

Regional Trauma Annual Report 2009-2010



A Report on the Activities of the Vancouver Coastal Health
Regional Trauma Program for Fiscal Year 2009-2010 (1 April 2009-31 March 2010)

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Acknowledgements

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 managers and staff from all of the contributing hospital sites (VGH, LGH, SPH and BCCH). For more information on the BCTR, please contact Ms. Nasira Lakha, Manager BCTR, at Nasira.Lakha@vch.ca and/or Ms. Dori Williams, BCTR Registrar, at Dori.Williams@vch.ca.

Executive Summary

This is the third published Annual Report from the VCH Regional Trauma Program and will reflect injury epidemiology data spanning the years 2005 to 2010 for the major trauma population.

This is an abbreviated report, as the VCH Trauma program will be undergoing a full Trauma Association of Canada (TAC) Accreditation process in the first half of 2011. The document preparation for the accreditation process will provide a fulsome and detailed overview of the evolution of the Trauma program since our last successful TAC Accreditation in 2005. The prepared document will reflect the priorities, milestones and maturation of the program within an evolving and changing VCH health care system. As such, only brief narratives will be provided with the data to assist with interpretation.

A copy of the prepared report will be available following the Accreditation process.

Regards

Dr. Ross Brown & Ms. Catherine Jones
VCH Regional Trauma leaders

BC Trauma Registry Data Notes

Please note the following in regards to the data content and formatting of the report's figures:

- All data was run on patient separation date (as opposed to incident date / admission date).
- Note years of missing data if applicable at the bottom of each figure, for example:
Data for BCCH not included for fiscal year 2005/2006.
- Separations beginning fiscal year 2007/2008 and onwards have increased in part on the basis of new Inclusion / Exclusion criteria (implemented April 1, 2007 separations):
 - Incident time to admission time interval has increased from 7 days or less to 21 days or less (NOTE: spine injured patients have always been included regardless of the time interval from incident to admission),
 - All transfers in and out of a BC Trauma Registry Facility are now included,
 - Length of Stay (LOS) criteria has increased from ≥ 3 days to >48 hours (NOTE: all pediatric patients (age ≤ 15) are now included regardless of LOS).
- All figures eliminate the 65 years and over with isolated hip fracture population.
- Data in this report will contain some overlap in patient numbers (patients captured more than once) as transfers occur between the four Trauma Registry sites within VCH.

Injury Epidemiology

Death from Injury

BC has one of the lowest death rates from injury in Canada based on last census data (Health Canada, Figure 1.) Unintentional injury (e.g. falls, MVC, etc.) accounts for nearly two thirds of all deaths in BC with suicide and homicide accounting for another one third (Figure 2). VCH has the lowest death rate due to MVC in BC (Figure 3).

Figure 1: Injury Death Rates in Canada (*Public Health Agency of Canada, 2005*)

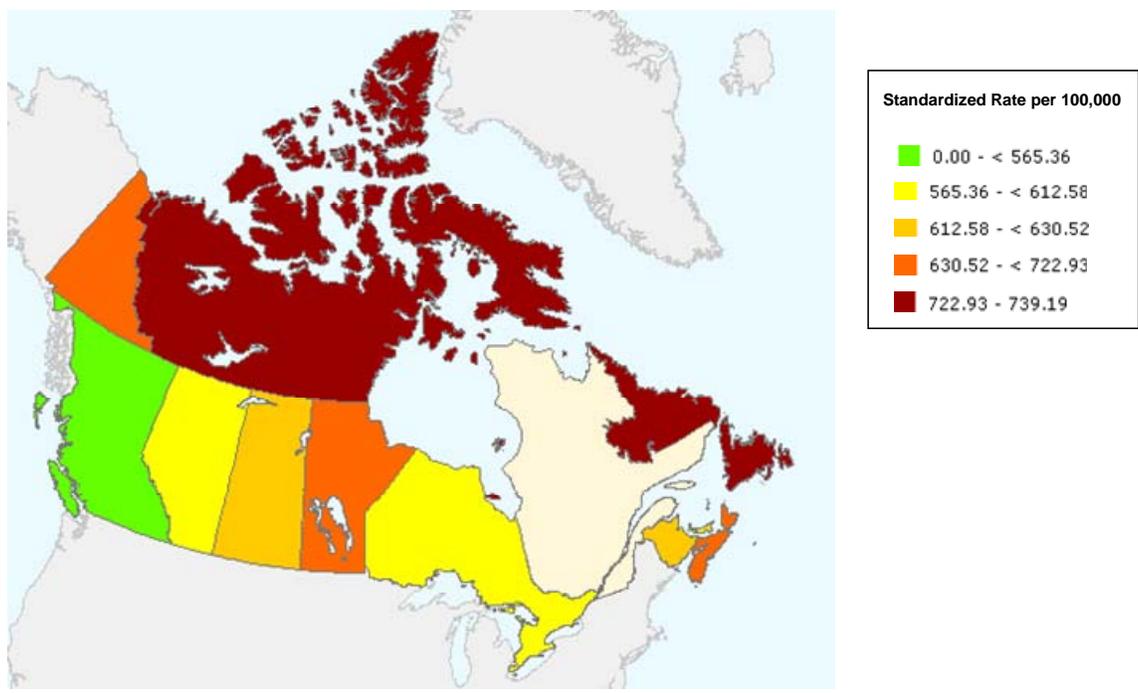
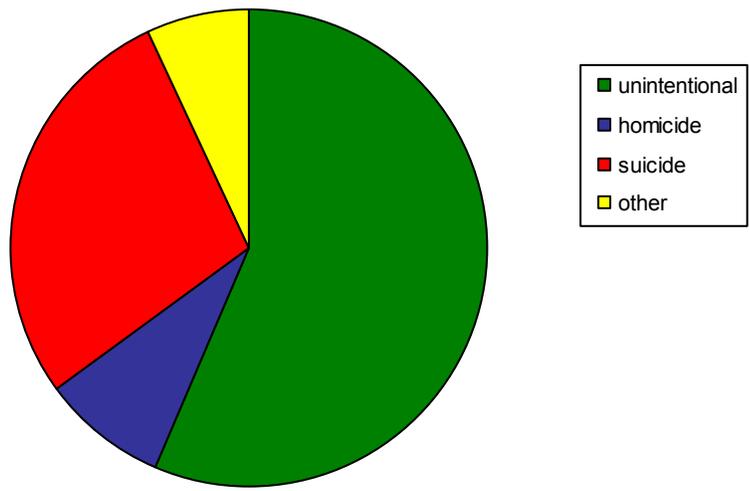
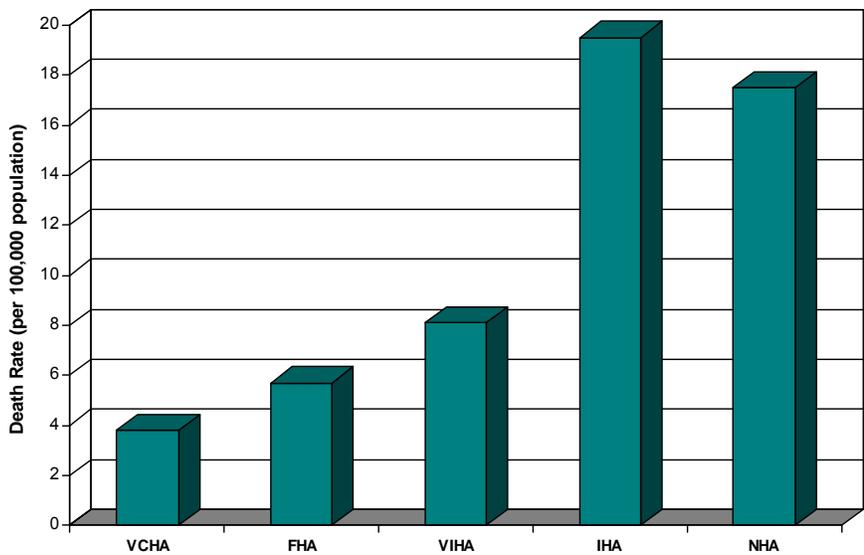


Figure 2: Injury Death Class Type in BC (BC Coroner 2009 Annual Report)



Note: "Other" deaths may become otherwise classified as BC Coroner investigations progress,

Figure 3: Motor Vehicle Incident Death Rate by Health Authority (BC Coroner 2009 Annual Report)



Regional Trauma Services Activity

Caseload Description: 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 (<10%) for this type of injury (Figure 4).

Unintentional Injury: The VCH Trauma Program predominantly serves a population sustaining blunt force unintentional injury, consistent with the experience of most Canadian Centres. Falls and motor vehicle collisions account for the majority of hospitalized trauma patients. Admissions for falls, especially in the elderly, continue to be the reason for a large percentage of trauma admissions over the last 5 years. (Figures 5, 6)

Figure 4: VCH/BCCH Injury Caseload by Intent 2009/2010- Unintentional vs. Intentional (BCTR)

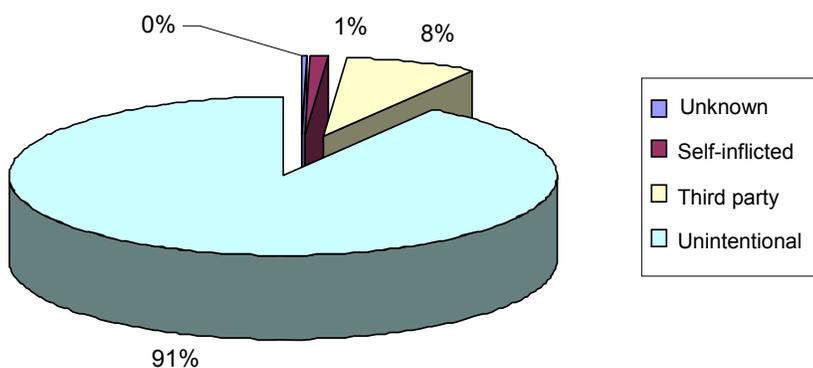
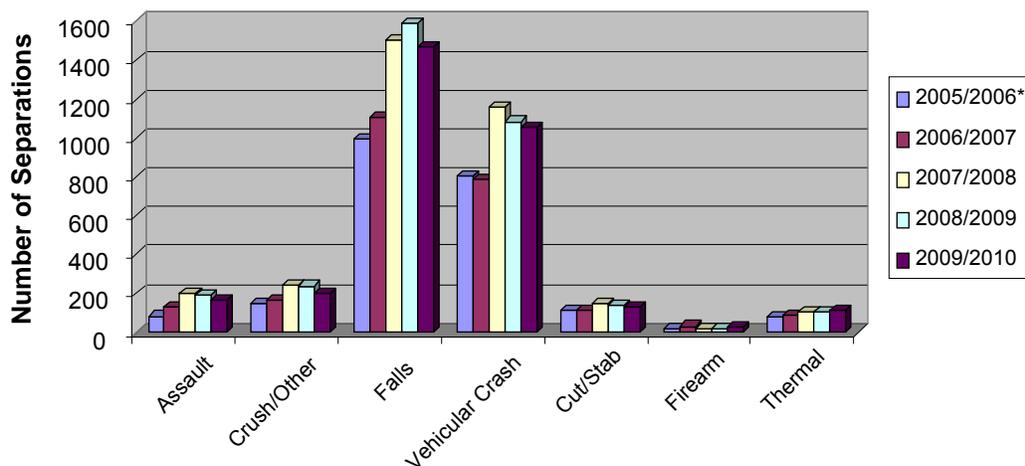


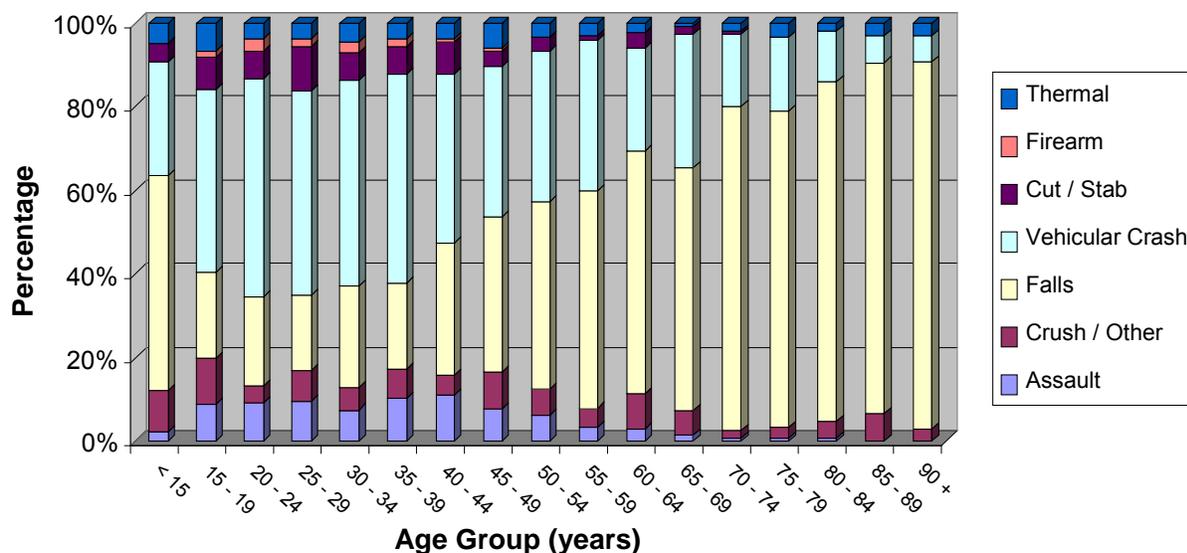
Figure 5: VCH/BCCH Mechanism of Injury by Fiscal Year (BCTR)



Note1: Data for BC Children's Hospital not included for Fiscal Year 2005/2006.

Note2: Apparent increase in separations beginning in 07/08 due to changes in BCTR patient selection criteria (see page 5)

Figure 6: VCH/BCCH Mechanism of Injury by Age Group 2009/2010 (BCTR)

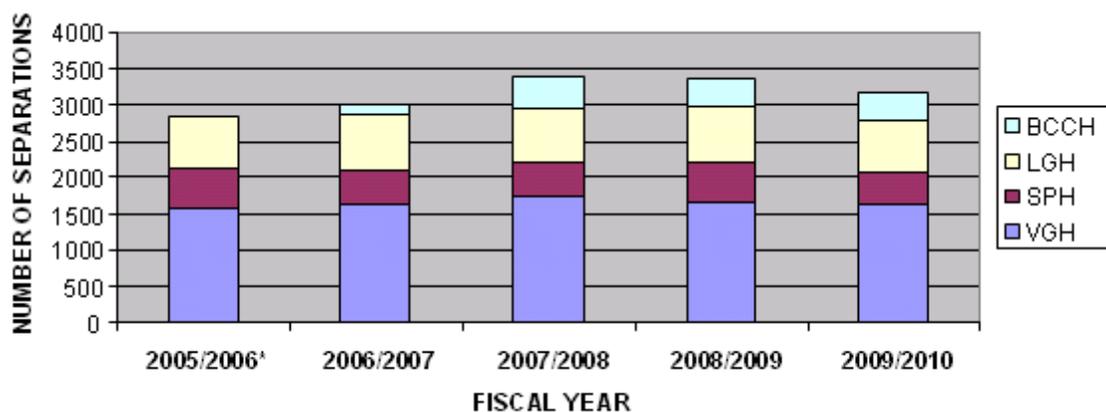


Common mechanisms of injury vary according to patient demographics with falls predominating in the elderly and motor vehicle collisions predominating in the early and middle years of life.

Trauma Caseload

1. **Total Trauma Caseload (Admitted patients only):** The total regional trauma caseload has been relatively flat over the last 5 years consistent with declining national injury trends offsetting the growing population (Figure 7). Population and current trauma caseload are consistent with a sustainable independent regional trauma system in VCH. There is currently no consistent data collection for ambulatory trauma care visits within VCH and BC and therefore no reporting on this activity.

Figure 7: VCH/BCCH Total Trauma Separations by Fiscal Year (BCTR)



Note*: Data for BC Children's Hospital not included for Fiscal Year 2005/2006

2. **Major trauma caseload:** VCH uses several definitions for major trauma depending on circumstance, including:
 - a. VCH Decision Support Caseload reporting: Major Clinical category (MCC)
 - b. BC Trauma Registry Caseload reporting: ISS>15
 - c. National Trauma Registry Caseload reporting: ISS>12

This major trauma caseload in VCH (as measured by Injury Severity Score or ISS of >15) has been stable with approximately 750 cases a year in the region including pediatric cases. The majority of adult major trauma patients (550 cases) are admitted to VGH, another ~150 to LGH and SPH along with the ~50 pediatric cases to BCCH (Figures 8 and 9).

3. **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 (Figures 8 and 9). 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.

Figure 8: VCH/BCCH Major and Non-major Trauma Caseload by Site 2009/2010 (BCTR)

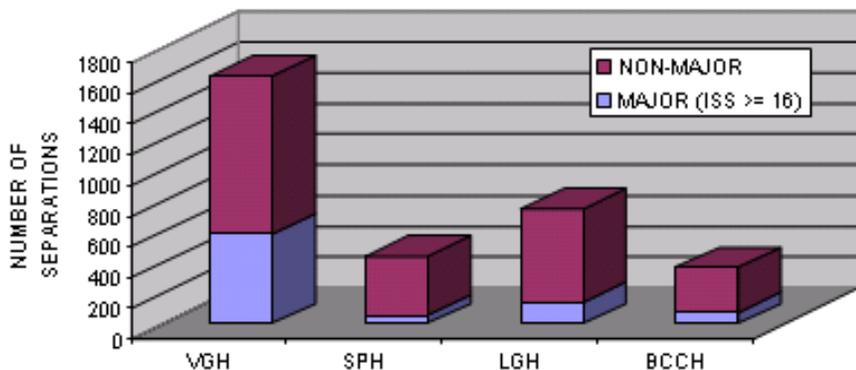
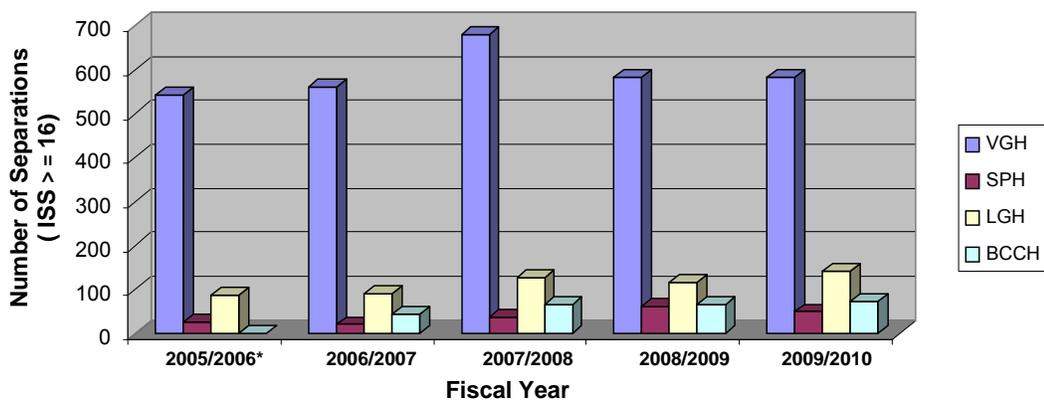


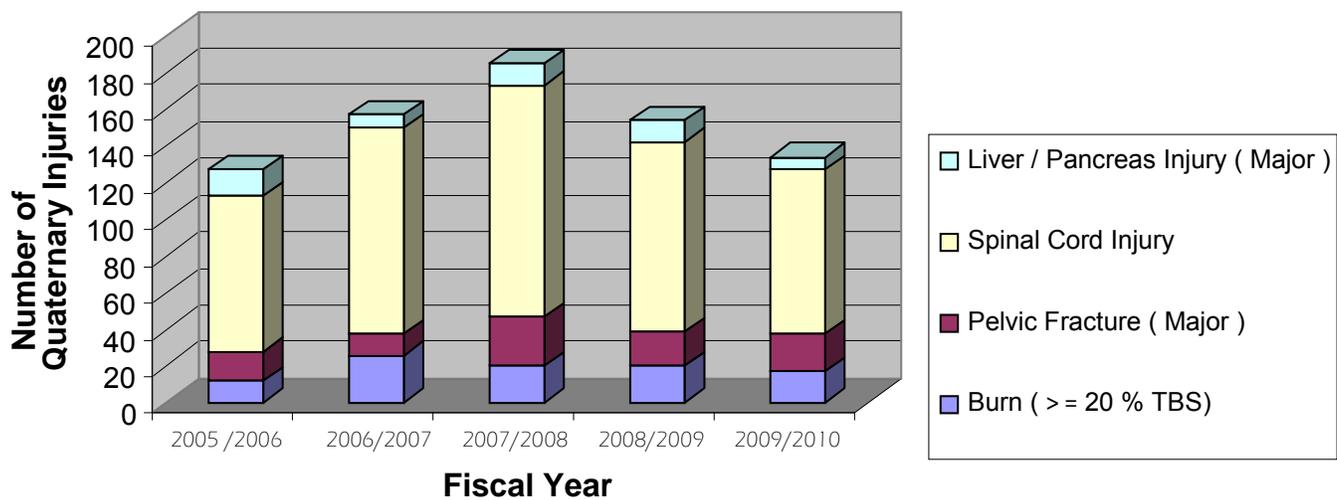
Figure 9: VCH/BCCH Separations with Injury Severity Score > = 16 by Fiscal Year (BCTR)



Note*: Data for BC Children's Hospital not included for Fiscal Year 2005/2006

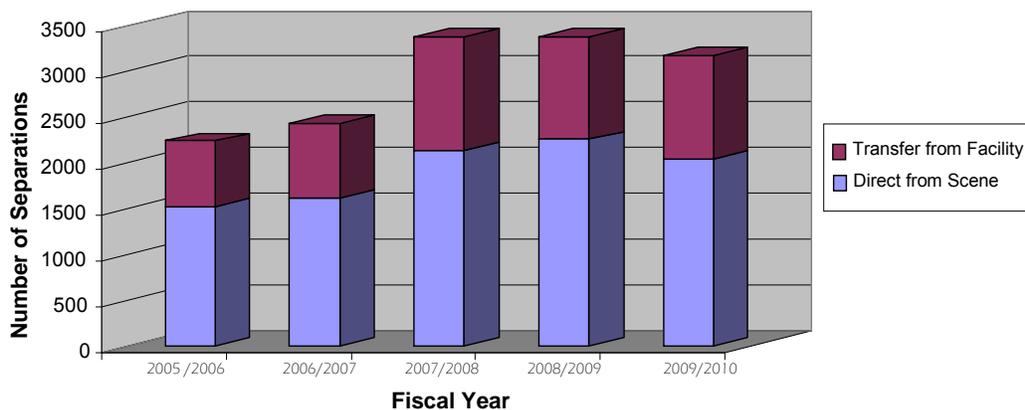
4. **Quaternary trauma caseload:** Some low incidence, high acuity or complex injuries are uniquely provided by the adult (VGH) and pediatric (BCCH) provincial trauma centers. This subset of the tertiary caseload, or quaternary care, includes spinal cord injury, burns, and endovascular services, along 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 10 and account for a large proportion of major trauma.

Figure 10: Quaternary Trauma Caseload by Fiscal Year - VGH (BCTR)



5. **Patient origin:** The majority of trauma patients admitted to the regional trauma system arrive by direct transport from the scene of injury by BCAS ground transport. About one third arrive by transfer from another institution (Fig 11). Similarly, the majority of admissions (2/3rds) to VCH trauma centres are patients who reside within the health authority boundaries. Some are transferred in for the quaternary services provided by VGH while others are injured while traveling or working within the VCH boundaries (Fig 12),

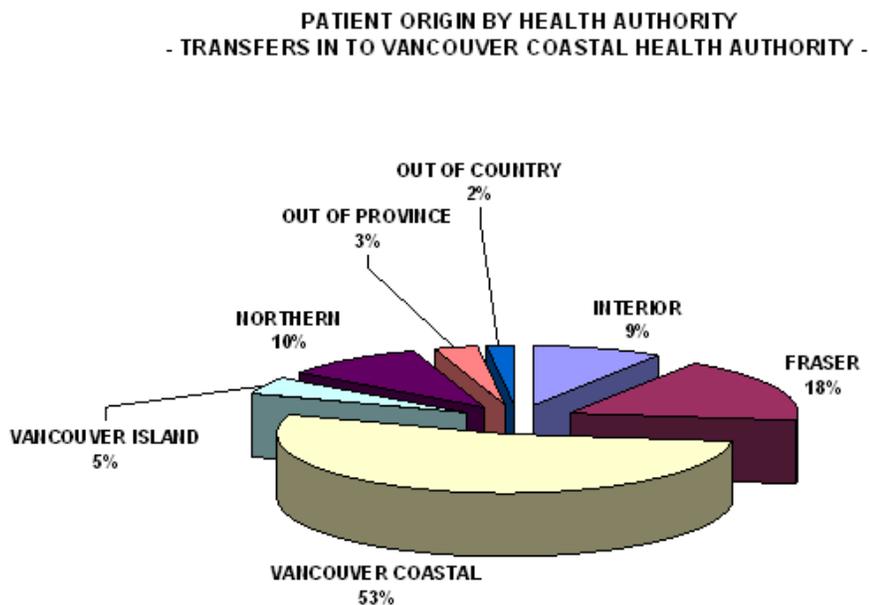
Figure 11: VCH/BCCH Patient Origins - Scene vs. Transfer (BCTR)



Note 1: Data for BC Children's Hospital not included for Fiscal Year 2005/2006

Note 2: Transfers in to VCH Trauma Registry Facilities include cases for which the interval from injury date to transfer date is within 7 days (for 2005/2006 and 2006/2007), or within 21 days for 2007/2008, 2008/2009 and 2009/2010 (spinal cord injured patients are included regardless of time interval). This explains the apparent jump in patient separations between 06/07 and 07/08.

Figure 12: Patient Transfers into VCH with Origins by Health Authority (BCTR)



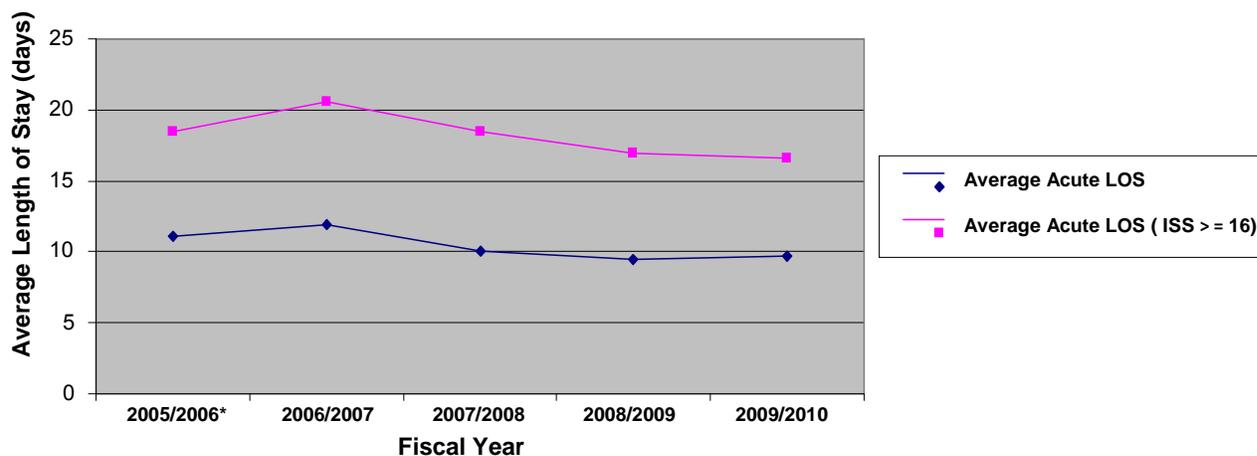
Performance Improvement and Patient Safety (PIPS)

The VCH 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 implemented system-wide (see web site - www.vch.ca - for full list) and performance is monitored through a variety of process and outcome measures. This rigorous program relies on the vision and hard work of the site Trauma Program Managers, aided by the site Trauma Directors and supported by the BC Trauma Registry.

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 13;
2. Average Length of stay (Adjusted to Injury Severity Score) Figure 13;
3. Average ICU length of stay Figure 14;
4. Alternate level of care (ALC) average LOS (not reported);
5. Discharge disposition (an indicator of functional status at discharge) Figure 15;
6. Crude mortality rates (by ISS) Fig 16; and
7. Risk adjusted injury mortality (TRISS methodology) 17 and 18.

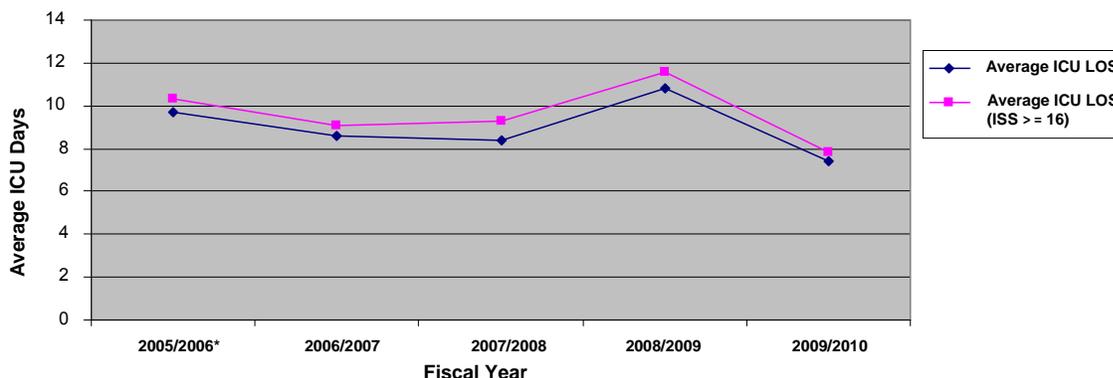
Figure 13: VCH/BCCH Average Length of Hospital Stay - ALOS (BCTR)



Note 1: Data for BC Children's Hospital not included for Fiscal Year 2005/2006
Note 2: ALOS is excluding Alternate Level of Care Days (ALC)
Note 3: 65 years and over with isolated hip fracture population removed

The ALOS is trending down and is a reflection of the significant efforts being placed on patient flow along the continuum of care by VCH hospitals. In particular, access to rehabilitation, convalescent care and community services has been enhanced (see accreditation documents).

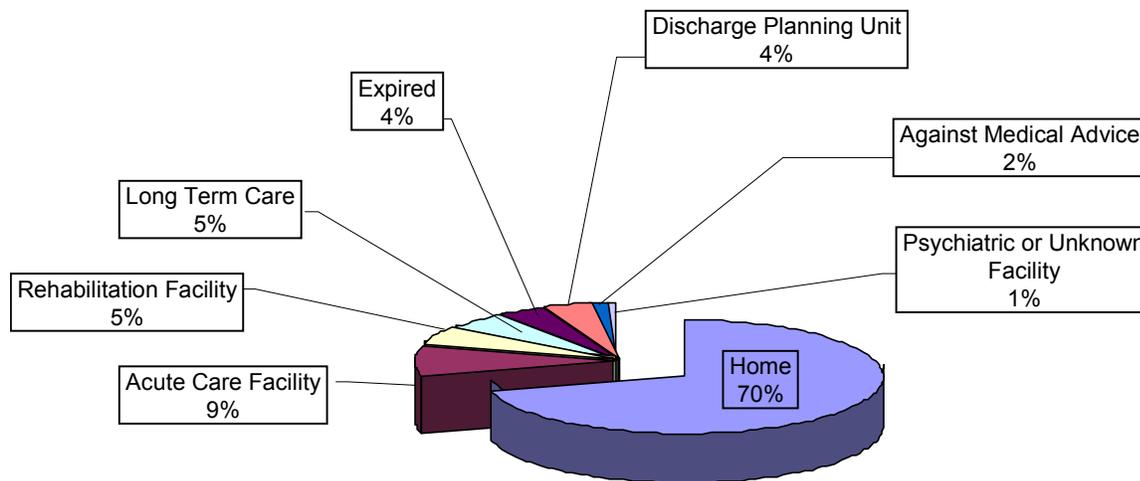
Figure 14: VCH/BCCH Average ICU Length of Stay



Note*: Data for BC Children's Hospital not included for Fiscal Year 2005/2006

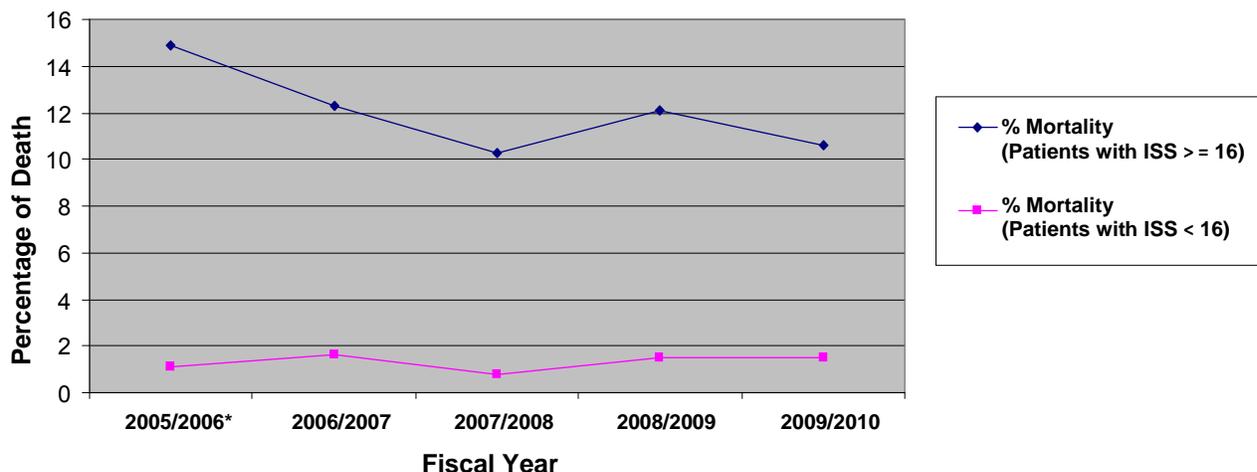
The significant improvement in ICU ALOS is the result of major efforts by the Regional Critical Care Council to implement processes and procedures to reduce length of stay such as tracheostomy weaning pathways and expedited OR access for tracheostomy.

Figure 15: VCH/BCCH Discharge Disposition 2009/2010 (BCTR)



As noted in the 2006/2007 Annual Report, the vast majority of trauma patients are discharged home which is as expected given the majority of our patients have an ISS <16. Still, only 5% (down from 8% reported in 06/07) of our patients are discharged to rehabilitation facilities while many more are transferred to other acute care facilities or remain in acute care beds within VCH. Please refer to a more detailed discussion in the “Regional Rehabilitation” section of the 2011 TAC Accreditation Document.

Figure 16: VCH/BCCH Crude Patient Mortality by Injury Severity Score (ISS) (BCTR)



Note 1: Data for BC Children's Hospital not included for Fiscal Year 2005/2006
Note 2: 65 years and older with isolated hip fracture population removed

Hospital mortality rates for trauma patients with an ISS less than 16 have varied little over the last five years (reported above) and historically over 10 years. For the cohort of more seriously injured patients however (ISS Scores >= 16) there has been a trend towards improved mortality over the past 5 years. Risk or acuity adjusted mortality rates shown below give a more accurate picture of performance (Figures 17 and 18).

Risk adjusted mortality is calculated utilizing Trauma Registry Injury Severity Score (TRISS) methodology as a benchmarking tool to define performance against an historical international benchmark, the Major Trauma Outcome Study (MTOS). TRISS uses the anatomic Injury Severity Scale (ISS) Score, the physiologic Revised Trauma Score (RTS) and Patient Age to calculate individual patient survival probabilities.

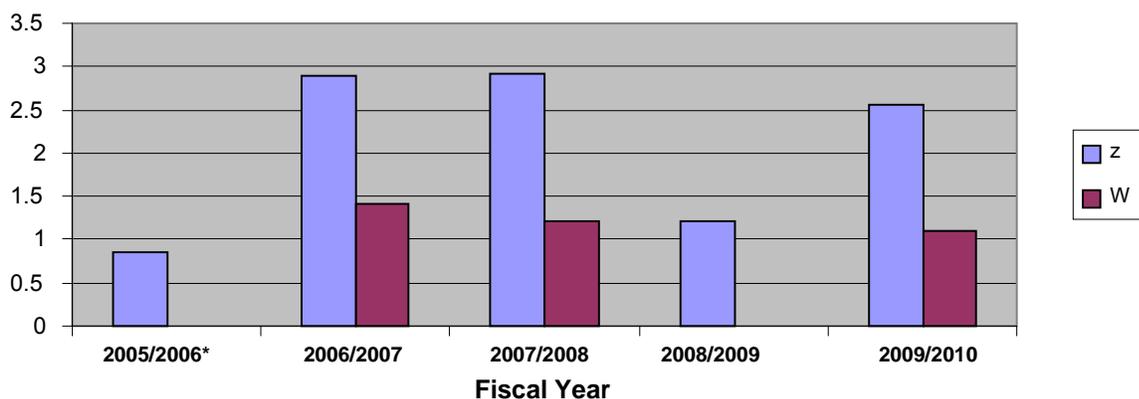
The TRISS z statistic indicates whether the number of observed survivors in the trauma system exceeds (+) or is less than (-) what would be predicted based on patient outcomes in the MTOS.

As can be seen for the following charts, VCH z scores are positive for all years indicating trend to improved survival over predicted outcomes (Figures 17 and 18)

The TRISS W statistic is reported when the z score is either >1.96 or < -1.96 indicating statistical difference from MTOS norms (+ is better, - is worse) The W score indicates the number of additional (unpredicted) survivors (+) or deaths (-) per 100 trauma admissions.

The system wide data show that survival is greater than predicted for patients with severe blunt injury over time with a relatively consistent number of unexpected survivors. The penetrating and paediatric trauma caseload is too small to reliably report performance.

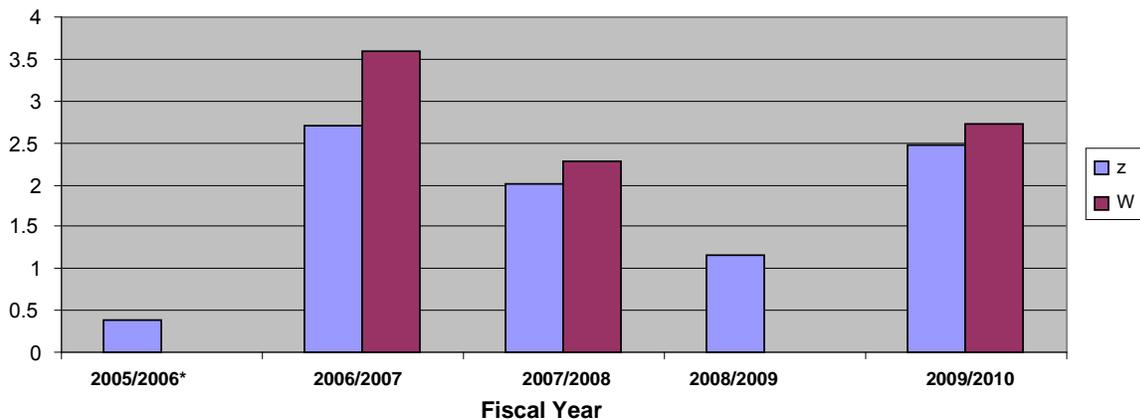
Figure 17: VCH/BCCH Adult Blunt z and W scores (All ISS) (BCTR)



Note 1: Data for BC Children's Hospital not included for Fiscal Year 2005/2006

Note 2: 65 years and older with isolated hip fracture population removed

Figure 18: VCH/BCCH Adult Blunt Injury z and W scores (ISS > = 16) (BCTR)



Note*: Data for BC Children's Hospital not included for Fiscal Year 2005/2006

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 first ever civilian based Canadian Forces Trauma Training Centre. UBC related trauma-training courses include:

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

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. Courses delivered include:

- Advanced Trauma Life Support (ATLS)
- Trauma Nurse Core Course (TNCC)
- Definitive Surgery for Trauma Care (DSTC) Course

Regional Trauma Rounds: Regional Trauma Rounds continue monthly with rotating presentations by each of the major VCH trauma centres and are available through videoconferencing to all interested BC hospitals.

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 work at VGH and are periodically deployed to Afghanistan or to other missions.

Injury Prevention

VCH participates in a provincially mandated injury prevention program. Readers are encouraged to refer to the comprehensive description of Injury Prevention strategies in the 2011 TAC Accreditation document.

The BC Trauma Registry (BCTR)

The BCTR is a province-wide program, funded by the Provincial Health Services Authority and administered through VCH. The BCTR is currently operational in 12 sites around the province with its leadership collocated with Trauma Services at VGH.

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. This comprehensive dataset on the most severely injured of our patients is utilized extensively for program reports, system planning, performance improvement, research, injury prevention, resource utilization and patient care. As such it is an indispensable component of the hospital, regional and provincial trauma programs.

The BCTR contributes data to the National Trauma Registry (CIHI) on an annual basis. As well, the registry works in close collaboration with the local burn, spine and orthopedic registries.

Please refer to the 2011 Trauma Association of Canada Accreditation documentation to learn more of the BCTR.

Summary and the Way Ahead

The Vancouver Coastal Health 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 in VCH, and the delivery of first-rate academic trauma programs. The maturation of our trauma system will continue as we move forward with projects such as the "Lower Mainland Integration Plan", the American College of Surgeons- Trauma Quality Improvement Program, and the Canadian Institute for Health Information- National Ambulatory Care Reporting System. We will strive to improve inter and intra-regional site communication and operations such as secondary transfers and inter-facility QI processes all in an effort to optimize the care we provide for our trauma patients. In addition, as VCH continues to regionalize and rationalize decision making processes, our Regional Trauma Working Group will be prepared and well positioned to transition from its current strategic role to a more operationally driven Regional Program following in the footsteps of the newly formed regional Mental Health and Cardiac Programs.

The regional trauma program leaders would like to personally thank the site leaders for their commitment and hard work as well as VCH 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 as manifest by the superb outcomes reported here and which stand alongside the best reported nationwide.