Message from the Trauma Director

In this yearly report of our activities, our goal is to share detailed information about the state of trauma at St. Michael’s Hospital (SMH). Care for the injured patients is a collaborative, coordinated, interdisciplinary effort involving a large group of people that work closely together to deliver patient care. It is not unlike the coordination we witness when going to the symphony, where all the musicians together create something that is greater than the sum of its parts. The major difference - lives are on the line and the “symphony” needs to be assembled at a moment’s notice, any time of the day or night.

This team includes experts in emergency care, trauma, orthopedics, neurosurgery, rehabilitation and more than a dozen other specialties. These specialists work together to provide the injured with the most advanced care available. We continue to innovate in trauma care through cutting-edge trauma research in patient safety, simulation and education.

The Trauma Program at SMH provides the region with access to high quality trauma care and leadership. It pushes the envelope in all of these aspects - through the rapid translation of evidence into practice; innovative models of care delivery to assure access and best practices; and by leading trauma education and system development within South Central Ontario and throughout the province.

Each year we focus on one significant contributor to the trauma team. This year we are recognizing the contributions made by the Department of Critical Care. Using a multidisciplinary approach, the Critical Care Department provides acute care for trauma patients who require the advanced monitoring and complex treatments of an intensive care unit. In this report we have highlighted some of the Department’s many individuals committed to improving the lives of trauma patients.

Our annual report highlights and acknowledges the work of every member of our inter-professional trauma team. This team works collaboratively to facilitate the early identification of patient care needs, enhance the coordination of care, increase timeliness in referrals and expedite transfers and repatriation of patients to their home hospital. The remarkable levels of enthusiasm, flexibility and teamwork within the program provide ongoing opportunities to bring the care of the most severely injured patients to the highest level.

Avery B. Nathens, MD PhD, FACS
Canada Research Chair in Systems of Trauma Care
Division Head, General Surgery & Director of Trauma
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St. Michael’s Hospital

St. Michael’s Hospital (SMH) is a Catholic teaching and research hospital founded by the Sisters of St. Joseph in 1892 to care for the sick and poor of Toronto’s inner city. Affectionately known as the Urban Angel, SMH is renown for providing exceptional patient care. As downtown Toronto’s adult trauma centre, the hospital is a hub for neurosurgery, complex cardiac and cardiovascular care, diabetes and osteoporosis care, minimally invasive surgery and care of the homeless and disadvantaged. SMH is also one of the province’s major sites of care for critically ill patients.

Fully affiliated with the University of Toronto (UofT), SMH provides outstanding medical education to health-care professionals across more than 23 academic disciplines. Home to the Li Ka Shing Knowledge Institute, made up of the Keenan Research Centre and the Li Ka Shing Healthcare Education Centre, the hospital is among the first in the world to bring together researchers, educators and clinicians to take best practice and research discoveries to patient bedsides faster.

At SMH, we recognize the value of every person and are guided by our commitment to excellence and leadership.

- We provide exemplary physical, emotional and spiritual care for each of our patients and their families.
- We balance the continued commitment to the care of the poor and those most in need with the provision of highly specialized services to a broader community.
- We build a work environment where each person is valued, respected and has an opportunity for personal and professional growth.
- We advance excellence in health services education.
- We foster a culture of discovery in all our activities and supporting exemplary health services research.
- We strengthen our relationships with universities, colleges, other hospitals, agencies and our community.
- We demonstrate social responsibility through the just use of our resources.

The commitment of our staff, physicians, volunteers, students, community partners and friends to our mission ensures we maintain a quality of presence and tradition of caring, the hallmarks of SMH.
St. Michael’s Hospital Trauma Program

Ontario’s trauma system is designed to ensure that whenever a person is injured, that person will receive the appropriate level of care in a timely fashion. In Ontario, there are 9 adult and 2 pediatric trauma centres designated by the provincial government. SMH designation, which first occurred in 1992, identified the unique resources available at SMH to care for the province’s most severely injured patients.

Severely injured patients rarely have a choice as to where they receive care. As a result, trauma centres differ from other hospitals in many respects. The trauma team is activated each time a severely injured patient arrives at SMH. The team is comprised of a trauma team leader (TTL), two emergency department (ED) nurses, respiratory therapist, x-ray technician and house staff representing general surgery, anaesthesia, and orthopedic surgery. The trauma team is highly trained to act quickly in caring for complex patients in a dynamic environment often with only limited information available. Our trauma resources are available to all those who require them. Our acceptance rate of over 99% for provincial trauma referrals emphasizes our commitment to trauma care. We provide trauma care to both the most vulnerable populations in the downtown core, and to those far beyond downtown.

Our trauma team is composed of multidisciplinary specialists and services including; the blood bank, sophisticated medical imaging department and operating rooms immediately available to attend to patients 24/7. The Allan T. Lambert Trauma & Neurosurgery Intensive Care Unit (TNICU) always has a bed ready to receive a critically ill trauma patient. Virtually every day in 2010, a trauma patient was admitted to the TNICU. Following the initial evaluation and management, there is a team of professionals including nurses, physiotherapists, occupational therapists, dietitians, recreation therapists, speech/language pathologists and social workers (among many others) to begin the rebuilding process for patients and their families after the most devastating injuries. This inter-professional team works collaboratively to facilitate the early identification of patient care needs, enhance the coordination of care, increase timeliness in referrals and expedite transfers and repatriation of patients to their home hospital. The enthusiasm, flexibility and teamwork within the Program provide ongoing opportunities to bring the care of the most severely injured patients to the highest level.

The SMH Trauma Program is accredited by the Trauma Association of Canada as a Level 1 trauma centre. Accreditation requires that external reviewers examine the resources and trauma care delivery to assure that trauma centres provide the highest quality of care.

SMH Trauma Team Activation (TTA) activation guidelines identify those patients who have a significant likelihood of requiring urgent operative intervention or ICU admission, and/or a high likelihood of significant morbidity or death. These guidelines make sure the right patient gets to the right hospital at the right time; the time from injury to definitive care at a trauma centre is an important determinant of trauma patient outcomes.

While a trauma patient can be defined rather broadly as an injured person who needs a health care professional to diagnose and treat actual or potential injuries, for the purposes of this annual report we are reporting on trauma team activations (TTA) only.

This report focuses on the 646 patients for whom the trauma team was activated in 2010. SMH cares for many trauma patients who do not activate the trauma team but benefit from the specialized services and expertise that exist in a Lead Trauma Hospital (LTH).
Our Patients

Age
Trauma continues to be a disease of the young. The majority of our patients were between the ages of 20 - 39 years old.

Gender
Males represent the majority of our trauma patients.

Mechanism of Injury
Blunt injuries such as motor vehicle crashes and falls are the predominant mechanisms of injury for our patients.

“St. Michael’s Hospital gave me back my life. Special thanks to the doctors and nurses of ICU unit.”
Transfer and Transport to St. Michael’s Hospital

In 2010, two-thirds (65%) of patients were transported directly from the scene of injury to SMH. The remainder (35%) were transferred in from a community hospital. While the majority of patients are transported by land ambulance, we also receive patients transported by helicopter.

Source of Patients

<table>
<thead>
<tr>
<th>Direct from Scene</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Ambulance</td>
<td>83%</td>
<td>85%</td>
</tr>
<tr>
<td>Air Ambulance</td>
<td>17%</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interfacility Transfer</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Ambulance</td>
<td>58%</td>
<td>58%</td>
</tr>
<tr>
<td>Air Ambulance</td>
<td>42%</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Trauma Team Activations

The trauma team is activated prior to a patient’s arrival using a two tiered response so that the composition of the team is matched to the anticipated needs of the patient. Both tiers require the trauma team to prepare for the arrival of a trauma patient with likelihood of severe injury. Tier 1 activations allow us to prepare for patients who might require immediate surgical intervention, with the staff surgeon, operating room, blood bank all being notified simultaneously to prepare for a critically injured patient.

Examples of mechanism of injuries that would lead to a Tier 1 activation are gunshot or stab wounds and patients who have sustained blunt force trauma where the patient is in shock.

Top 11 Referring Facilities

<table>
<thead>
<tr>
<th>Facility Name:</th>
<th>% of all transfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Victoria Hospital (Barrie)</td>
<td>6</td>
</tr>
<tr>
<td>Credit Valley Hospital (Mississauga)</td>
<td>6</td>
</tr>
<tr>
<td>Collingwood General and Marine Hospital (Collingwood)</td>
<td>5</td>
</tr>
<tr>
<td>Haliburton Highlands Health Services Corporation (Minden)</td>
<td>5</td>
</tr>
<tr>
<td>Peterborough Regional Health Centre (Peterborough)</td>
<td>4</td>
</tr>
<tr>
<td>Muskoka Algonquin Healthcare (Bracebridge)</td>
<td>4</td>
</tr>
<tr>
<td>Georgian Bay General Hospital (Midland Site)</td>
<td>4</td>
</tr>
<tr>
<td>William Osler Health Centre (Civic Site)</td>
<td>4</td>
</tr>
<tr>
<td>William Osler Health Centre (Etobicoke)</td>
<td>4</td>
</tr>
<tr>
<td>Stevenson Memorial Hospital (Alliston)</td>
<td>4</td>
</tr>
<tr>
<td>Lakeridge Health Corporation (Bowmanville)</td>
<td>4</td>
</tr>
</tbody>
</table>
Injury Characteristics

Injuries can be classified in a number of ways (e.g. falls, motor vehicle collisions), severity, the body location of injuries and intent (e.g. unintentional or intentional). The following tables and graphs show the mechanism of injury for trauma patients. This information is stratified for all injuries and according to the Injury Severity Score (ISS).

Higher Injury Severity Scores are associated with decreased survival rate. An ISS greater than 15 identifies patients with a very high risk of death.

Mechanism of Injury

Motor vehicle collisions (MVC) are the most common mechanism of injury for our trauma patients.

Survival by Mechanism of Injury

There are many factors that affect survival and recovery after injury including underlying patient factors (age, other diseases) and mechanism of injury. The majority of trauma patients admitted to SMH survive.

<table>
<thead>
<tr>
<th>Survival Rate by Mechanism of Injury</th>
<th>% of trauma patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stab</td>
<td>95</td>
</tr>
<tr>
<td>Struck by/against</td>
<td>90</td>
</tr>
<tr>
<td>Other</td>
<td>90</td>
</tr>
<tr>
<td>Motor vehicle</td>
<td>89</td>
</tr>
<tr>
<td>Gunshot wound</td>
<td>88</td>
</tr>
<tr>
<td>Fall</td>
<td>88</td>
</tr>
<tr>
<td>Pedestrian / Cyclist</td>
<td>88</td>
</tr>
</tbody>
</table>

Injury Severity Score

In 2010, more than half of trauma patients had an ISS of 15 or higher.
Severe Injuries by Body Region

Injuries are classified by their location and severity. Trauma patients frequently have more than one injury. Last year, we identified 934 severe injuries (defined as an Abbreviated Injury Severity Score $\geq 3$) in 646 patients. This figure illustrates the distribution of these 934 injuries by body region.

- Head: 21%
- Facial: 4%
- Neck: 1%
- Chest (lungs & ribs): 29%
- Spine: 10%
- Abdomen: 9%
- Arms & Legs: 26%

Intentional Injuries

Injuries are typically classified as unintentional, intentional or undetermined intent. Approximately a quarter of traumatic injuries seen at SMH are intentional assaults or self-inflicted, the majority of which are stab wounds.

Emergency Department (ED) Disposition

Following their initial assessment and resuscitation in the ED, 31% of patients are transferred to the TNICU. An additional 19% require direct transportation from the emergency department to the operating room for immediate operative management for their injuries.

<table>
<thead>
<tr>
<th>Emergency Room Disposition</th>
<th>% patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient Unit</td>
<td>32</td>
</tr>
<tr>
<td>Intensive Care Unit</td>
<td>31</td>
</tr>
<tr>
<td>Operating Room</td>
<td>19</td>
</tr>
<tr>
<td>Home</td>
<td>15</td>
</tr>
<tr>
<td>Death in the Emergency Department</td>
<td>2</td>
</tr>
<tr>
<td>Transfer to Specialty Care</td>
<td>1</td>
</tr>
</tbody>
</table>
Surgical Activity

This past year more than 45% of trauma patients required one or more surgical interventions to manage their injuries. Patients with multisystem injuries may be cared for by numerous subspecialties including plastic surgery, general surgery, neurosurgery and orthopedic surgery during a single trip to the operating room.

<table>
<thead>
<tr>
<th>Blood Product</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRBC</td>
<td>1129</td>
<td>1514</td>
</tr>
<tr>
<td>Platelets</td>
<td>78</td>
<td>129</td>
</tr>
<tr>
<td>Plasma / Cryoprecipitate</td>
<td>368</td>
<td>494</td>
</tr>
</tbody>
</table>

Massive Transfusion Protocol

Massive hemorrhage is defined as transfusion of 10 or more PRBC units in a 24 hour period. Massive hemorrhage is a leading cause of potentially preventable death in trauma. The Trauma Program follows a massive transfusion protocol (MTP) designed to provide patients with timely and adequate replacement during massive blood loss using appropriate blood components. The MTP is activated for patients experiencing substantial blood loss with anticipated ongoing uncontrolled hemorrhage.

In 2010 the MTP was initiated 43 times for trauma patients.

<table>
<thead>
<tr>
<th>Number of times MTP called</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blunt trauma</td>
<td>14</td>
<td>33</td>
</tr>
<tr>
<td>Penetrating trauma</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

An analysis of the MTP done in 2010 demonstrated reduced wait times for blood components through improved processes in getting blood products to patients.

Transfusion Medicine

Injured patients are among the most common users of blood products at SMH. A total of 1514 units of packed red blood cells (PRBC) were transfused to trauma patients this past year. 31% of TTA patients received blood transfusions. An average of 7.53 units of blood were given to those patients who required transfusion.
3 Resource Utilization

Length of Stay

Among admitted trauma patients, the average length of stay in 2010 was 11.24 days and the average ICU length of stay was 7.26 days.

Discharge Disposition

While the majority of our patients were discharged home, 19% of our trauma patients were discharged to a rehabilitation facility for additional care.

Our Rehabilitation Partners

<table>
<thead>
<tr>
<th>Rehabilitation Destination</th>
<th>% patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toronto Rehabilitation Institute</td>
<td>24</td>
</tr>
<tr>
<td>St. John’s Rehabilitation Institute</td>
<td>24</td>
</tr>
<tr>
<td>Bridgepoint Health</td>
<td>23</td>
</tr>
<tr>
<td>West Park Healthcare Centre</td>
<td>16</td>
</tr>
<tr>
<td>Providence Health</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
</tr>
</tbody>
</table>

“I cannot stress enough or praise sufficiently enough the excellent care, attention and warmth that I received during my stay by all involved with me.”
4 Quality Assurance & Accountability

Trauma Registry

The trauma registry is a comprehensive database of information of each trauma patient’s traumatic injury and clinical presentation, ongoing care and ultimate outcome at discharge from SMH. This data is evaluated as part of our own internal performance improvement activities and is also submitted to the Ontario Trauma Registry for regional trauma system evaluation.

In addition to submitting our data for Provincial and National analysis, since 2007, we have been submitting our injury data to the U.S. National Trauma Databank. We are able to evaluate our outcomes and processes of care against U.S. trauma centres as part of the American College of Surgeons, Trauma Quality Improvement Program (TQIP). The TQIP pilot project began in 2007 with 21 centres including SMH and in 2010 there were 65 participating sites across the United States. We are the only Canadian site participating in this initiative.

Quality Assurance (QA)

The Trauma Quality Assessment and Performance Improvement Report (TQAR) is a program based tool that we use to monitor and evaluate trauma care. The report uses established quality indicators that have been determined by consensus among our trauma colleagues. The TQAR report allows us to evaluate current QA efforts and provide direction for future QA initiatives. The TQAR is reviewed at the Trauma Care Committee quarterly and is also reviewed at the Trauma/Neurosurgery Program Council.

In 2010, the TQAR reported on over 50 outcome and process indicators across the continuum of trauma care from trauma team activation to discharge. Detailed chart reviews based on the indicator data included Trauma Team Leader response times, how much time is spent in the trauma bay, complications including ventilator associated pneumonia, surgical site infections and decubitus ulcers, appropriate resource utilization including ICU length of stay and triage errors related to level of trauma activation. In 2010, we continued to focus on medication reconciliation, venous thromboembolism rates and prophylaxis, blood alcohol level screening and treatment, and appropriate utilization of our massive transfusion protocol.

Corporate accountability for our publicly reported mortality rates was reviewed in detail this year. We reported on the trauma program mortality review process to the Quality Committee of the Board comparing the corporate mortality metrics with the trauma program metrics.

The 2010 TQIP risk adjusted benchmark reports directed us to a detailed ongoing review of our management of isolated traumatic brain injuries to determine if there are better management strategies that we can incorporate into the care of these patients. This work continues in 2011.
Quality Assurance Initiatives for Aging Trauma Patients:

SMH is committed to providing care for aging trauma patients through its Geriatric Trauma Consultation Services (GTCS). The GTSC is a geriatric consultation model aimed at preventing and managing age-specific complications for all patients 60 years or older who are admitted to the Trauma Service:

- Patients are seen by an Advanced Practice Nurse (APN) Specialist in Geriatrics within 72 hours of admission to the Trauma Service and undergo a targeted assessment, including a functional, cognitive and psychosocial evaluation.

- The APN Specialist in Geriatrics is committed to communicating and advocating for patients through attendance at weekly multidisciplinary trauma rounds, liaising with the other members of the patient care team and documenting care recommendations on a specific geriatric summary sheet in the patient chart.

There is also a Geriatric Trauma Advisory Group that reviews the geriatric operational guidelines for the Trauma Service. This collaborative advisory group includes representation from the following types of care providers:

- APN Specialist in Geriatrics
- Surgeon
- Clinical Nurse Specialist in Gerontology
- Geriatrician
- Occupational Therapist
- Physiotherapist
- Speech and Language Pathologist
- Quality Assurance Coordinator
- Case Manager
- Social Worker
- Nurse Practitioner
- Spiritual Care
Evidence Based Practice and Guidelines

Evidence Based Practice Guidelines and Protocols set the standards for treatment of the injured patient and are based upon review of current trauma literature. There are close to 20 trauma specific protocols and guidelines in place at SMH. Each year new protocols are developed and established protocols are reviewed to ensure they continue to reflect current best practice.

<table>
<thead>
<tr>
<th>New Protocols in 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol for Intravenous Administration of Tranexamic Acid (TXA, Cyklokapron) During Trauma Resuscitation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Revised Guidelines in 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imaging of the Genitourinary Tract</td>
</tr>
<tr>
<td>Geriatric Trauma Protocol</td>
</tr>
<tr>
<td>Trauma in Pregnancy</td>
</tr>
<tr>
<td>Screening for Blunt Cerebrovascular Injuries</td>
</tr>
<tr>
<td>Massive Transfusion Protocol (MTP)</td>
</tr>
</tbody>
</table>

Trauma Related Protocols:

- Alcohol Screening and Brief Intervention Operational Guidelines for Trauma Patients
- Epidural Analgesia Protocol Chest Tube Management and Removal in Trauma Patients
- Cervical / Thoracic / Lumbar Spine Clearing Guidelines
- Geriatric Trauma Operational Guidelines
- Guidelines for Management of Penetrating Abdominal, Flank and Back Trauma
- Guidelines for Management of Penetrating Neck Trauma
- Gunshot Wound Police Disclosure
- Imaging of the Genitourinary Tract
- Intra-Abdominal Bladder Pressure Monitoring
- Massive Transfusion Protocol
- Prophylaxis for Venous Thromboembolism in Trauma and Neurosurgical Patients
- Resuscitation Protocol in Patients with Major Torso Trauma
- Screening for Blunt Cerebrovascular Injuries
- Trauma-Neurosurgery Intensive Care Admission and Discharge Policy
- Trauma and Neurosurgery Inpatient Unit Admission Criteria for Intermediate Care Beds
- Trauma In Pregnancy
- Trauma Team Activation
Focus on 2010: Critical Care

Each year we focus on one significant contributor to the trauma team. This year we are recognizing the contributions made by the Department of Critical Care at SMH. Using a multidisciplinary approach, the Critical Care Department provides acute care for trauma patients who require the advanced monitoring and complex treatments of an intensive care unit. Below are some of the Department’s many medical professionals who are committed to improving the lives of trauma patients:

Najma Ahmed, MD PhD FRCSC

Dr. Ahmed is the Director of the General Surgery residency program at the UofT, the largest surgery program in the country. She has revamped the curriculum and assessment protocols within the program and has undertaken research into better methods to teach and evaluate surgical residents. She is also a trauma surgeon at SMH and the associate director of the SMH Trauma Program with a focus on education and simulation-based assessment. She was instrumental in developing an innovative simulation-based multiprofessional curriculum on team-based trauma care and oversees the educational experience of residents and students on the trauma service.

Andrew Baker, MD FRCPC

Andrew Baker is the Chief of the Critical Care Department. He works clinically in the Trauma and Neurosurgery Intensive Care Unit and is the Medical Director of the Trauma and Neurosurgery Program. He directs a neuroscience laboratory in the Keenan Research Centre where the focus is on the mechanisms of traumatic brain injury. He is interested in how white matter deteriorates following traumatic brain injury and more recently has investigated the mechanisms of primary blast wave exposure on white matter and neurological function. He also conducts research in clinical traumatic brain injury and especially the role of biomarkers and the detection of mild traumatic brain injury.

Sara Gray, MD MPH

Dr. Gray is an Adjunct Scientist in the Keenan Research Centre of the Li Ka Shing Knowledge Institute, an Assistant Professor with the Department of Medicine, UofT and a Staff Physician with the Emergency and Critical Care Department. A key focus of Dr. Gray’s research involves the continuum of care between the Emergency Department and Intensive Care Unit.

John C. Marshall, MD FRCSC FACS

John Marshall is a Professor of Surgery at the UofT, and a trauma surgeon and intensivist at SMH. His academic interests are sepsis, trauma, and the innate immune response. Professor Marshall has also been active in clinical research in sepsis and ICU-acquired infection, and in the design of clinical
trials and outcome measures. He is the past-chair of the International Sepsis Forum and past-President of the Surgical Infection Society, and currently serves as chair of the Canadian Critical Care Trials Group. He is also the founding chair of the International Forum of Acute Care Trialists - a global network of investigator-led critical care clinical research groups. He is a member of the editorial boards of seven journals.

Avery Nathens, MD PhD FACS

Dr. Nathens is currently the Division Head in General Surgery and Director of Trauma at SMH and a Professor of Surgery at the UofT. He is a practicing trauma surgeon and epidemiologist with a focus on trauma system design. He is an active member of the Provincial Trauma Network, and the National Trauma Registry Advisory Committee and holds a Canada Research Chair in Systems of Trauma Care. Internationally, he chairs the National Trauma Databank Sub-Committee and the committee overseeing the Trauma Quality Improvement Program. Dr. Nathens has had extensive experience evaluating trauma system effectiveness and patient flow within a system and has published many landmark peer-reviewed papers in the Lancet, NEJM and JAMA focusing on trauma system design and implementation.

Antoine Pronovost, MD MBA FRCPC

Dr. Antoine Pronovost is an Assistant Professor at the UofT, and Medical Director of the Trauma and Neurosurgery ICU. He earned his medical degree from the University of Ottawa in 2001, followed by a residency in Anesthesia 2006 and a Critical Care Fellowship in 2008, both at the UofT. Dr. Pronovost earned a Masters in Business Administration from the Rotman School of Management at the UofT in 2005, subsequently completing an administrative residency at SMH and is pursuing Evidence-based Design Accreditation and Certification (EDAC). His interests include the application of process improvement methodologies to health care, development of enhanced communication tools in critical care, and the application of Evidence-Based Design in acute health care environments.
Critical Care Research:

The Department of Critical Care is committed to basic, clinical and translational research, and is widely recognized for their research expertise in clinical trauma care. Some key contributions and publications include the following:


Advanced Trauma Care for Nurses (ATCN®)

This two day course is offered in collaboration with the ATLS® course and is endorsed by the Society of Trauma Nurses. The interdisciplinary learning format enhances team building and a greater understanding of interdisciplinary roles in the management of the trauma patient. Physicians and nurses attend a series of interactive ATLS® lectures together, with the nurses then spending the remainder of the course focusing on knowledge and technical skill stations relevant to their work on the trauma team.

The skill stations are interactive and hands-on, focusing on a variety of challenging case scenarios. The practical testing stations allow ATCN® students to demonstrate the application of newly acquired skills on a simulated patient. The advanced training and critical thinking processes that the nurses learn enhance nursing’s ability to make an even bigger impact in caring for trauma patients.

In 2010, the ATCN® program dissemination across Ontario continued with courses being offered at Hamilton Health Sciences, the Ottawa Hospital / L’Hôpital d’Ottawa and the Hôpital régional de Sudbury Regional Hospital with a total of 7 courses being offered and 104 registered nurses enrolled in the courses. Since the introduction of the ATCN® course to Canada by SMH the number of courses and participants who have taken the course have more than doubled.

ATCN® skill stations include:
- Initial Airway and Management
- Airway and Ventilatory Management
- Spine and Extremity Injuries
- Head Trauma
- Hemorrhagic Shock
- Pediatric Trauma

ATCN® Courses 2008 - 2010

# of participants
Advanced Trauma Life Support Course (ATLS®)

The Advanced Trauma Life Support Course (ATLS®) provides a framework of knowledge and techniques for the initial management of a trauma patient. The ATLS® course has been taught at SMH for over 15 years with a focus on teaching UofT medical residents from diverse disciplines including Family Medicine, Emergency Medicine, Anesthesia, Orthopedic Surgery, Cardiac Surgery, Neurosurgery, Plastic Surgery and General Surgery.

In the last 15 years of the ATLS® program at SMH, 847 physicians have been trained in this course, 112 of those participants completed the course in 2010.

Advanced Trauma Operative Management (ATOM®)

The ATOM course is a unique day-long course designed to teach advanced techniques in trauma surgery in a one-on-one mentored environment and in a practical laboratory setting to senior level surgical residents. Research has demonstrated that ATOM training has a positive effect on trauma related knowledge and skills. SMH has been offering the ATOM course on an annual basis since 2003 and trained 20 senior surgical residents from the UofT and McMaster University in 2010.
Advanced Surgical Skills for Exposure in Trauma (ASSET)

SMH hosted the first inaugural ASSET course outside of the United States in 2010, bringing together senior trauma surgeons to be trained as faculty for the promulgation of this course throughout Canada. The one day ASSET course consisted of a series of short case-based overviews followed by a hands-on component of key surgical exposures in five anatomic areas of neck, chest, abdomen and pelvis and upper and lower extremities.

Breakfast of Our Champions:
Journey to Excellence

This inter-disciplinary event is held in partnership with our colleagues in the Mobility Program. The aim of this semi-annual event is to showcase and share the exciting research, clinical practice and education initiatives being led by our colleagues. Over forty posters were on display demonstrating the novel activities being conducted within the programs. Various speakers presented their work on topics such as an intervention for youth violence, patient safety and improving outcomes following work place injury. The event ended with the presentation of awards which recognized the participants’ work in areas such as pain management following surgery, trauma systems and the elderly and patient’s attitudes towards participating in research. The breakfast is an important way for members of the program to learn from each other and to celebrate our successes.

Rural Trauma Team Development Course (RTTDC®)

The RTTDC® was developed by the Rural Trauma Committee of the American College of Surgeons Committee on Trauma. The course is designed to enhance the development of rural trauma teams and highlights a team approach that addresses the common problems in the initial assessment and stabilization of injured patients. The RTTDC® is designed to increase the efficiency of stabilization of injured patients, resource utilization and improve the overall level of care provided to the injured patient in the rural/community environment. This course is presented at rural facilities by a multidisciplinary team of physicians and nurses from SMH.

Telemedicine for Trauma Resuscitation

Resuscitation of a critically ill trauma patient requires the coordinated efforts of an interdisciplinary team.

In the spring of 2010, SMH in collaboration with the Ontario Telemedicine Network (OTN) began a
pilot project to assess the utility and feasibility of using telemedicine technology to facilitate rural emergency department access to trauma specialist consultation to assist in the care of complex trauma resuscitations. Telemedicine technology streams live video, audio and radiology images from remote emergency departments to a computer terminal at SMH and permits real time interaction between the referring medical team and a SMH trauma specialist. The study is currently enrolling patients from three referring emergency departments in Ontario.

**ThinkFirst Injury Prevention Strategy in Youth (TIPSY)**

The TIPSY Program is an on-site injury prevention program that was adopted by SMH in 2006 and is delivered and led by key experts. Offered throughout the academic year, high school students in the Greater Toronto Area between the ages of 15 - 19 are educated about risk taking behaviours and their consequences. Students are given an overview of basic brain and spinal cord anatomy. They participate in discussions with Mothers Against Drunk Drivers, Toronto Police Services, Safe and Sober Canada, as well as a Voice of Injury Prevention (VIP) spokesperson who has sustained either a brain or spinal cord injury. The VIP recounts the first-hand events that led to their injury and explains the consequences and lasting effect of their injury. The students participate in walking tours of the Trauma Bay in the ED, the Trauma/Neurosurgery ICU and Trauma/Neurosurgery In-Patient Unit.

**Trauma Team Evaluation and Management (TEAM)**

The TEAM course content is an introduction to the concepts of trauma assessment and management, adapted from the Advanced Trauma Life Support Course (ATLS®).

All second year medical students at the UofT participate in this day long education workshop held throughout the academic year which includes classroom teaching, a series of clinical trauma case scenarios and practice in the simulation laboratory.

**Trauma Continuum Conference**

In November 2010, the Trauma Continuum Conference joined forces with the Emergency Department to host a sold-out one day interprofessional conference with the theme of “Creating Order Out of Chaos”. The keynote address “Triage of Mass Casualties: Creating Order out of Chaos” was delivered by Dr. Chris Giannou, the former head surgeon of the International Committee of the Red Cross. The remainder of the day consisted of a series of plenary presentations, break out sessions and a debate. There were close to 250 attendees representing all aspects and phases of the trauma continuum from Emergency Medicine Service (EMS) providers to acute care bedside clinicians, researchers and rehabilitation personnel.
SMH Trauma Program is comprised of world-renowned researchers and state-of-the art research facilities and is affiliated with the UofT, as well as the newly created Li Ka Shing Knowledge Institute and the Keenan Research Centre. Trauma-related research at SMH looks at traumatic injury in a number of different contexts, from the individual patient to community and societal issues. Some examples of the diverse foci of traumatic injury research that were published in 2010 are outlined below:

**Physiological changes in the brain after a traumatic injury:**


**Strategies to prevent or reduce sports-related injuries:**


**Interventions to prevent youth and domestic violence:**

Methods to improve how our trauma system is organized:


Geographical characteristics and patterns of injury:


Improving care of patients in the acute care setting:


Rehabilitation after mild traumatic brain injury:


Medical education:


In addition to publishing their research in high-quality medical journals, researchers in the program presented their findings in nationally and internationally at conferences including those of the Trauma Association of Canada, Canadian Pain Society, Canadian Association of Neuroscience Nurses, World Congress on Traumatic Brain Injury.
SMH Trauma in the News

During 2010, SMH Trauma Program earned extensive media coverage on stories that reached audiences in Canada and abroad. The majority of this media coverage focused on the stewardship role SMH plays in improving health care systems for traumatically injured patients as well as significant contributions to injury prevention research and activities.

Our contributions to trauma care in Canada were reaffirmed when SMH received two out of only five available national awards for injury research. Researchers working with Dr. Avery Nathens, will examine rural Canadians’ access to trauma centres and neurosurgeon Dr. Michael Cusimano will lead a team studying traumatic brain injuries.

In 2010, SMH also received international coverage of many research studies by Dr. Michael Cusimano related to injury prevention topics. Highlights included:

- Concussion rates in junior hockey 7 times higher than previously reported.
- Education promoting proper playing techniques and enforcement of rules, not helmet use, is most effective at stopping rugby concussions.
- Skiers and snowboarders forgo helmet use placing fashion before safety.
- Violent injury events most likely to take place in areas with more bars, social housing units and homeless shelters as well as lower-income households.
- Between midnight and 4 a.m. the most prominent ‘hot spot’ for ambulance dispatches for assault injuries is southwest downtown areas known as the ‘Entertainment District’.

SMH related headlines this year also shed light on the often overlooked topic of intimate partner violence as well as the growing concern of youth violence in Canada. SMH was recognized as proactive in its approach to helping victims of domestic abuse by asking all women who come to the emergency department the simple words, “do you feel safe at home?”. Dr. Carolyn Snider’s continued work on the development of an emergency department-based youth violence intervention program will continue to gain media attention in the upcoming year.

The Trauma Program is an internationally recognized leader in trauma care addressing all aspects of trauma including research, prevention, patient care and public policy. Much of this work has been recognized through media reports in local, national and international press and we will continue to share our successes and advancement in the years ahead.

“There are only so many [team grants] available and so few resources available. If you get one, it’s a great achievement,” said Christine Lavictoire, a deputy director at CIHR.
St. Michael’s

Inspired Care. Inspiring Science.

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