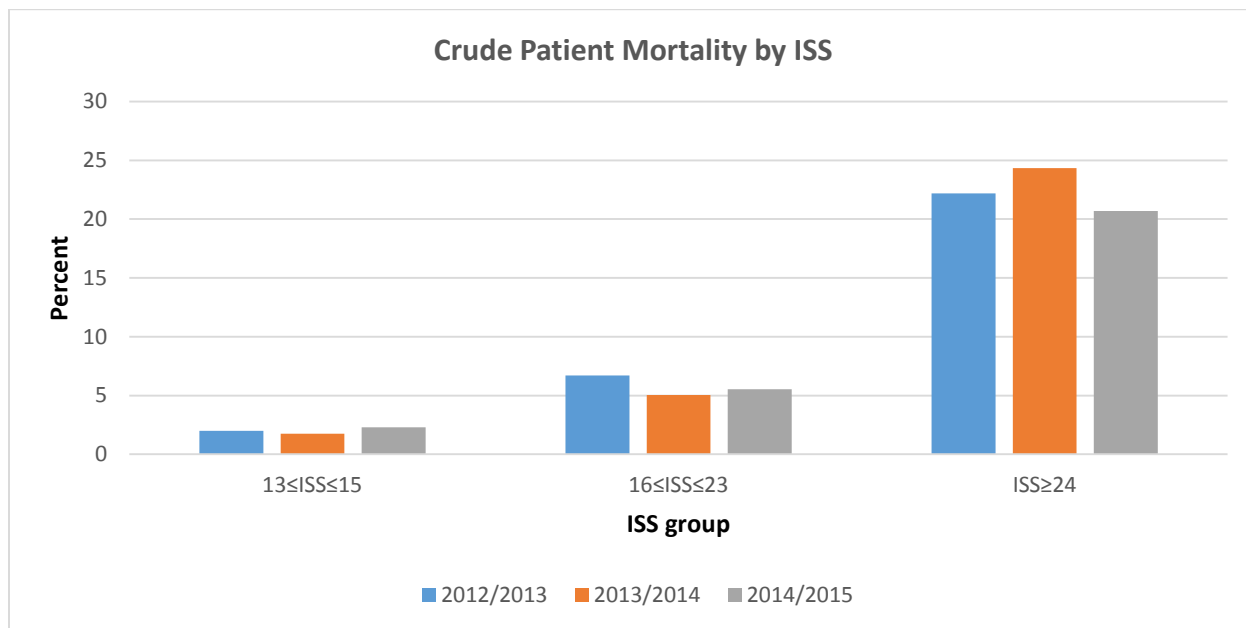


Source: BCTR

\*Both psychiatry and rehabilitation discharges include units within the same facility or a separate facility.

Figure 6.15 demonstrates that nearly 50% of trauma patients are discharged home following their hospitalization. The second leading disposition is transfer to another acute care facility (17%); patients are repatriated to sending facilities (once they no longer require specialized care at one of the facilities within VCH) or transferred to a facility closer to home to receive ongoing care and/or rehabilitation. The third most common disposition, with nearly equal numbers of patients, is transfer to inpatient rehabilitation centres (16%). Transfers to in-patient rehabilitation at LGH are difficult to track because the LGH rehabilitation unit is within the same acute care facility.

**6.16: VGH, SPH, LGH AND BCCH CRUDE PATIENT MORTALITY BY ISS**

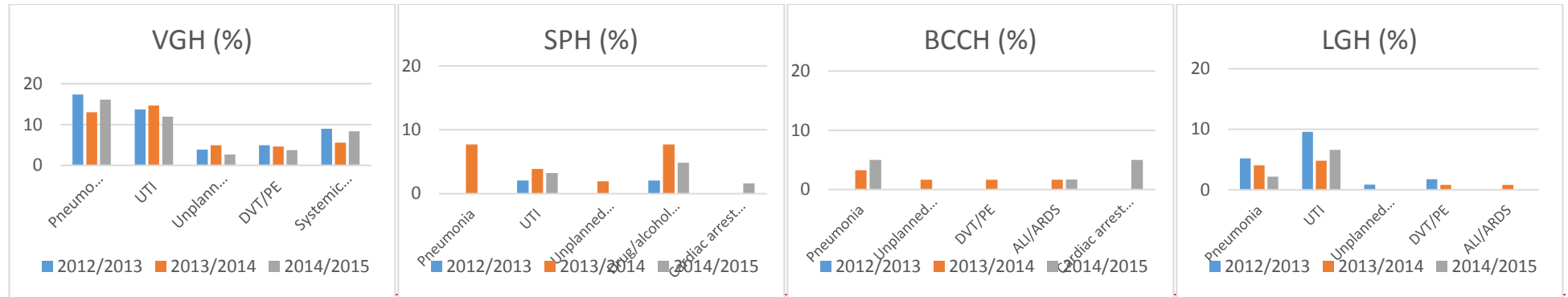


Source: BCTR

Hospital mortality rates for trauma patients with an ISS less than 16 have varied little over the last three years (reported above) and historically over the last 10 years. Ongoing quality improvement initiatives at both the site and regional level are targeted to decrease mortalities across the region. There has been a slight decrease in mortality for the most severely injured patients.

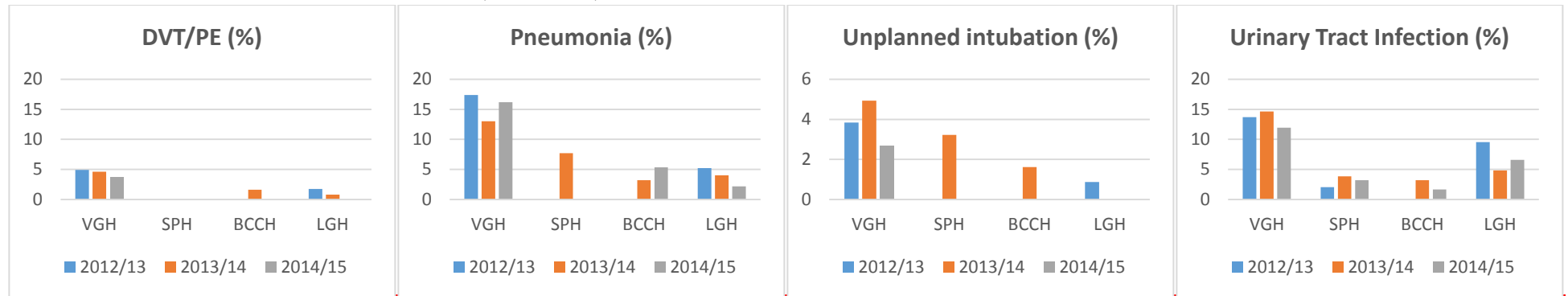
Trauma mortality reviews are conducted during site level PIPS reviews. A rigorous PIPS process for mortality will include review of pre-hospital, ED, and inpatient records. For detailed site level mortality review processes, please see Appendix C: Site Mortality Review Process

**6.17.1: TOP 5 COMPLICATIONS BY FACILITY (Version 1)**



Source: BCTR

**6.17.2: COMPLICATIONS BY FACILITY (Version 2)**



Source: BCTR

Please see Appendix D for Complication Definitions





## **DVT/PE**

The incidence of DVT/PE at the VGH is showing decreasing a trend over the three fiscal years reported. Compliance with venous thromboembolism prophylaxis has been a challenge in the poly trauma population with traumatic brain injury (TBI). Recent changes to clinical practice guidelines and ongoing research/collaboration is occurring at VGH in collaboration with Trauma Services, Neurosurgery, and ICU. The low rates of this complication at LGH and SPH may reflect early mobilization or the use of VTE prophylaxis in less severely injured patients. DVT/PE is rare complications in the pediatric population.

## **Pneumonia**

While pneumonia represents a common complication, this graph does not differentiate type of pneumonia (i.e. HAP, VAP). VAP is a challenging complication to create additional improvements in rates because most ICUs are closed units; however, VAP bundles are implemented at all sites. Early mobilization protocols and PT coverage in ICUs may be contributing to improvements.

## **Unplanned Intubation**

Many trauma patients arrive to our trauma centres and do not require immediate control of their airway for life threatening injuries or airway emergencies. Patients are often managed by the admitting service in high acuity units. Patients who require delayed intubation usually require it for changes in medical status. All unplanned intubations are reviewed as part of site PIPS programs.

## **Urinary Tract Infection**

The second complication that is present at all three adult sites is UTI. The overall UTI rate is trending down or relatively unchanged at all three adult sites. The Ministry of Health has set a target to reduce institutional UTI rates below 6/1000 patients. UTI complications are reviewed during site level PIPS reviews. Regional and site level Catheter Associated UTI (CAUTI) initiatives have made impacts.

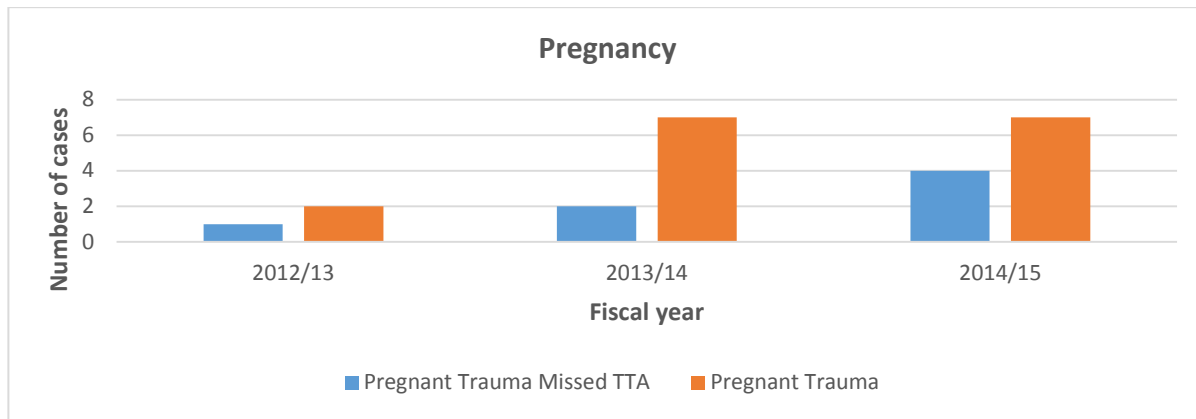
## **Drug and Alcohol Withdrawal**

Due to high incidence of intoxication, substance abuse and mental illness in the trauma population at PHC/SPH, strong partnerships with other departments such as Mental Health and Addictions, Social work, Psychiatry, Geriatrics have been developed to address the issues. Committees and groups such as ED/ Mental Health Working group; SPH Addiction Medicine Consult Team; ED Psychiatric assessment nurse (PAN); and the Geriatric ED nurse (GEN) have been created to improve the quality of care and patient flow. These initiatives have allowed the reduction of drug and alcohol complications and the risk of falls in the trauma patient population. While drug/alcohol withdrawal is not a top five complication at LGH or VGH, it is a complication that is addressed in some patients at both of these sites.

## 7. Excellence and Innovation Project

Trauma during pregnancy leads to 46% of maternal deaths with over 1 million deaths worldwide every year. 6-7% of pregnancies are complicated by trauma and result in hospital admission in 0.4% of pregnancies. Recognizing this public health threat to our pregnant population and the inability to provide adequate care of the pregnant trauma patient across the region, partnerships were developed to improve care for pregnant trauma patients. Collaboration between VCH and PHSA (BC Women’s Hospital) has led to a memorandum of understanding and improved care for this at risk population.

### 7.18: VGH, SPH, LGH AND BCCH PREGNANCY



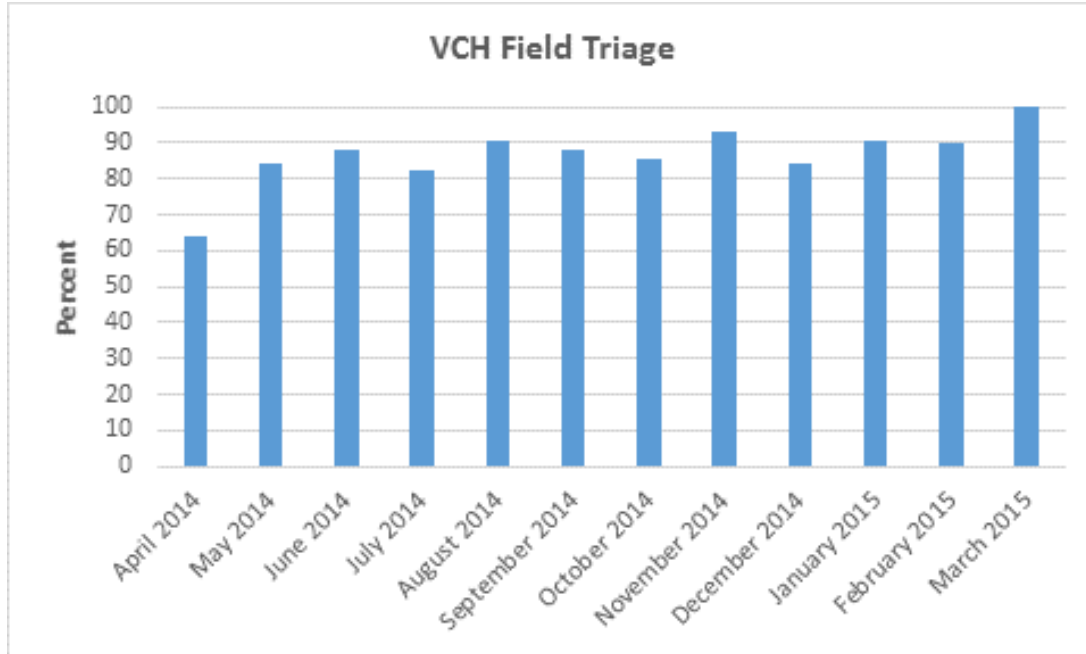
Source: BCTR and VGH Pre-Registry

Pregnant trauma admissions across the region are infrequent. Because of this, it is imperative to provide the best care for the patient in the appropriate trauma centre. Pre-hospital destination protocols transfer pregnant trauma patients to the highest level trauma centre. When TTA criteria for pregnant patients were implemented at VGH, all pregnant trauma patients were a TTA upon arrival, regardless of gestational age or mechanism. Upon further review, this TTA process was too inclusive for patients with minor mechanisms of injury; therefore VGH has revised the TTA criteria for this population to include major mechanism of injury. The TTA process brings expertise to the patient’s bedside in the ED. The trauma team leader (TTL) initiates the consult MFM. If the patient requires admission, the TTL and MFM physician collaboratively determine if the patient can be transferred to a trauma centre with in-house obstetrical care, if the patient needs to remain at VGH, or if they require transfer to BC Women’s Hospital. All pregnant trauma admissions are reviewed for quality assurance initiatives with trauma services and maternal fetal medicine.

The VGH Trauma Program implemented an orientation and training program for staff from BCWH. Fourteen MFM physicians and 34 high-acuity trained BCWH RNs were oriented and toured through all possible areas that will care for pregnant trauma patients. Orientation included: location of fetal monitors, neo-natal resuscitation equipment, obstetrical equipment, and an overview of the VGH Trauma Service. An ID card was developed including pertinent information from orientation.

## 8. Accreditation Canada Indicators

### 8.1: VCH FIELD TRIAGE

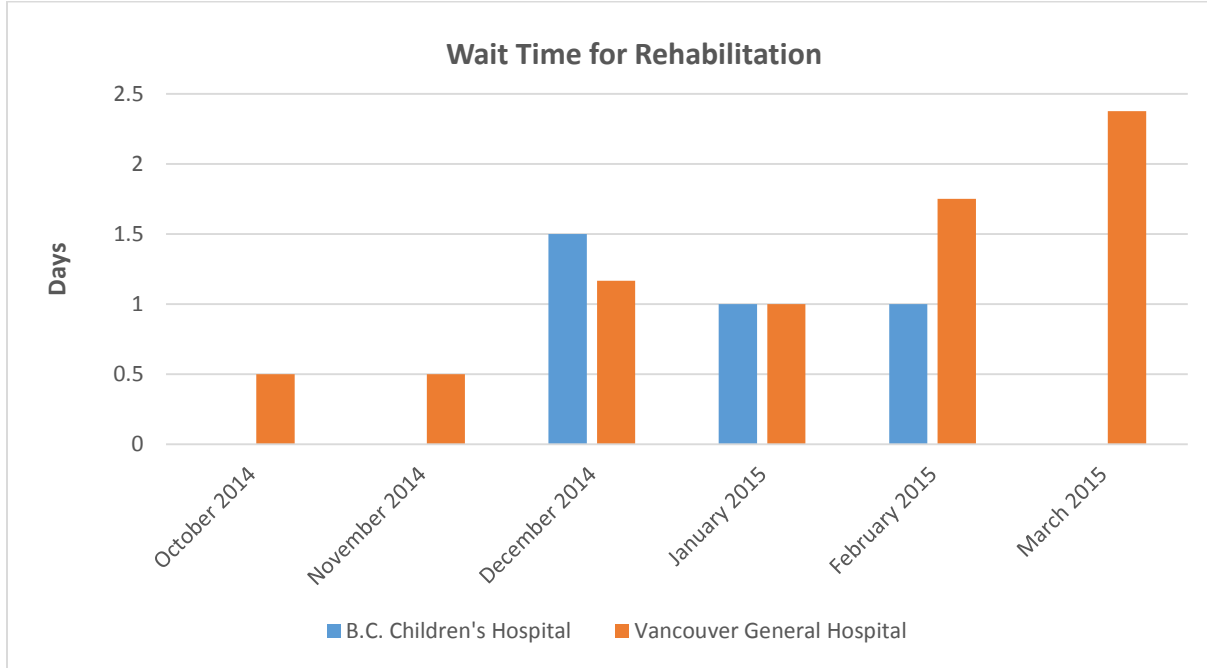


Source: BCTR

Accreditation Canada defines field triage as the proportion of patients with major anatomic injuries admitted to a Level I or II (or equivalent) trauma centre. This indicator effectively measures the appropriate triage of major trauma at the system level. It is an important measure of the coordination of pre-hospital and hospital care and determines whether patients are receiving care in the most appropriate setting.

Our Regional Trauma System is an inclusive trauma system. Within our system, all our trauma centres play a vital role in the system. All Level 3-5 trauma centres initially manage injured trauma patients and evaluate the need for transfer to higher level of care. Our review of the field triage cases identified within the limitations of the AC indicator, included isolated elderly pelvis or rib fracture patients that were injured from a ground level fall. Many of these patients were appropriately managed at our Level 3 sites and in some isolated cases our Level 5 sites. Any patients in question of needing transfer to the Level 1 site that were not transferred are reviewed by medical and nursing at the RTP level.

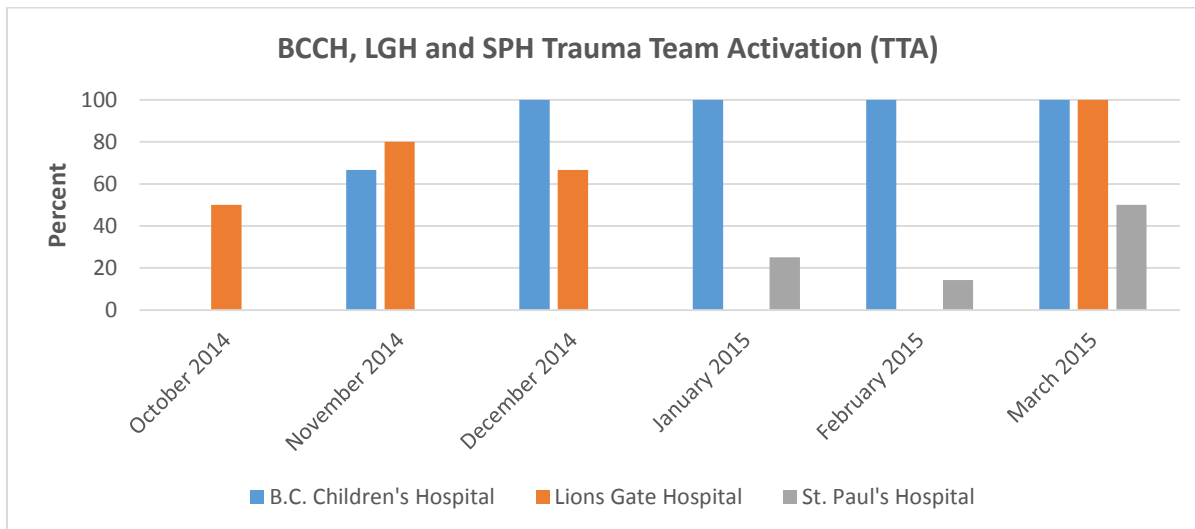
**8.2: WAIT TIME FOR REHABILITATION (Days)**



Source: BCTR

Many trauma patients require rehabilitation following their injuries. Rehabilitation services may be provided within designated trauma centres or at a specialized rehabilitation facility. The wait time for rehabilitation represents the measure of institutional efficiency and system responsiveness. This indicator is measured in days from the day the rehabilitation consultant deems the patient ready for inpatient rehabilitation to the day of transfer to the appropriate facility. Accreditation Canada has set a threshold for this indicator of  $\leq 8$  days.

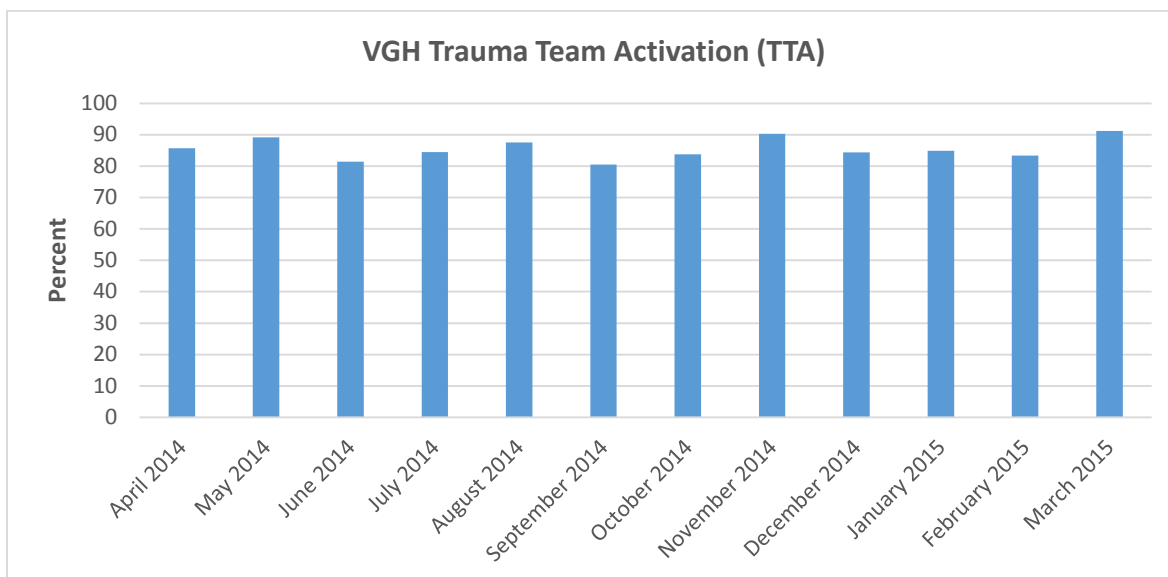
**8.3.1: BCCH, LGH and SPH TRAUMA TEAM ACTIVATION**



Source: BCTR

Each site reviews TTA and missed TTA as part of their regular PIPS process.

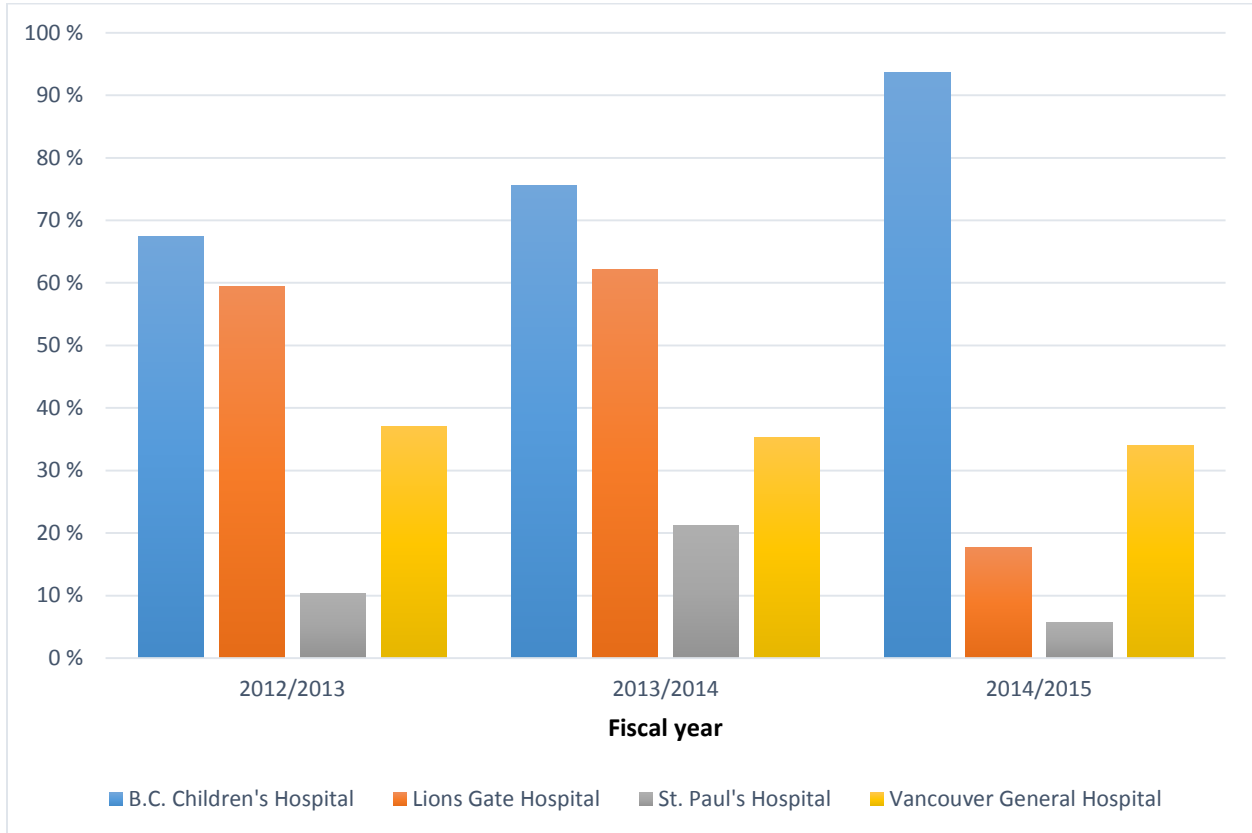
**8.3.2: VGH TRAUMA TEAM ACTIVATION**



Source: BCTR and VGH Pre-Registry:

To capture the complete population, VGH tracks all non-admitted TTA and missed TTA through site level PIPS reviews and inputs these cases into the VGH Pre-Registry database.

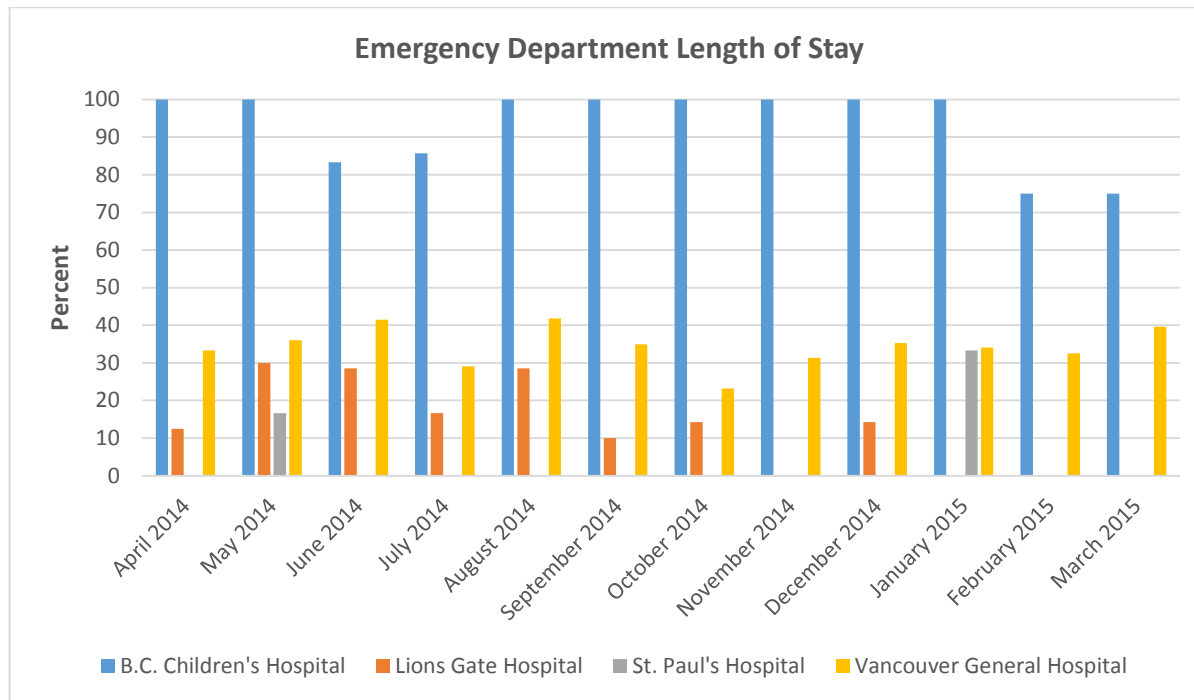
**8.4.1: EMERGENCY DEPARTMENT LOS FOR FISCAL YEAR 2012/13 TO 2014/15**



Source: BCTR

Figure 8.4.1 represents ED LOS for each fiscal year. The above table shows the percentage of patients with an ISS > 12 that are transferred from the ED to an inpatient unit within 4 hours of arrival to the trauma centre. BCCH has showed improvements with their ED length of stay. The challenges at the adult sites reflect hospital flow challenges with in-patient capacity. VGH has showed very little change in patient movement from the ED over the last three fiscal years. This is in the context of steadily increasing total ED visits. Please see Appendix E: Site Patient Flow Initiatives

**8.4.2: EMERGENCY DEPARTMENT LOS**

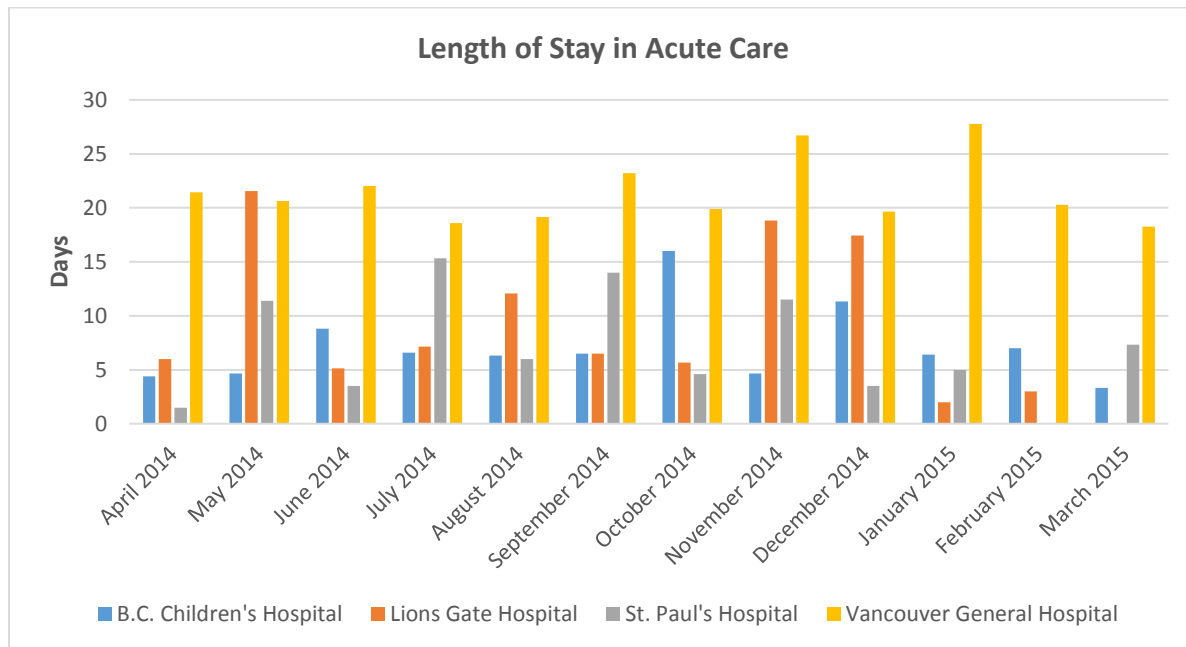


Source: BCTR

Length of stay is recognized as an indicator of hospital efficiency. The transfer of patients from the ED to the Intensive Care Unit (ICU), Operative Room (OR), or inpatient unit is associated with improved patient outcomes. Accreditation Canada’s threshold for this indicator is 90%. Figure 8.2 represents the percentage of patients transferred from the ED within four hours of arrival showing the average of all patient transfers for the fiscal year. The level 1 Pediatric facility, BCCH, is meeting the threshold for this indicator for the last fiscal year. The level 1 Adult facility, VGH, is not meeting the threshold for this indicator with 34% of trauma patients being transferred from the ED.

Figure 8.4.2 represents the percentage of patients meeting the AC threshold for each calendar month of fiscal year 2014/15 and shows the percentage of patients with an ISS > 12 that are transferred from the ED to an inpatient unit within 4 hours of arrival. Many factors can impact patient flow from the ED to the inpatient trauma units. All VGH trauma residents and physicians are aware to communicate patient admissions when needed to admitting and request high acuity or trauma ward beds. Communication with the inpatient PCC or charge nurse is done to alert them of admitted trauma patients in the ED and prioritization of patients is discussed with the charge nurse at this time. Inpatient PCCs and charge nurses will collaborate with Access and Flow Leaders to facilitate transfer of patients to inpatient beds. Please see Appendix E for Site Patient Flow Initiatives targeted to improve ED LOS.

**8.5: LENGTH OF STAY IN ACUTE CARE**



Source: BCTR

Hospital length of stay is an indicator of hospital efficiency and trauma system responsiveness. There is no threshold for this indicator. Figure 8.5 shows fluctuations in LOS across both Level 1 trauma centres. VGH cares for the greatest number of moderate-severe and severely injured trauma patients, many requiring quaternary services, who experience prolonged ICU and high acuity admissions which impact LOS.



**8.6: COMPLICATIONS DURING HOSPITAL STAY**

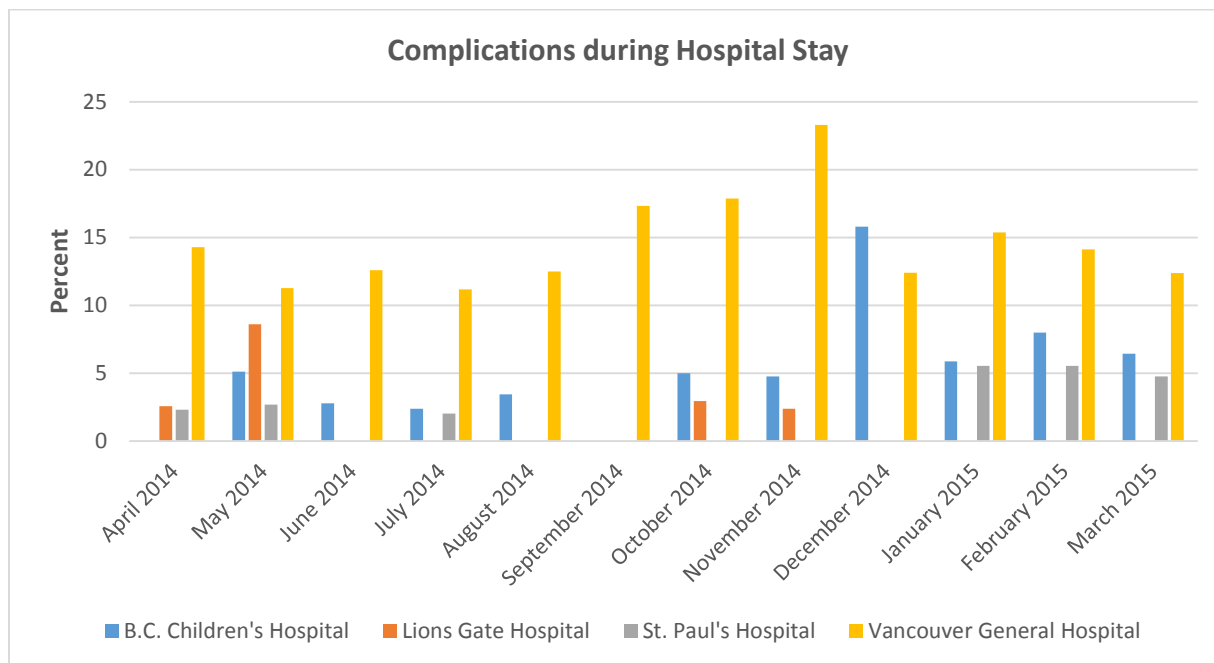
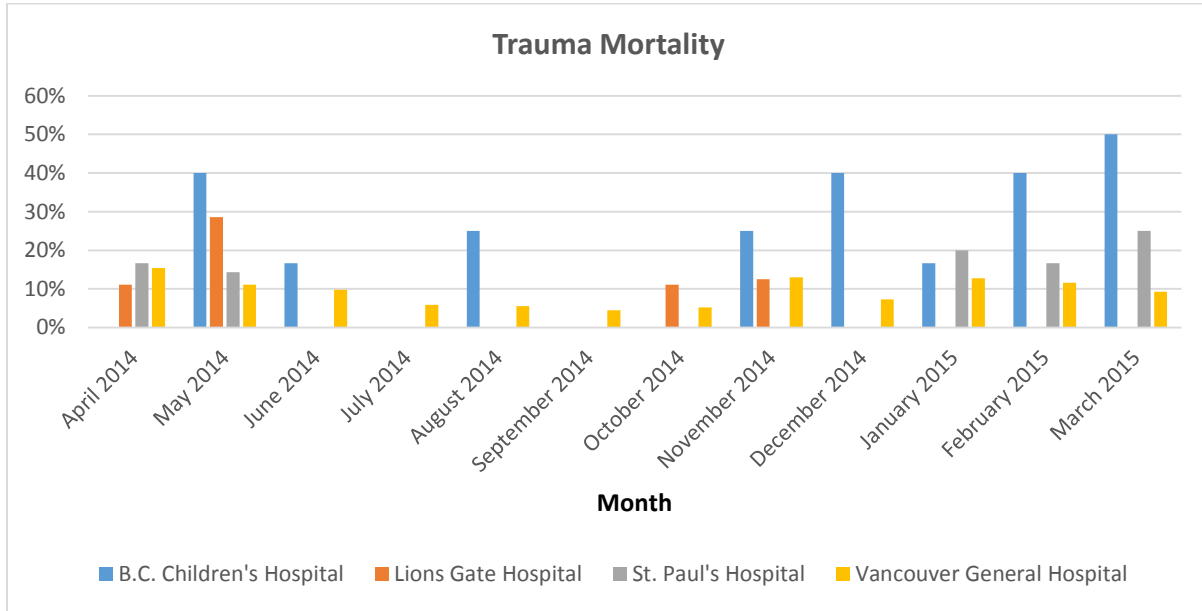


Figure 8.6 reflects the percentage of patients experiencing complication during their hospital stay. The BC Trauma Registry defines complications as an adverse event or outcome that happened during the course of a patient’s hospital stay. Complications are considered a valid outcome measure for the safety of trauma services and patients. The complications included within this indicator include: decubitus ulcer, hospital-acquired infection, iatrogenic pneumothorax, myocardial infarction, acute renal failure, deep vein thrombosis, pulmonary embolism, and death beyond 30 minutes of arrival to the hospital and within 30 days of admission. Figure 8.6 represents the total complication rate per site for each month of fiscal year 2014/15.

Each facility reviews complications through a rigorous PIPS review process. Site level improvements are focused on site complication rates and targeted through site level PIPS initiatives.

**8.7: TRAUMA MORTALITY**



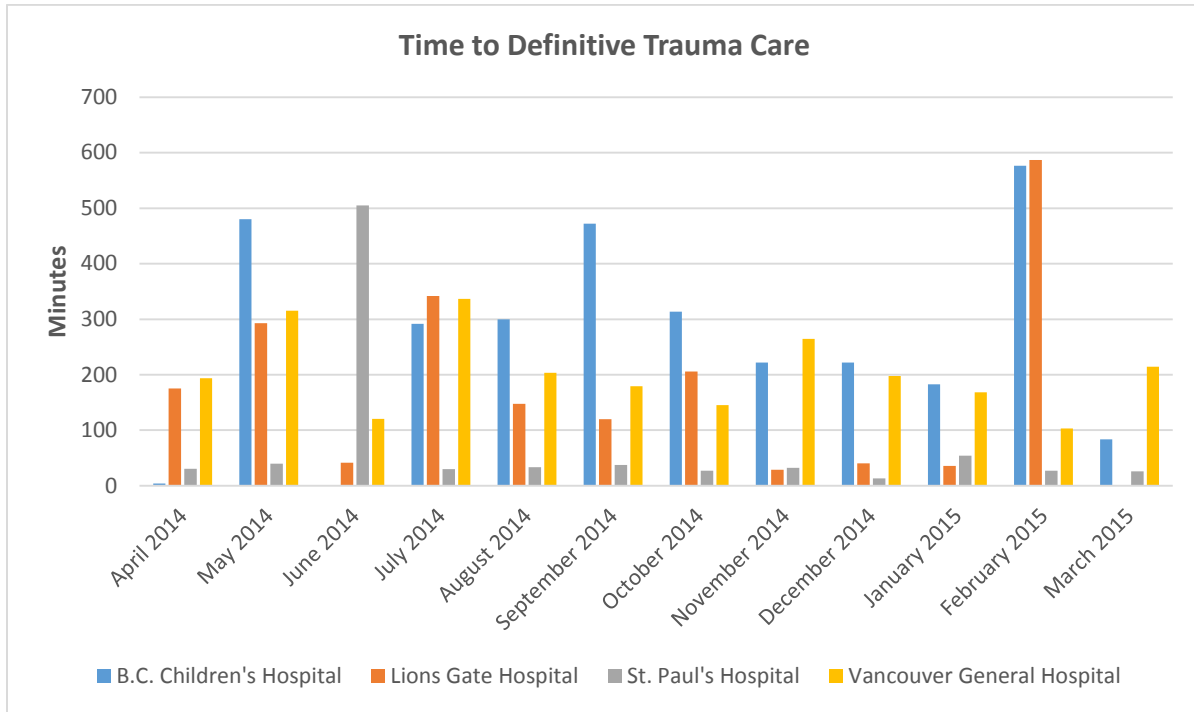
Source: BCTR

In-hospital 30 day trauma mortality is a valid outcome measure for the effectiveness of trauma services. Higher mortality rates may be an indicator of issues in trauma care. Figure 8.7 represents the 30 day trauma mortality for the regional sites. Please refer to Appendix C for site level mortality review processes.

**Note:** mortalities identified at BCCH can lead to increased percentages because of their low number of trauma patients. Small numbers of admissions and mortalities can skew the graph.

## 9. Trauma System Optional Indicator

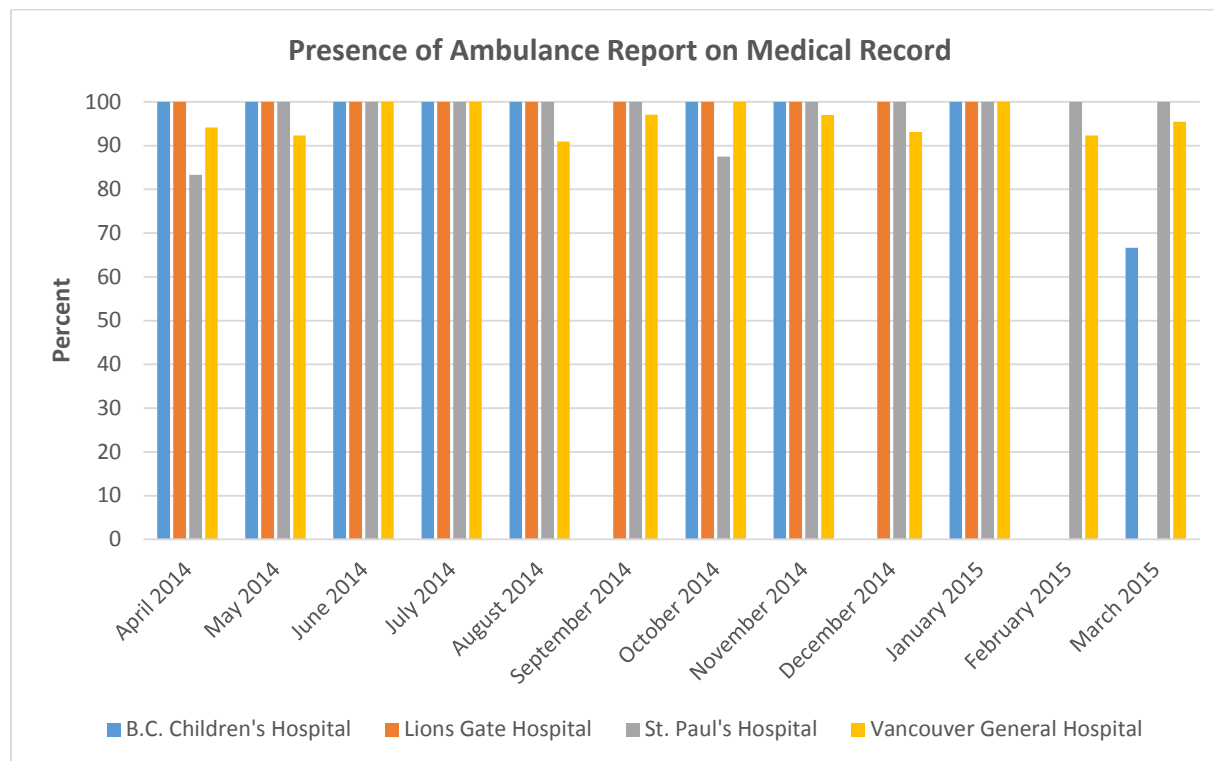
### 9.1: TIME TO DEFINITIVE TRAUMA CARE



Source: BCTR

Time to definitive care represents the total length of time for a trauma patient to arrive at their final destination. Ideally, patients would arrive at a definitive care facility within minutes to hours of their injury. Recognizing some of the geographic and transport challenges inherent in BC, patients may experience prolonged transport times. At this time, there is no threshold for this indicator; however, all patients transferred to higher level of care are reviewed by trauma coordinators, entered into the pre-registry, and reviewed as part of the on-site PIPS review process.

### 9.3 PRESENCE OF AMBULANCE REPORT ON MEDICAL RECORD

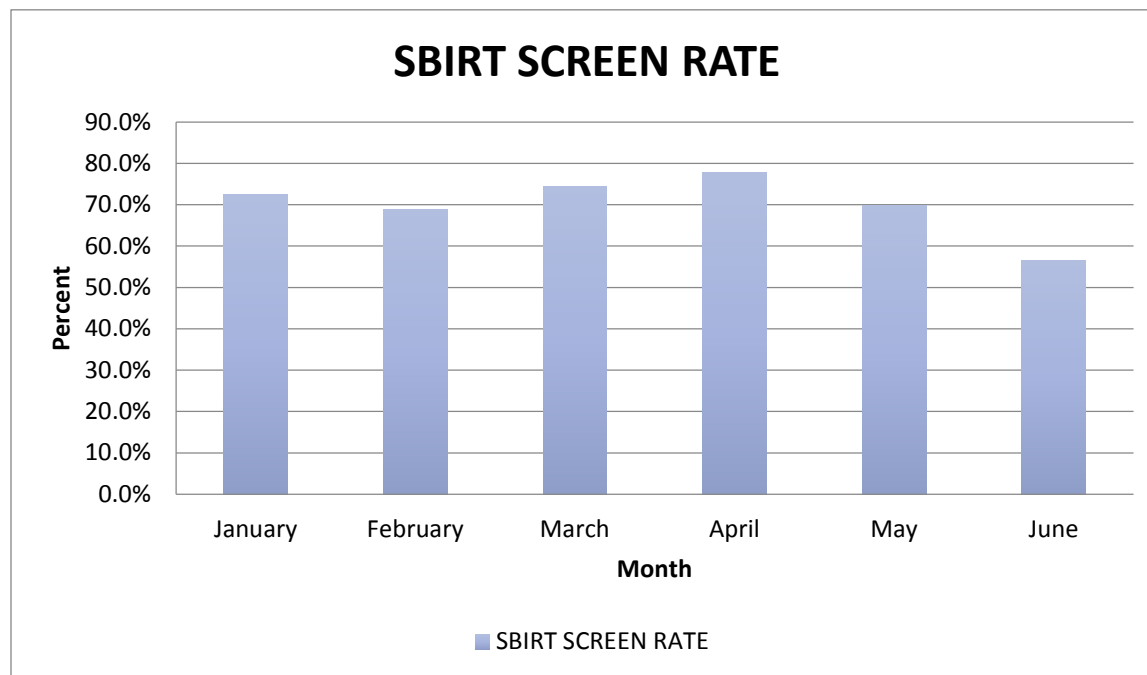


Source: BCTR

The presence of an ambulance report is critical to provide scene information and treatments received in the pre-hospital setting; it may be required to guide ongoing treatment of the trauma patient. The presence of an ambulance report can positively affect patient outcomes and interagency communication and effective transfer of care. This Accreditation Canada indicator is an optional indicator that can be selected by sites and is not one of the indicators selected by the region to submit to AC; however, Figure 9.3 indicates that the ambulance report has been present on the medical record on average in over 90% of chart reviews.

## 10. Accreditation Canada Trauma Centre Optional Indicators

### 10.1 SCREENING, BRIEF INTERVENTION, AND REFERRAL TO TREATMENT VGH

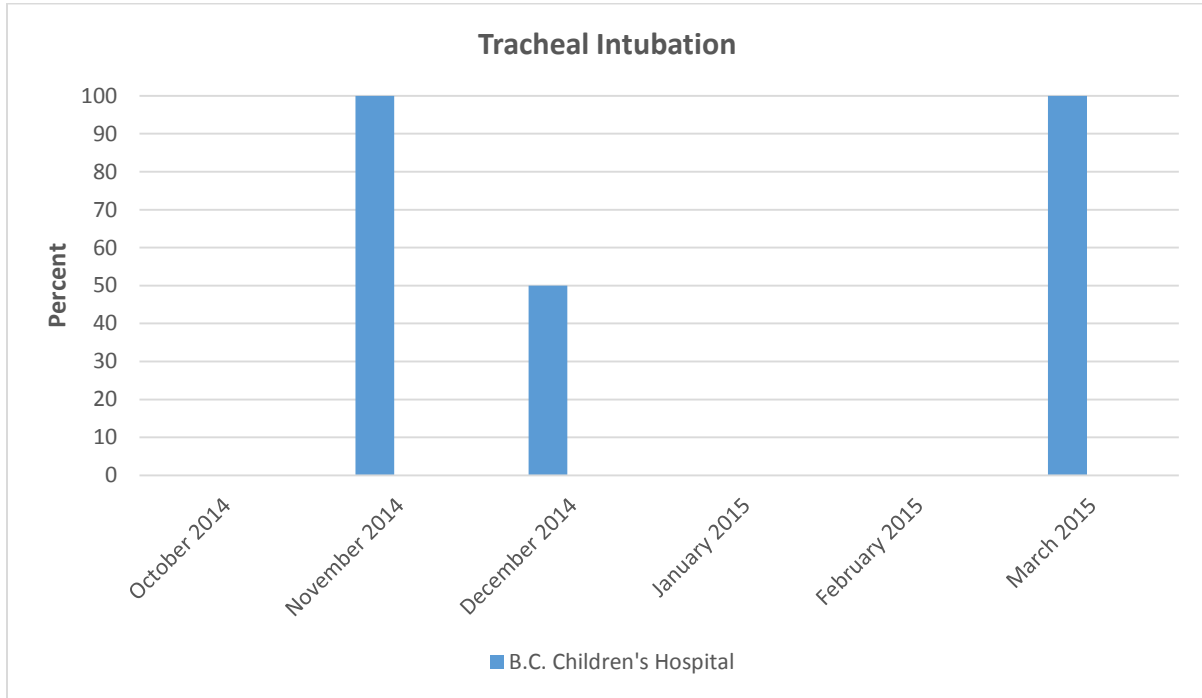


Source VGH Pre-registry:

Alcohol abuse and dependency screening is determined to be an accepted screening process measure for the effectiveness of trauma services. The Screening, Brief Intervention, and Referral to Treatment (SBIRT) indicator measures the effectiveness in screening trauma patients for alcohol abuse and alcohol dependency. This indicator is used to identify patients engaging in high-risk behaviours who will potentially benefit from treatment that addresses alcohol misuse or dependency. The SBIRT Screen rate was calculated using the formula: All Screened/All Trauma Admissions

In October 2014, VGH implemented the SBIRT program on the Burn, Trauma, and High Acuity Unit and Orthopedic-Trauma Unit for Trauma patients admitted to the trauma service. This SBIRT program is the first one implemented in trauma centres within BC. Figure 10.1 represents the percentage of trauma patients that had an SBIRT screening completed during their hospitalization. The goal of the SBIRT initiative is to screen all trauma patients for their at risk alcohol use. Patients who score 5 or higher on the Audit-C tool are referred to the Social Worker for the Brief Intervention and referred to treatment as needed. One of the limitations to successfully capturing SBIRT screening in the trauma population is ensuring documentation is completed and added to the patient record. At this time, this information is documented in the VGH Pre-registry program.

**10.2 TRACHEAL INTUBATION BCCH**



Source: BCTR

This optional indicator is being tracked by BC Children’s hospital to assess timeliness of intubation in injured patients with a documented decreased level of consciousness (GCS < 9) and having a successful insertion of an endotracheal tube in the emergency department.

## 11. Education and Training Initiatives

### UBC undergraduate, postgraduate trauma training programs

The consolidation of most major blunt trauma in the VCH region to one site (VGH) has allowed for the development of specialty trauma services and dedicated trauma units. These permit development of comprehensive training programs for undergraduate medical training (UBC), postgraduate (residency and fellowship) training and the civilian based Canadian Forces Trauma Training Centre.

UBC related trauma-training courses include:

- Trauma Evaluation and Management (TEAM) – undergraduate: 6/year
- Trauma Labs – postgraduate

### Advanced Trauma Life Support (ATLS):

Vancouver General Hospital has taken the lead provincially in offering ATLS courses since June 2014. During the first year of the VGH ATLS Program, more courses were provided during that calendar year than in previous years. VGH prides itself on providing leadership and training to ATLS coordinators around BC and has assisted in training ALTS coordinators around the province. The VGH ATLS program continues to evolve and share resources with other ATLS Coordinators.

- ATLS Provider Course: 6/year
- ATLS Refresher Course: 5/year
- ATLS Instructor Course: 2/year

### Canadian Forces Trauma Training Centre (West):

The CFTTC(W) is a tremendous credit to the VCH Trauma Program (led by VGH) being a first of its kind in Canada, joint civilian/military trauma training facility. This training program continues to support CF physician assistant (PA) training, a military clinical maintenance of skills program, as well as pre-deployment preparation for Canadian domestic and international missions. This includes training in both adult and pediatric trauma. A cadre staff of military medical personnel works at VGH and are periodically deployed on Canadian Forces missions.

### In Situ Trauma Simulations:

Regular simulation training occurs in the emergency department trauma bays at VGH, BCCH, LGH, and SPH.

### Pediatric Advanced Trauma Simulation (PATS) Course:

BC Children's Hospital has developed a one day course to train the interdisciplinary team approaches to the management of pediatric trauma patients. The PATS course is a simulation-based course that includes: 4 simulation stations and an advanced airway/breathing skill station. Participants complete a series of online modules prior to participating. Participants include emergency physicians, ED and ICU RNs, and RTs.



### Postgraduate Surgical Trauma Training Program:

Vancouver General Hospital is one of two sites in Canada regularly offering the Definitive Surgery for Trauma Care (DSTC) Course. DSTC is a program requirement for all graduating surgical residents from the UBC General Surgery Program. DSTC teaches qualified participating surgeons techniques in damage control surgery to intervene and stabilize the critically injured trauma patient prior to transport to definitive care.

### Regional Trauma Rounds:

Regional Trauma Rounds continue monthly with rotating presentations by each of the major regional trauma centres and are available through videoconferencing to all interested BC hospitals. Rounds are broadcast to all trauma sites across the region and to some sites provincially.

### Simulated Trauma Resuscitation Update Course (STRUC):

A new course called STRUC has been created to provide team based training for the emergency resuscitation of severely injured patients. This is a one day simulation course that builds on ATLS principles for trauma teams working within an urban trauma centre. The courses are site based to encourage participation by members of the inter-disciplinary team that work within that centre. STRUC focuses on team training, crisis resource management principles (strong trauma team leadership, communication, role delegation), and appropriate resuscitative management skills. Each course includes skills training for difficult and surgical airway skills and surgical thoracostomy/thoracotomy skills.

### Educational Outreach Programs:

Outreach programs are critical to trauma care providers in rural and remote communities in addition to practitioners working in the field of trauma.

### Trauma Nurse Core Course (TNCC)

TNCC is offered by Pacific Rim Nursing Consultants. Pacific Rim Nursing Consultants take pride in their ability to offer TNCC around the province by utilizing local and imported faculty at hospital sites around the province. The ability to travel to rural communities and offer TNCC locally creates educational opportunities for rural nurses that are unable to travel to Vancouver for educational training.

### VCH Rural Trauma Update:

This half day course brings expert faculty to our rural medical facilities to support the interdisciplinary team in an education program within their own facility. Course faculty includes a trauma surgeon, and emergency physician trauma team leaders, and trauma nurse clinician. Case scenarios and topic reviews are based on local needs and includes team based in situ trauma simulation. Courses have been held at the Whistler Health Care Center, Powell River, and Squamish Hospital; with courses planned in Sechelt and the Central Coast this year.





## 12. Injury Prevention

The Vancouver General Hospital Injury Prevention Program Leader works collaboratively with injury prevention programs locally, provincially, and nationally. Within this role, new injury prevention initiatives have been developed in collaboration with other stakeholders across the health care continuum.

### Screening, Brief Intervention, and Referral to Treatment (SBIRT)

Injuries related to alcohol are an ongoing trend of trauma admissions at Vancouver General Hospital (VGH). Alcohol significantly increases the likelihood for injury: alcohol-related injury has been a top priority for the VGH Trauma Services Team since 2013. VGH Injury Prevention (IP) Program has led an initiative to implement a Screening, Brief Intervention, and Referral to Treatment Program on the inpatient Burn, Trauma, and High Acuity and Orthopedic-Trauma Units. Implemented in the fall of 2014, VGH IP and Trauma Services implemented SBIRT screening for all trauma patients admitted to the trauma service. SBIRT is a clinical preventive service, which has proven to be beneficial in the management of individuals who are not substance dependent, but classify as hazardous drinkers.

SBIRT is an integrated approach to the delivery of early intervention and treatment services for patients with substance use disorders, and for people who are at risk of developing these disorders. Utilizing the universal screening AUDIT-C tool, all trauma patients with hazardous drinking patterns are identified through screening, patients with a score of 5 or higher receive a brief intervention from a social worker. Some individuals may be referred for more treatment depending on their level of substance use and engagement for treatment.

The VGH IP Lead collaborated with social workers, department leaders, and educators across the continuum of trauma care. Adaptations to the trauma nursing documentation form were made to include SBIRT screening in appropriate situations for patients in the ED. Additionally, a new Audit-C screening tool was developed for the in-patient units; this tool provides space for the RNs to complete the screening and for the Social Worker to document the brief intervention on the same form if the screen is positive.

### Action Mini-Grants

VGH IP has given several small grants to different organizations that promote injury prevention in the community. Please see Appendix F for Injury Prevention Action Mini-Grants that have been given.

### Seniors' Falls Prevention Initiative

Because of the growing trend in falls, particularly in seniors, as the leading cause of injury across VCH, a partnership between BCEHS, the Department of Family Physicians, Home Health, VCH Falls Prevention, VCH Emergency Departments and VGH Trauma Services will ensure that seniors who experience a fall has been developed. This initiative will ensure that seniors who fall receive



preventative care to prevent a subsequent more serious fall, ambulance calls, and emergency department visits. Seniors who have a fall in their home and phone BCEHS for assistance off of the floor (many of these phone calls do not result in transfer to hospital or assessment by a health care practitioner) will be asked to participate in a new initiative connecting them to the Home Health Central Intake liaison for assessment and referral to appropriate resources. This initiative is being explored in two Communities of Care (Richmond and North Shore).

## 12. Research Activities

New knowledge, particularly about the care we provide, is essential to ongoing system improvement. Throughout the regional program there are research initiatives investigating new and better ways to care for our patients. Both VGH and BC Children's Hospital are involved in research projects.

### Multicentre Randomized Clinical Trials

- Rib Fracture Fixation - Operative versus non-operative treatment of acute unstable chest wall injuries: A multi-centered randomized controlled trial

### Epidemiology: Trauma Systems and Access to Care

- Pediatric Trauma Care Quality Indicators: A National Review
- The electronic Trauma Health Record (eTHR): Advancing Trauma Care and Injury Surveillance in Low to Middle Income Countries
- Trauma Transfers

### Global Health

- Ethiopia – Global Surgery
- Mexican Red Cross
- London School of Hygiene and Tropical Medicine

### Clinical Research

Many of the surgical subspecialties have ongoing clinical research projects that are related to trauma care and outcomes. Additionally, several resident research projects have been fostered and have resulted in national presentations. Current clinical studies under investigation by the VGH/UBC Trauma Program include:

- Autolaunch
- IVC Filters
- Pancreatic Injury - Retrospective study on the diagnosis and management of pancreatic injuries
- Pelvic Compartment Syndrome
- ROTEM/Timing of DVT Prophylaxis/Pre-Post Study
- Tertiary Survey
- Review of Mortality after Acute Trauma in BC
- Risks and Benefits of VTE in TBI

### Emergency General Surgery

- A Day in the Life of ACS (24 hour survey)
- National Survey of ACS
- Operations in ACS
- Systematic Review of Trauma System Effectiveness

## Trauma Association of Canada Accepted Abstracts May 2016

1. 64-slice CT compared to MRI to clear cervical spine injury in high-risk obtunded blunt trauma patients – **Oral Presentation**  
Author: Jessica McCallum
2. A Systematic Review of the Risks and Benefits of Venous Thromboembolism Prophylaxis in Traumatic Brain Injury - **Oral Presentation**  
Author: Joseph Margolick
3. Grade-V liver trauma involving a liver allograft - **Poster Presentation**
4. IVC Filter Use in Canadian Level 1 Trauma Centre – **Oral Presentation**  
Author: Radoslav Krouchev
5. Is your data telling you what you think it is? An assessment of BC Trauma Registry Completeness – **Oral Presentation**  
Authors: N. Bradley, N. Garraway, N. Lakha, J.Li, J. Hamm, Morad Hameed
6. The Impact of the Acute Care Surgery Service Model on non-clinical outcomes including Health Economics, Delivery Systems, and Education: A systematic review – **Oral Presentation**  
Author: Kristin De Girolamo
7. The timing of initiation of venous thromboembolism prophylaxis after traumatic solid organ injury: A national survey of practice. – **Oral Presentation**  
Authors: P. Murphy, D. Grau, N. Parry, S. Rizoli, M. Hameed
8. Trauma Scoring Systems – **Oral Presentation**  
Authors: Deanna Fong, Erin Shangguan, Rocio Swaby
9. What are they doing now? An SBIRT Evaluation – **Oral Presentation**  
Authors: Safia Mohamed, Zahra Hussein, Nasira Lakha
10. Oncological emergencies in Acute Care Surgery: An analysis of processes and outcomes.  
Authors: R. Al-Shehhi, K. DeGirolamo K, B. Drake, Garraway N, E. E. Joos, Y, S.M. McConnell , S.M. Hameed – **Oral Presentation**
11. Evolution of Guidelines for Definitive Emergency Airway Management in Adult Major Trauma  
Authors: B Waller, J Trojanowski, A Meikle, N Garraway, S.M Hameed



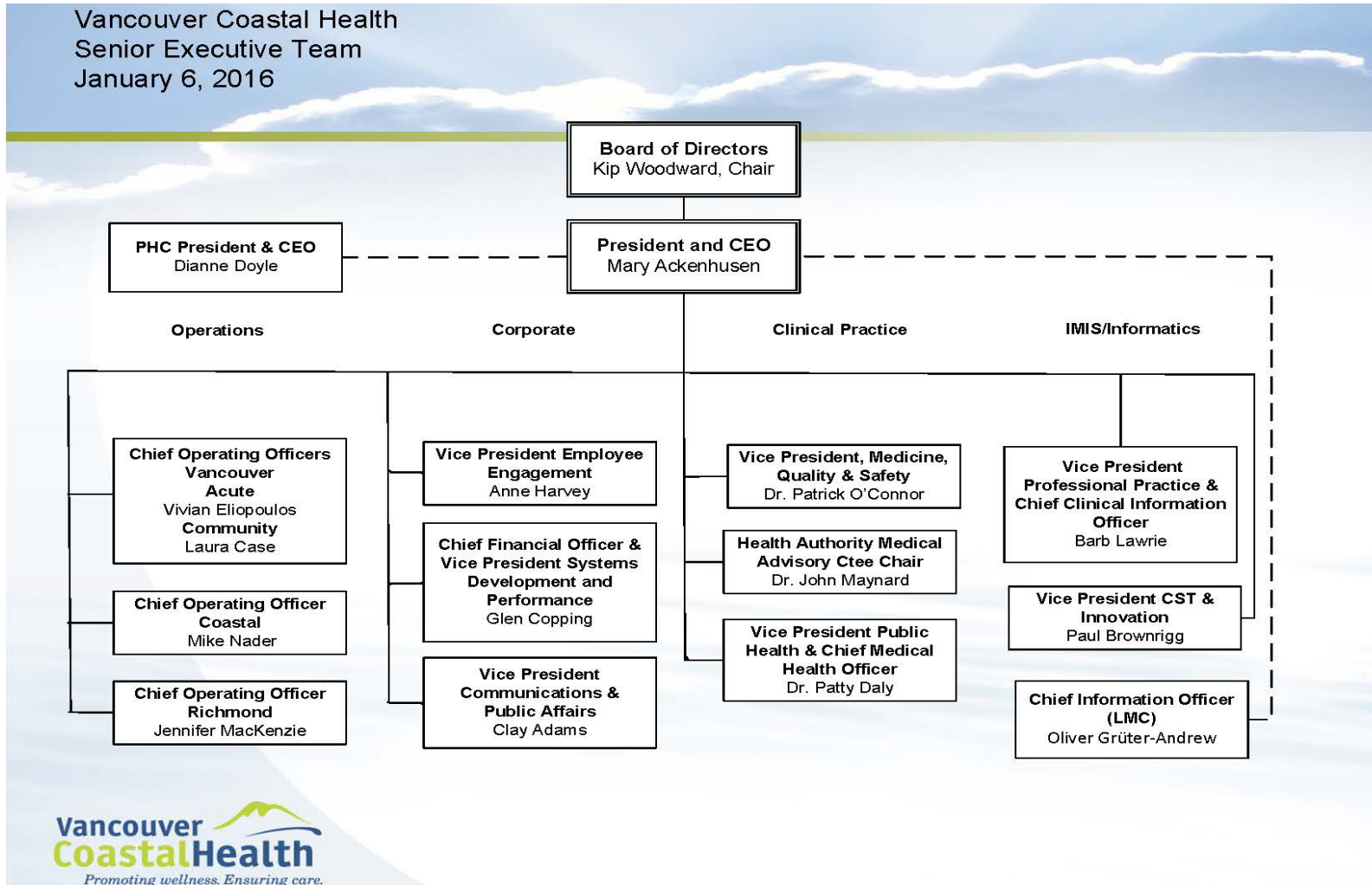
### 13. Summary and Future Goals

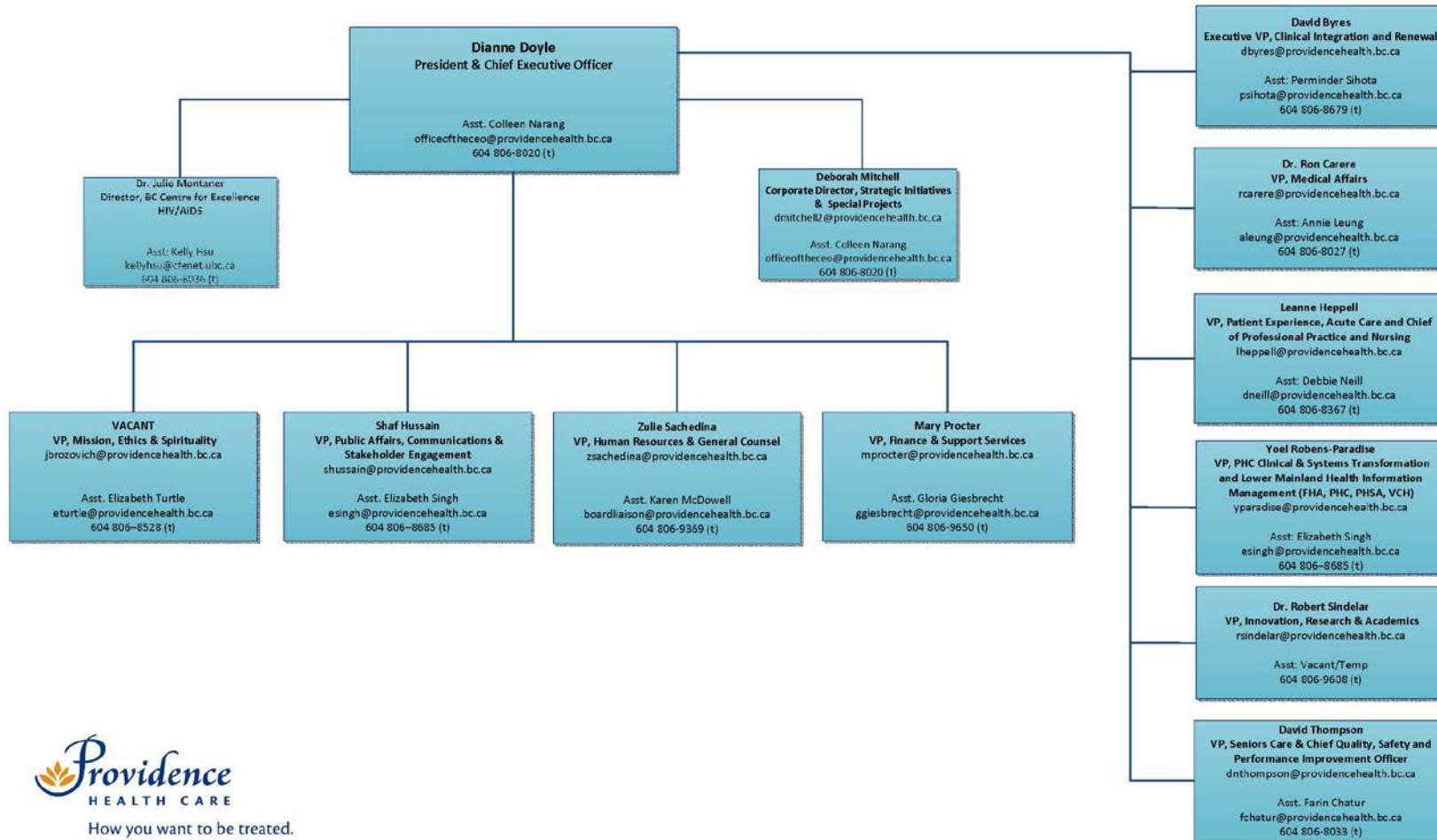
The Regional Trauma Program is justifiably proud of the work outlined in this report, which documents a very high standard of clinical performance for the care of major trauma patients within the region and the delivery of first-rate academic trauma programs.

Following the completion of the Trauma Distinction Accreditation process, this program will focus on implementing and prioritizing the recommendations garnered from this Trauma Distinction process. The Regional Trauma Program will have ongoing involvement with the Clinical and Systems Transformation project as design sessions 2.0 are scheduled in the coming months. The Program will continue its participation with Trauma Services of BC and take an integral part in provincial initiatives including a provincial PIPS program and disaster/mass casualty planning.

The regional trauma program leaders would like to personally thank the site leaders for their commitment and hard work, as well as, VCH and PHSA senior leadership for their support of the Regional Trauma Program. We would also like to acknowledge the efforts of our front line trauma care providers from across all specialties and all sites for their dedication to excellence in patient care and performance improvement.

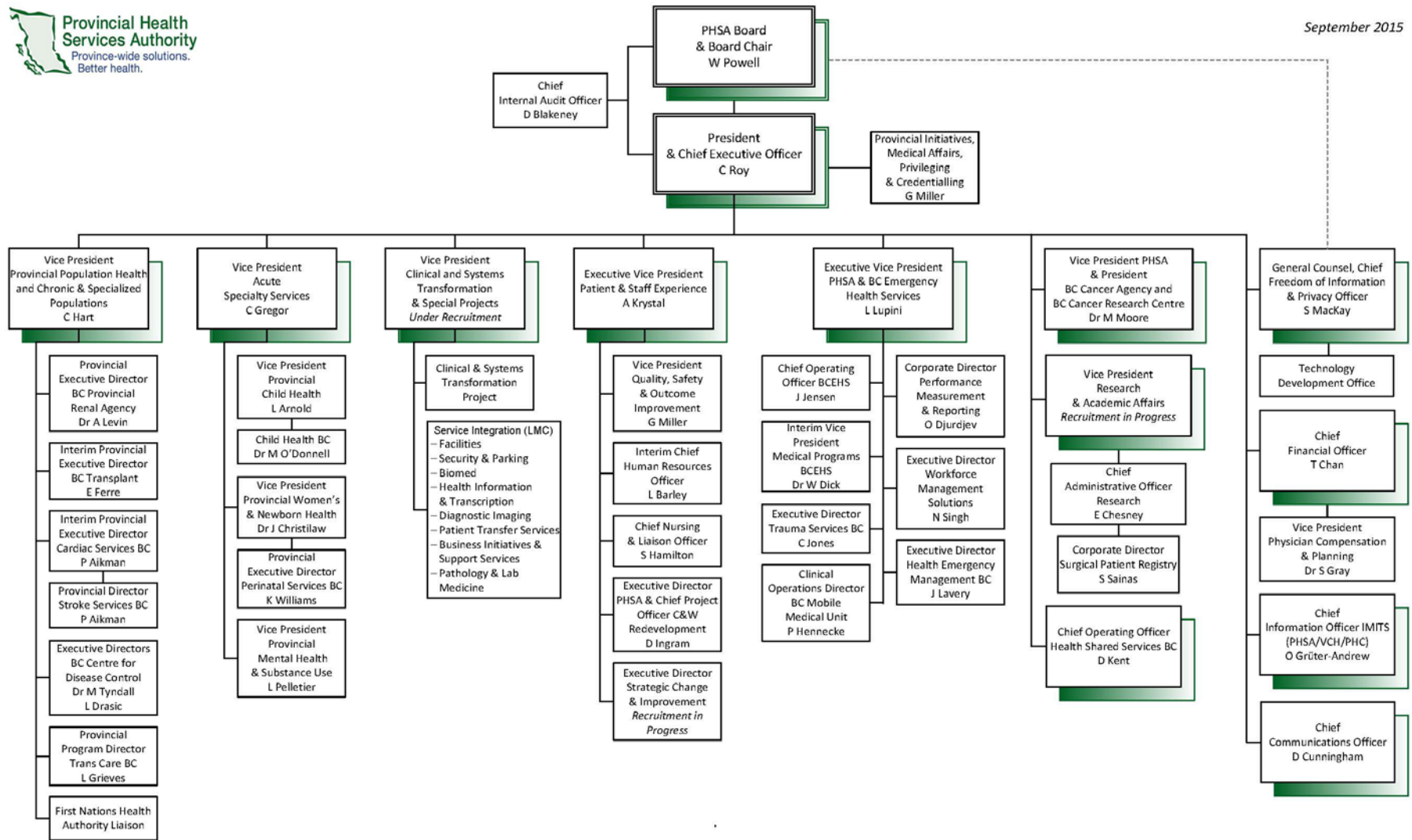
## 14. Appendix A: Organizational Charts











## 15. Appendix B – Site Level PIPS Programs

### Site PIPS Programs

#### Vancouver General Hospital

- Continuous performance improvement process
- Trauma coordinator primary role at VGH is to support the PIPS program
- Ongoing data collection, quality issues, trends, complications and mortalities are followed up concurrently and retrospectively
- Detailed mortality and morbidity reviews are conducted to monitor, evaluate and improve performance and care
- VGH has a variety of quality forums within the hospital where the quality of patient care for trauma patients is discussed
- PI education and awareness is done at the unit level during rounds
- Resident teams are oriented to the QA process for trauma services
- Development, implementation, review, and revision of trauma related policies, protocols, and guidelines are the result of QA reviews
- Trauma patients having any morbidity, mortality, complication, flagged PI's or having any issues, are followed by the trauma coordinator and entered into the pre-registry data base
- Resident physicians are responsible for completing their M&M forms on trauma patients with identified complications and issues
- Monthly trauma program M&M meetings are conducted with the entire Trauma Service and consulting services as needed, with a plan for loop closure
- General Surgery Divisional Mortality and Morbidity meetings occur weekly and include trauma M&M
- VGH Trauma Advisory Committee (VGH-TAC), and from that group, sub multidisciplinary working groups are in place in each of the area's to work of initiatives such as development of CPG's, Pre-printed Doctors orders, New documentation forms and tools, patient safety issues, communication issues, and equipment issues are examples of work done in these sub-groups.

#### VGH committees and working groups:

- Trauma Advisory Committee
- BPTU QA Committee
- ER/ Trauma Working Group
- OR/ Anaesthesia/Trauma Working Group
- Ortho/Trauma Quality Group
- ER/Trauma Radiology Quality Working Group
- Regional Trauma Program (is it a program or council now?)
- Trauma Services BC
- BC Interdisciplinary Trauma Group

## BC Children's Hospital PIPS Program

BCCH site specific policies are available on the intranet located at

[http://bccwhcms.medworxx.com/Site\\_Published/bccwh/Home.aspx](http://bccwhcms.medworxx.com/Site_Published/bccwh/Home.aspx)

- All Trauma Team Activation (TTA) are reviewed by the Trauma Manager
- Retrospective chart reviews are performed monthly by the Trauma Manager for patients discharged prior to review.
- Chart reviews include: BCTR and Pre-Registry performance indicators, national pediatric indicators, and site specific criteria to evaluate effectiveness of protocols, etc.
- Bi-monthly in-depth reviews of all Emergency visits
- Bi-annual reviews of Emergency admissions for missed activations
- Ongoing follow up and loop closure is performed by the Trauma Manager and Trauma Director with the related department or specialty as issues arise.
- Quality Assurance is a standing item on all Trauma Steering Committee meeting agendas.
- The Trauma Manager and the BC Trauma Registry Analyst meet regularly to review data and complete the follow up of flagged performance indicators.
- The Trauma Manager, Trauma Director and Registry Analyst meet to review specific case indicators and complications.
- Bi-monthly regular (q2 monthly) multidisciplinary rounds are conducted to evaluate cases flagged for review.
- Output from these regular Morbidity and Mortality rounds informs the refinement of our Pediatric Trauma procedures and policies, at all levels and locations of patient care.

BC Children's is participating in a national research project regarding establishment of pediatric trauma benchmarks. The following indicators are compared nationally:

- Injury time to trauma centre
- Trauma Team activated according to site criteria
- TTL arrival within 20 min
- Was the ED documentation hourly including sequential NVS for head injuries and temperature?
- CT done within 2 hours or prior to arrival for patients with a GCS <12
- ED length of stay
- Intubated with a GCS <9
- Admitted to a non-surgeon or non-intensivist
- Was a formal review done for mortality?
- Was c-spine appropriately managed according to site criteria including clear documentation of clearance?
- Missed injuries not identified in the ED
- Delay to OR or unplanned return to OR
- Unplanned admission or readmission to ICU
- Direct admission (bypassing the ED)

## Lions Gate Hospital

The LGH PIPS program monitors and continually improves structures, processes, and outcomes. The PIPS program is essential to provide leadership and participation in PIPS activities regional, provincial, and/or national trauma advisory committees.

Performance Indicators tracked at LGH:

- Trauma Team Activations (Code 99)
  - Missed Code 99 (<10%)
- Trauma consults
  - Missed Trauma consults
- Trauma associated Mortalities
- Triage under or over scored
- Complications
  - MI, PE, VTE ,CVA, Pneumonia, Hemorrhage, UTI,VAP, fall(and any others that should arise
- VTE prophylaxis within 24 hrs
- Delay to OR
- Delay to CT (>2hr)
- Delay in consult
- ED LOS (<4 hr)
- Field triage (destination protocol)
- Time to rehab
- Organ donation

LGH PIPS processes include other key stakeholders such as: pre-hospital, transferring facilities, and rehabilitation. PIPS reviews are include fact-finding process providing best outcome results for patients. Key indicator rates may change over time as new issues arise or as current ones resolve. Additionally, ongoing education and orientation of staff encourages best practice some review of processes are occasionally needed. Ongoing reviews are done: concurrently in safety huddles in the appropriate areas, through individual conversations, and newsletters when there are general areas that require re-thinking and review. Additionally, forms are reviewed with individual staff when appropriate to provide loop closure.



## St. Paul's Hospital

The PHC/SPH site PIPS Trauma Program involves a process of:

On- going trauma specific data collection from sources such as BCTR – Pre registry and SPH specific trauma reports, generated monthly from PHC /SPH EMS. Some of the data elements collected that are rigorously reviewed for QA and QI purpose include:

- Trauma acuity for all moderate and major trauma patients.
- CTAS levels 1-4 on trauma admissions
- Field Triage: (patient with major anatomic injuries admitted at SPH level 3 Trauma Center)
- Trauma Team Activations (TTA)
- Missed TTA
- Trauma consults
- Missed trauma consults.
- All trauma associated mortalities
- All trauma associated complications
- Presence of mental health issues
- Drug and alcohol misuse trauma admissions
- Presence of intoxication on admission
- Admitting and discharge triage codes
- Primary admission and discharge diagnosis
- Arrival mode
- ED LOS
- AHLOS

The data that is collected from the various elements is reviewed and analyzed by the Trauma Coordinator including all TTA's, Trauma consults and major trauma ISS > 12 .

Specific factors, outlier cases or discrepancies are flagged and presented to the PHC Trauma Physician Lead. Any case or factor deemed worthy for further review is presented to the PHC/SPH Trauma Advisory Committee (PHCTAC) and follow up can vary from conversation with Department Heads, involved clinicians or individuals.

All trauma related mortalities are reviewed by the physician members of the PHCTAC and presented at the committee meetings quarterly, with outcome measurements.

Findings and results from data collection are used for quality assurance and quality improvement purpose. Discussions and recommendations are focused on evaluation of best practice for trauma care management of the difficult SPH patient.

Other factors continuously assessed are: impact of flow patterns, delays in services, outcomes, educational needs, staffing patterns.



## 16. Appendix C – Site Mortality Review Processes

### **BC Children's Hospital**

All trauma mortalities are reviewed by a multidisciplinary group in Trauma Morbidity and Mortality Rounds, which are held every two months. A report is generated summarizing the mortality round, submitted to the hospital's Mortality Review Committee, and then forwarded to the Medical Advisory Committee. Most trauma mortalities are also reviewed in multiple Mortality Rounds by the subspecialty group and the department/unit where the death occurred. The Trauma Program leaders are often invited to these rounds. BC Children's also oversees, on an ad hoc basis, reviews of mortalities or morbidities or identified concerns, on pediatric trauma patients across the system and the province.

### **Vancouver General Hospital**

Trauma mortalities at VGH are reviewed on several levels. Initial review of the case is done by the Trauma Program Coordinator. Following that review, the case is discussed with the attending trauma physician to gather additional information. These cases are discussed at the monthly trauma program M&M meetings. Trauma Program M&M rounds are multidisciplinary and include case presentations by the residents and trauma coordinator; discussions around care and any identified issues are held, with a plan for loop closure. Trauma mortalities at VGH are also discussed in General Surgery Division Morbidity and Mortality Rounds. All mortalities are reported and reviewed monthly at the Regional Trauma Program Meeting. The RTP mortality PIPS process addresses any regional or system level issues.

### **Lions Gate Hospital**

LGH reviews morbidity and mortality cases include a collaborative evaluation and review by all disciplines involved, and those used as experts. Examples of adverse events include unanticipated medical outcomes leading to harm or even death, significant medication errors, or patterns of smaller events that warrant investigation. Any adverse event triggers a formal patient safety review to learn everything possible to prevent harm to future patients.

LGH Trauma and Emergency Department (ED) conducts monthly reviews on all morbidities and mortalities within 48 hours of Emergency Department admission. The M&M review process includes all members of the team involved in the patient's care in the review. Emergency Physicians or Trauma Team Leaders (TTLs) present M&M cases monthly utilizing research to support practice updates or changes. M&M rounds provide learning opportunities for the entire inter-professional team. Any trauma related morbidity or mortality cases are reviewed in real time by the Trauma Nurse Clinician and Trauma Team Leader, ensuring quality reviews/changes take place immediately.



### **St. Paul's Hospital**

All trauma mortalities are reviewed by the members of the PHC Trauma Advisory Committee quarterly. Discrepancies or presenting problem are addressed for further discussion, evaluation and followed up with the appropriate department head, or personally with the involved clinician.

Reports generated from the Pre Trauma Registry and BCTR such as trauma complications and mortalities (that fit the registry inclusion criteria) are all reviewed and analyzed. All complications or mortalities are also reviewed at the Regional Program level if there is concern and review worthy at the Regional level.

## 17. Appendix D- Complication Definitions

### **Deep Vein Thrombosis**

The BC Trauma Registry defines a deep vein thrombosis as the formation, development, or existence of a blood clot or thrombus within the vascular system, which may be coupled with inflammation. The patient must be treated with anticoagulation therapy and/or placement of a vena cava filter or clipping of the vena cava.

### **Drug and Alcohol Withdrawal**

The BC Trauma registry defines drug and alcohol withdrawal as a set of symptoms that may occur when a person who has been habitually drinking too much alcohol or habitually using certain drugs (e.g. narcotics, benzodiazepine) experiences physical symptoms upon suddenly stopping consumption. Symptoms may include: activation syndrome (i.e., tremulousness, agitation, rapid heartbeat and high blood pressure), seizures, hallucinations or delirium tremens.

### **Pneumonia**

The BC Trauma Registry defines pneumonia as a pneumonia that developed during the hospitalization at the accepting facility. The definition includes ventilator assisted pneumonia (VAP) and excludes aspiration pneumonia.

In recognition of the need to improve pneumonia rates at VGH, the trauma program has partnered with various inpatient high acuity units to implement the RESPIRE protocol. The RESPIRE protocol targets the high acuity patient population with chest trauma, head injuries. Pneumonia is an uncommon and generally decreasing complication at other sites.

### **Pulmonary Embolus**

The BC Trauma Registry defines a lodging of a blood clot in a pulmonary artery with subsequent obstruction of blood supply to the lung parenchyma. The blood clots usually originate from the deep leg veins or the pelvic venous system.

### **Unplanned Intubation**

The BC Trauma Registry defines unplanned intubation as the patient required placement of an endotracheal tube and mechanical or assisted ventilation because of the onset of respiratory or cardiac failure manifested by severe respiratory distress, hypoxia, hypercarbia or respiratory acidosis. In patients who were intubated in the field or emergency department, or those intubated for surgery, unplanned intubation occurs if they required reintubation > 24 hours after extubation.

### **Urinary Tract Infection**

The BC Trauma Registry defines a urinary tract infection as an infection anywhere along the urinary tract. It excludes asymptomatic bacteriuria and "other" UTIs that are more like deep space infections of the urinary tract.





## 18. Appendix E – Patient Flow Initiatives

### Vancouver General Hospital (Vancouver Acute)

Patient flow initiatives have been implemented across VCHA to reduce ED LOS. The Patient Flow and Access website <http://vch-connect.vch.ca/programs/pfavan/Pages/default.aspx> details all initiative implemented to enhance patient flow.

The Every Minute Counts initiative is designed to improve patient flow by facilitating earlier and timely discharges and reduces the amount of time a unit or ward bed sits empty so that patients can be moved out of the ED faster.

An educational initiative across Vancouver Coastal Health is designed to educate all staff across VGH, UBC Hospital, and GF Strong to understand their role in patient flow. Additionally, all patient care coordinators and charge nurses can receive additional training to understand and incorporate the use of Capacity Planning Tools, the Bed Management System, Transport Tracking, and the ED Regional Dashboard tools into their daily workflow.

The Regional Bed Management System has been implemented in order to standardize and automate acute patient and bed flow. The patient flow and bed management system provides clinical staff with decision-making capability pertaining to the supply and demand of beds. Status is tracked through real-time bed boards with information to coordinate patient care.

### Lions Gate Hospital

Lions Gate Hospital continues to have patient flow and capacity challenges. In response to these ongoing challenges, LGH has implemented several flow and capacity initiatives:

- GP in LGH ED with the focus on identifying seniors above age 70 who provide assessment and evaluation of services to foster discharge out of ED and back home. This initiative utilizes the expertise of a GP with a focus on geriatric care. The ED GP liaises with home health practitioners, the Geriatric Triage Nurse (GTN), and Discharge Coordinator (DCC), and community GP to provide the supports requires facilitating a safe discharge home.
- ED Inter-professional Care (ICare) rounds occur daily and focus on key medical and functional goals for all admitted patients in ED (this would include any trauma patients)
- Inpatient Units "Operation Uplift" encompasses multiple key strategies focused on quality of patient care, and reaching quality targeted discharge targets each day across all units, Team Care, and completing 48/6, and plan of care.
- Long Length of Stay initiative/refresh - reviewing and taking action for patients greater than 30 day LOS.
- Daily bed meetings are conducted with all inpatient Managers and Patient Care Coordinators (PCC) and are structured with a focus on real time actions of PCCs/Managers to foster timely pull of ED patients to inpatient units, SCOUT, or ICU and PAR to inpatient surgical beds etc. This meeting focuses on identifying areas of patient flow concerns, real



time action, and evaluation in the afternoon bed meeting. This also highlights patients that require repatriation within Coastal Rural sites, as well as outside the VCH Region (Northern Health, VIHA, Fraser Health)

- LGH has an Overcapacity protocol (OCP) 1 with thresholds established and actions for OCP 1, 2 and 3 (under review and will undergo revision in the near future), this includes placing stable patients in transition spaces (hallways or lounges).

## St. Paul's Hospital

The patient population it serves has the highest incidence of intoxication/ substance abuse and mental illness. More than 2/3 of trauma patients are admitted with a head injury due to a fall or assault and neurological assessment becomes very obscure. Since SPH does not have a neuro/surgical unit, it has developed strong partnerships with Trauma Level 1 Centre for rapid consultation and transfer of patient when necessary. 64% of these patients do not require surgical intervention therefore not necessarily transferred to a level I, patients are too unstable to be admitted to a ward and not ill enough to be in ICU. These patients are kept in ED for close observation and further diagnostic imaging - until cleared neurologically followed by appropriate discharge disposition from ED. In order to temporarily accommodate the overflow due to this fact, SPH has a DTU area (in ED) which accommodates the fairly stable short stay ED patients - therefore ED LOS is skewed. DTU is not the solution for these patients and administrative leaders are discussing new solutions with the redevelopment plan of the hospital.

With the high incidence of intoxication / substance abuse trauma cases admitted with a GCS < 13, neurological and medical assessments are masked and delayed by the effects of alcohol and drugs, therefore the patients remain in ED for close observation and subsequently neurologically and medically cleared before ED disposition. This has presented an increase in challenges in ED LOS and patient flow, where the leadership is considering alternatives in the redevelopment plan.

Partnerships between Emergency Department with Mental Health and Addiction, ED /Mental Health working group, Psychiatry, Social Work, and the addition of a Psychiatric Assessment Nurse (PAN) in the ED, has helped assist with the patient flow of the mental illness, alcohol and substance abuse patients once medically cleared from their trauma injury.



## **19. Appendix F: Injury Prevention Action Mini-Grants**

### **Flatspot Longboards – Grant amount \$500.00 – Grant letter**

Flatspot hosts free educational sessions where they teach children and young adults how to safely stop on their skateboard/longboard. They also educate youth on identifying your limits and wearing safety gear such as helmets, gloves and kneepads. This program is currently in place but they would like the additional funding to increase the number of classes from once a month to twice a month. Furthermore they would like to provide helmets to those who do not have access to one and water for all participants. The reason we chose to use the granting letter was due to the low \$ amount and the fact that this can be viewed as more of a donation to an already existing program.

### **HUB Cycling- Grant Amount \$1000 – Grant Letter**

HUB cycling is a charitable organization that provides cycling education and awareness. They would like to create a social media campaign focused on “dooring” and the importance of having front and rear lights on your bike. The reason we chose a granting letter is because the initiative is not directly dealing with a vulnerable population.

### **Silver Harbour Seniors’ Activity Centre – Grant Amount: \$1500.00 – CHSA**

Silver Harbour is a non-profit organization that provides recreational programs and social services for seniors on the north shore. Silver Harbour would like to host a number of events over 2016 about fall preventions and physical exercise. The reason we chose a CHSA is because the participants would be considered a vulnerable population and may be associated with Vancouver Coastal Health.

### **G.V. Counselling and Education Society for Families – Grant Amount: \$1000 – CHSA**

G.V. Counseling is a non-profit organization that provides clinical counselling and practical psycho-educational programs to mainly Farsi-speaking communities. This organization would like to host an 8 week group that focused on parenting challenges, psychosocial adaptation, youth addiction and many others. The reason we chose a CHSA is because participants may be associated with Vancouver Coastal Health.

### **Hollyburn Family Services Society – Grant Amount \$1000 - CHSA**

Hollyburn is a non-profit organization that addresses issues such as youth and senior homelessness and domestic violence. Hollyburn would like to host an event titled “Fit 4 Defence” which would educate seniors on self-defence and harm reduction. The reason we chose CHSA is because the participants would be considered a vulnerable population and may be associated with Vancouver Coastal Health.

## 20. Appendix G: AIS Codes for Quaternary Cases

### AIS CODES FOR QUATERNARY CASES

#### **Spinal Cord Injury**

640200 - 640236 or

640240 - 640276 or

640400 - 640428 or

640440 - 640468 or

640600 - 640628 or

640640 - 640668

#### **Pelvic Fracture**

856162, 856171, 856163, 856172, 856164, 856173

#### **Burn ( $\geq 20\%$ TBS)**

912018, 912020, 912024, 912026, 912030, 912032

#### **Liver/Pancreas Injury**

541826, 541828, 541830, 541840, 542826, 542828, 542830, 542832



## Appendix H: BC Coroners Service Geographical Definitions

**Fraser Region:** Burnaby to the Coquihalla Highway summit, east to Manning Park and north to Jackass Mountain bordering Merritt.

**Interior Region:** Includes the region north to 100 Mile House and Blue River, east to the Alberta border, south to the USA border and west to the Manning Park gate, including Ashcroft, Lytton and Lillooet.

**Island Region:** Includes all of Vancouver Island, the Gulf Islands and Powell River.

**Northern Region:** Includes the region north, east and west from 100 Mile House to all Provincial borders, and Haida Gwaii.

**Metro Region:** Includes Sunshine Coast, Sea to Sky Corridor, North Shore, Vancouver, UBC, Richmond, and Delta.