Annual
Trauma
Services
Report

April 1, 2000 to March 31, 2001
Calgary Health Region
Regional Trauma Services Annual Report 2000/2001

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Organizational Structure

Regional Trauma Services personnel include:

**Foothills Medical Centre Site:**
- Ms. Janet Umphrey, Executive Director
- Dr. Cam Waddell, Medical Director
- Ms. Sue Conroy, Director Emergency/Trauma Services
- Dr. John Kortbeek, Regional Medical Director, Trauma Services
- Ms. Jane Bartlett, Regional Trauma Services Manager
- Ms. Patricia Long, Regional Trauma Services Coordinator
- Ms. Christi Findlay, Regional Trauma Services Data Analyst
- Ms. Michaile Lovatt, Regional Trauma Services Data Analyst
- Ms. Sandra Dowkes, Regional Trauma Services Secretary

**Alberta Children’s Hospital Site:**
- Mr. Hume Martin, Executive Director
- Ms. Bonnie Johnston, Director In-patient and Related Services
- Dr. Robin Eccles, Chair Pediatric Trauma Committee
- Ms. Kerry Larkin, Patient Care Manager Emergency
- Ms. Jeanette Pearce, Regional Pediatric Trauma Coordinator
- Ms. Michaile Lovatt, Regional Trauma Services Data Analyst

**District Trauma Site Trauma Committee Chair’s:**
- Dr. Bruce Rothwell: Peter Lougheed Centre Trauma Committee
- Dr. Gerald Lazarenko: Rockyview Hospital Trauma Committee

Acknowledgements to former personnel:

- Dr. Chris Eagle, Executive Director, FMC
- Ms. Pam Holberton, Trauma Services Manager, CHR
- Ms. Cathy Dobson, Pediatric Trauma Coordinator
- Ms. Cathy Hubley, Trauma Data Analyst
INTRODUCTION

Dr. John B. Kortbeek, Director, Regional Trauma Services, Calgary Health Region

The Pine Lake tornado was a sentinel event during the past year for Calgary’s Regional Trauma Service. The tornado touched down on a hot Friday afternoon leaving in its path at least 300 injured amidst chaos and turmoil. The initial disaster response was well coordinated and efficient, with cooperation between a variety of agencies, including EMS and police.

Scene management included evacuation by ground ambulance and STARS helicopters. Subsequent triage assessment and resuscitation in Red Deer was also coordinated and efficient. Eleven fixed wing dedicated aircraft of the provincial air ambulance system were positioned in Red Deer to transport patients to Calgary and Edmonton.

When the disaster was declared in Calgary, the response from personnel was tremendous. The initial transfer of major trauma patients to the Calgary region appeared to be quite manageable, resulting in a downgrade of the disaster response. Over the ensuing weekend a larger number of patients were transported to Calgary than expected, many arriving from small hospitals where they had been taken directly by local ground ambulance crews.

In addition, the tornado coincided with one of the busiest trauma weeks ever. Over 35 major motor vehicle crash victims were treated at the Foothills Medical Centre that week. The major trauma inpatient census peaked at approximately eighty patients. The disaster illustrated the preparedness of the system, as well as highlighted areas for improvement.

A major initiative of the Calgary region involving the trauma service over the past year has been to dissect last summer’s event and prepare for a future multi-casualty incident. These efforts have become quite timely with the announcement of the G8 meeting in Kananaskis next summer, given the recent experience in Milan. Tremendous growth in the Calgary region and a booming economy have allowed the Calgary Health Region to attract new, highly skilled, committed and energetic individuals in a variety of disciplines who will be tremendous contributors to the trauma program. This includes new recruits in neurosurgery, intensive care, general/trauma surgery, vascular and thoracic surgery, as well as emergency medicine.

The announcement of the new Alberta Children's Hospital facility on the West University campus offers great potential for the evolution of Trauma Services. The region will work with Trauma Services at the Alberta Children's Hospital headed by Dr. Robin Eccles in the coming years. The scope, response and needs of the Children's tertiary trauma facility will be developed.

The Calgary Regional Trauma Service continues to promote the establishment of benchmarks for trauma care, included in the report. A complete summary of our performance indicators are also included in the report.

We continue to work with our colleagues in Alberta, and the Alberta Centre for Injury Control and Research in the development of the provincial trauma proposal. The service has also been active in ongoing initiatives in setting trauma system standards with the Trauma Association of Canada and the American College of Surgeons Committee on Trauma.

The Trauma Services Annual Report reflects the commitment, energy and dedication of our staff in meeting the challenges of providing excellent trauma care in an era of increased scrutiny, rising expectations and tight budgets.

We welcome your suggestions and feedback. Please feel free to contact any of the trauma services staff with your comments and suggestions.

Submitted by John B. Kortbeek MD FRCSC FACS
Foothills Medical Centre
TRAUMA SERVICE ACTIVITIES

The Regional Trauma Service continues to provide support for trauma care in the following areas:

1. Clinical
2. Education
3. Quality Improvement
4. Research
5. Administration
6. Data Management

1. CLINICAL

Clinical follow through of trauma patients remains an important component of the trauma service. Collaboration with staff, physicians and residents assists with identification of clinical projects.

As a result of these activities, refinements to the trauma team activation process have been achieved, as well as the provision of educational activities suited to the needs of the various clinical areas.

2. EDUCATION:

Conferences/Workshops:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Calgary weekly Trauma Resident Rounds – Trauma Services</td>
<td>2000/2001</td>
<td>Calgary</td>
</tr>
<tr>
<td>University of Calgary Undergraduate Trauma Seminars – Trauma Services</td>
<td>2000/2001</td>
<td>Calgary</td>
</tr>
<tr>
<td>Academic Half-days, University of Calgary, <em>Trauma</em> – John Kortbeek</td>
<td>2001</td>
<td>Calgary April</td>
</tr>
<tr>
<td>Academic Half-days, University of Calgary, <em>Post-operative Care</em> – John Kortbeek</td>
<td>2001</td>
<td>Calgary April</td>
</tr>
<tr>
<td><em>Evolution of Trauma Care in Calgary and Lessons Learned from the Pine Lake Tornado</em> (slides)</td>
<td>March 2001</td>
<td>St. George Hospital Surgical Grand Rounds, Australia</td>
</tr>
<tr>
<td><em>Difficult trauma cases: What would you do?</em> Presented at the Trauma Association of Canada/Australian Trauma Society Meeting.</td>
<td>March 2001</td>
<td>Trauma 2001 Sydney, Australia</td>
</tr>
</tbody>
</table>
Workun S.A., Knox L., Doig C., Burrowes P., Larsen G., Kortbeek J. *Prospective evaluation of CT scanning for the spinal clearance of unconscious trauma patients (Bearpit).* Presented at the Trauma Association of Canada/Australian Trauma Society Meeting.


*The Trauma Perspective (Chair)*

Combined TAC/Australasia Trauma Society – Patricia Long, Attendee

International Conference on Pediatric Trauma – Robin Eccles, Attendee.

**Trauma Nursing Core Course® (TNCC®)**:

- Calgary
  - June & November 2000, January & March 2001

Many other TNCC® courses have been offered by other nursing personnel throughout the province and by Trauma Services in the Capital Health Authority.

**Advanced Trauma Life Support® (ATLS®)**:

- Student Provider Courses:
- Instructor Course:
  - November 18, 2000

**In-service/Orientation**

Monthly trauma orientations
  - residents (GS, Trauma, ICU)
  - clinical clerks, fellows, electives, international medical students

Thoracic Trauma, Emergency, March 2001
  - ED staff
  - general surgery residents
  - respiratory therapists

Caring for Families/Trauma Patients in Crisis, March 2001
  - ED staff

Blunt Cardiac Trauma, August, September 2000
Regional Trauma Services Annual Report
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Trauma Rounds, 0730-0830

2000

April 28  Metabolic Responses to Trauma: Current Concepts
- Dr. Morad Hameed, U of Miami

May 26  Prehospital Cricothyrotomy and Rapid Sequence Intubation: A Critical Review
- Dr. Andy Anton, Medical Director, EMS

September 29  Pine Lake Disaster – Videoconference
- STARS: Dr. Greg Powell, Dr. Lance Shepard
- Emergency: Dr. Arun Abbi
- Trauma Services/General Surgery: Dr. John Kortbeek
- Orthopedics: Dr. Jim Powell
- Anesthesia: Dr. Jennifer Froelich
- ICU: Dr. Chip Doig

October 27  Spinal Instability
- Dr. Stephan J. DuPlessis, Spinal Neurosurgery, U of C Spine Program

December 1  Pain Management of the Injured Patient
- Dr. Rob Mulloy, General Surgery
- Dr. Jennifer Froelich, Anesthesia

2001

January 26  Open Pelvic Fractures
- Dr. Jim Powell, Associate Clinical Professor, University of Calgary

February 23  Trauma Care Comes of Age
- Dr. Leanelle Goldstein, UCSD Medical Centre, San Diego, CA

March 23  Protection Against Ballistic Injuries
- Lt. Col. Ian Anderson, MD, CM, FRCSC
  Fellow – Critical Care/Trauma

Rounds sponsored by Aventis
3. QUALITY IMPROVEMENT

The measurement and evaluation of the various components of the trauma service continues to be of prime importance in directing and improving the quality of care delivered at both the adult and pediatric sites within the region. At the FMC and ACH, quarterly reviews of statistics and performance indicators are compiled for analysis and review. At the PLC and RGH, reports/issues generated from various sources are brought forward for review at the respective trauma committees on a quarterly basis.

Projects related to the trauma quality improvement process include:

- review of standards of care and benchmarks within other trauma service organizations
- revision and development of performance indicators for adult and pediatric trauma
- revision of guidelines for communication between prehospital personnel and trauma team leaders/team
- ongoing revisions to the trauma team activation process
- Manager attended Team Based Process Improvement Orientation as part of QIHI initiatives
- ongoing review of all trauma laparotomies

4. RESEARCH

JOHN B. KORTBEEK

Abstracts


Publications


Chapters


Submitted/In Press


RICHARD E. BUCKLEY

Grants

Pharmacia Upjohn/Searle, $120,000.00, 2001
Pharmacia Upjohn/Searle, $120,000.00, 2002.

Publications


Projects in Publication

- Prospective randomized controlled multi-centre clinical trial: operative vs nonoperative treatment of displaced intra-articular calcaneal fractures - A 2-8 year follow-up. Co-authors: Dr. Suzanne Tough, Dr. B. McCormack, Dr. G. Pate, Dr. R. Leighton, Dr. D. Petrie, Dr. Galpin. Accepted by the American Journal of Bone and Joint Surgery
- Long-term ct results in calcaneal fractures treated operatively and nonoperatively. Co-authors: Dr. Phil Aubin, Dr. Doug Connell. Submitted to Journal of Orthopaedic Trauma
- Multi-centre clinical trial: New, symphysial plate for pelvic diastases. Co-authors: Dr. Ross Leighton, Dr. Jim Powell
- Comparison of experiences of observers looking at distal radial fracture healing patterns. Co-authors: Dr. Jim Powell, Dr. Eli Olschewski, Dr. Paraic Murray
- Invited article: Calcaneal fractures: Do we operate on all, some or none? American Academy of Orthopaedic Surgery Journal. Co-author: Dr. Suzanne Tough
- Displaced intra-articular calcaneal fractures: who fails treatment and needs a subtalar fusion. Co-authors: Dr. Marcel Csizy, Mr. Jason Smith, Dr. Suzanne Tough, Dr. Bob McCormack, Dr. Graham Pate, Dr. Ross Leighton, Dr. Dave Petrie, Dr. Robert Galpin. Accepted by the Journal of Orthopaedic Trauma
- Patients lost to follow-up: Why? A critique of a prospective trauma data base. Co-author: M. Lucas Murnaghan. Accepted by the Canadian Journal of Surgery

Projects in Progress

- Multi-Centre Clinical Trial Reamed Versus Unreamed Femoral Nailing. Co-authors: Dr. Jim Powell, Dr. Russ de Groote, Canadian Orthopedic Trauma Society (COTS)
• Prophylaxis of Deep Vein Thrombosis in Patients with Fractures of the Lower Extremity Distal to the Knee. Co-authors: Dr. Gwen deVries, Dr. Greg Abelseth, Dr. Jim Powell, Dr. Bryce Cowan, COTS
• Randomized Controlled Study of Novos (TM) Putty Versus Standard Treatment for Open Tibial Fractures. Co-authors: Dr. Mike McKee, COTS
• Tibial Malrotation Study - Postoperative CT Correlates with Clinical Presentation. Co-authors: Dr. Shannon Puloski, Dr. Jim Powell, Dr. Bart Allende
• Multicentre Clinical Trial - Ring Fixator Versus Standard ORIF of Severely Displaced Tibial Plateau Fractures. Co-authors: Dr. Shafique Pirani, COTS
• The Female Calcaneal Fracture. Co-authors: Dr. Jorge Barl, COTS
• Prospective Gait Analysis of Calcaneal Fracture Patients: A Natural History. Co-author: Dr. Jason O'Brien
• Osteosynthesis of Fractures of the Patella, Prospective Randomized Trial, Suture vs. Wire. Co-author: Dr. Seth Bitting
• Displaced Intra-articular Calcaneal Fractures and Correlation's between Range of motion and Outcome. Co-authors: Dr. Nigel Willis and Stephen Kingwell
• Displaced Intra-articular Calcaneal Fractures and Correlations with Outcome for Bilateral Heel Fractures. Co-authors: Mr. Paul Dooley, COTS
• αBSM in Calcaneal Fractures. Co-author: COTS
• Complications in Calcaneal Fractures. Co-authors: Jamie Howard, COTS
• αBSM in Distal Radial Fractures. Co-authors: Dr. Vaughan Bowen, COTS

Presentations:

• Podium Presentation (Jim Dr. Powell): A prospective randomized trial comparing reamed and unreamed intra-medullary nailing: Analysis of rates of union. COTS/COA meeting Edmonton June 4, 2000
• OTA update Course, Calgary, Alberta, July 15, 2000 - The latest in calcaneal fractures
• OTA update Course, Calgary, Alberta, July 15, 2000 - Proximal humeral fractures: An update
• Podium Presentation: Prospective randomized multi-centre canadian clinical trial: Operative vs. non-operative treatment of displaced intra-articular calcaneal fractures. OTA Meeting, San Antonio, Texas, October 14, 2000
• Podium Presentation: Displaced intra-articular calcaneal fractures: Who fails treatment and needs subtalar fusion. OTA, San Antonio, Texas, October 14, 2000
• Abstract (Dr. Jim Powell): Prospective randomized trial comparing reamed and unreamed intramedullary nailing: analysis of pulmonary complications. COT/OTA Meeting, San Antonio, October 13, 2000
• Basic Course Lecture: Absolute fracture stability. AO Course, Toronto, Ontario, November 16, 2000
• Advanced Course Lecture: The side for unreamed femoral nails. AO Course Toronto, Ontario, November 16, 2000,
• Acute infection. AO Course Toronto, Canada, November 19, 2000
• Calcaneal fracture treatment/subtalar fusions and randomized prospective trial discussion. Nottingham Fracture Forum, Nottingham, England, November 22, 2000
• How to do a fireside discussion. AO Course Davos Switzerland, December 10, 2000
• Ankle fractures. AO Course Davos Switzerland, December 13, 2000
• Your fractures and my fractures. Emergency Medicine Conference for Rural Physicians, Banff, January 20, 2001
- Fracture healing and my philosophy: An orthopaedic trauma surgeon’s prospective. Canadian Orthopaedic Technician Conference, Rockyview General Hospital, February 17, 2001
- Podium Presentation: Prospective randomized multi-centre Canadian clinical trial - Operative vs. non-operative treatment of displaced intra-articular calcaneal fractures. AAOS Meeting, San Francisco, California, March 3, Highlight Paper and Winner of “Bovill Award”

DR. GARNETTE R. SUTHERLAND

Intraoperative Magnetic Resonance Research Program 1995 -
(Innovative Magnetic Resonance Imaging Systems [IMRIS]; BrainLAB; Marconi Medical Systems; Magnex Scientific UK; Surrey Medical Imaging Systems UK; National Research Council Canada; Foothills Medical Centre, U of Calgary

Grants

Medical Research Council of Canada $382,758
1998-01
(Operating Grant)
Metabolic basis and motor syndrome of pyridoxine sensory neuropathy. A combined NMR spectroscopic chromatographic, electrophysiological and behavioural study with M. Hulliger, D.P. Archer

Heart & Stroke Foundation of Alberta & NWT $153,000
1999-02
(Operating Grant)
Metabolism and the Ischemic Brain: New Perspectives

Alberta Foundation for Health Research $500,000
1999-01
(Operating Grant - Southern Alberta Stroke Program)
A Window on the Brain
with T.E. Feasby, W.J. Becker, A.M. Buchan

Canadian Foundation for Innovation $4,720,000
1999-2003
(Infrastructure Support)
Seaman Family MR Research Centre

Medical Research Council of Canada $174,000
1999-2003
(Operating Grant)
Metabolism and the Ischemic Brain: New Perspectives
Abstracts

Hamilton MG, Vecil J, Kaibara T, Sutherland GR. The successful integration of frameless stereotaxy with the mobile 1.5-Tesla intraoperative MR imaging system. 34th Meeting of the Canadian Congress of Neurological Sciences, Ottawa, Ontario, June 13-17, 2000


Kaibara T, Myles ST, Sutherland GR. Epilepsy surgery guided by high field intraoperative MR imaging. The 59th Annual Meeting of the Japan Neurosurgical Society, Fukuoka, Japan, October 24-28, 2000

Kaibara T, Dort J, Sutherland GR. Skull base surgery augmented by mobile 1.5Tesla intraoperative MR imaging. The 59th Annual Meeting of the Japan Neurosurgical Society, Fukuoka, Japan, October 24-28, 2000

Kaibara T, Sutherland GR. Surgical navigation with high field intraoperative MR imaging. The 59th Annual Meeting of the Japan Neurosurgical Society, Fukuoka, Japan, October 24-28, 2000


Publications


Tyson RL, Perron J, Sutherland GR. 6-Aminonicotinamide inhibition of the pentose phosphate pathway in rat neocortex. Neuro Report II(9): 1845-1848, 2000


Kaibara T, Hurlbert RJ, Sutherland GR. Intraoperative magnetic resonance imaging – Augmented transoral resection of axial disease. Neurosurg Focus 10 (2):Article 4, 2001


Submitted/In Press


Louw DF, Asfora WT, Sutherland GR. A Brief History of Aneurysm Clips. (In Press: Neurosurg Focus 2001)


Dumont AS, Verma S, Hurlbert RJ, Sutherland GR. Thromboembolic stroke secondary to blunt traumatic cardiac injury. (Submitted: J Neurosurg 2001)

Dumont AS, Dumont RJ, McNeill JH, Kassell NF, Sutherland GR, Stewart DJ, Verma S. Chronic endothelin antagonism restores myogenic tone, endothelium-dependent vasomotion and responsiveness to a K_{ATP} channel opener in cerebral arteries of diabetic rats. (Submitted Neurosurg 2001)

Dumont AS, Dumont RJ, Kassell NF, Sutherland GR, Verma S. Endothelin and cerebral vasospasm in hypertension. (Submitted: AHA Journal 2001)

Kaibara T, Myles ST, Lee MA, Sutherland GR. Optimizing epilepsy surgery with intraoperative MR imaging. (Submitted Epilepsia 2001)

Darsaut TE, Tyson RL, Sutherland GR. Acute changes in cerebral glucose metabolism induced by phenazine methosulfate and methylene blue. (Submitted J Neurochem 2001)

Archer DP, Cowan RAMcT, Falkenstein RJ, Wallace CJ, Kaibara T, Sutherland GR. A controlled study of intraoperative mobile, high field magnetic resonance imaging for craniotomy. (Submitted Can J Anaesth 2001)

Tyson RL, Sutherland GR. Regional pyruvate carboxylase activity measured using NMR spectroscopy-detected [1-\(^{13}\)C] glucose metabolism. (Submitted: J Cereb Blood Flow Metab 2001)

**Book Chapters**


**Presentations**

Advances and Clinical Experiences with Mobile Intraoperative MR Imaging at 1.5Tesla. Walton Neurosurgical Institute, Liverpool, UK, May 31, 2000

University of Birmingham, Queen Elizabeth Hospital. Advances and Clinical Experiences with Mobile Intraoperative MR Imaging at 1.5 Tesla. Birmingham, UK, June 2, 2000

Advances in Mobile Intraoperative MR Imaging (IMRIS 1.5T, iMotion). XIV Congress European Society for Stereotactic and Functional Neurosurgery, London, UK, October 25, 2000

Neurosurgery in the 21\(^{st}\) Century: Intraoperative MRI. 5\(^{th}\) Detroit Neurosurgery Symposium, Detroit, Michigan, November 4, 2000

Neurosurgical Operating Room of the 21\(^{st}\) Century. 8\(^{th}\) Annual Banff Conference, Banff, Alberta, February 2-3 2001

**BRENT W. WINSTON**

**Grants**

- Alberta Heritage Foundation For Medical Research Establishment and Clinical Investigator Grant - 3 year Grant awarded 1996, renewed 1999
- Research in Excellence - Alberta Government one time award- $28,000
- Medical Research Council of Canada Scholarship - 5 yr Award starting 1996.
- Medical Research Council of Canada Operating Grant - 3 year Grant awarded 1996, renewed 1999.
- Regional ICU Department Grant – 1 year award, 2000-2001.
- Medical Services Incorporated Grant – 2 year award.
- Heart and Stroke Foundation of Canada, Alberta Chapter – 1 year grant

**Co Investigator Industry Sponsored:**

Chiron Pharmaceuticals. OPTIMIST Trial – Phase III TFPI in Severe Sepsis. $396,000 to date
Invited Lecturer to Critical Care Fellows Seminars, University of Toronto, Nov, 2000

Invited Speaker to the Respirology Research in Progress, University of Toronto, November 2000

Invited speaker, University of Manitoba, Division of Critical Care Medicine, January 25-26, 2001. Two presentations entitled: 1) “Cell and molecular aspects of sepsis: targeted therapy” and 2) “Factor B induction in septic shock.”

Oral presentation at the Annual Meeting of the American Society of Critical Care Medicine, Feb. 11, 2001, Moscone Center, San Francisco, CA. Presentation entitled “IGF-I is upregulated in fibroproliferative ARDS.”


Abstracts


Connie Mowat, Sabine Bisson, Stephen Robbins and, Brent W. Winston. TNFα stimulates MEKK1 activation in lipid rafts (or low density membrane microdomains, LDMC’s). Oral presentation at the CSCI and RCPS Annual Meeting September 2000

Brent W. Winston, P. M. Krein, P Sabatini, W. Tinmouth, R. Brisebois, C. Doig, and F. Green. IGF-I is upregulated in fibroproliferative ARDS. Oral presentation at the Annual Meeting of the Society of Critical Care Medicine, February, 2001


Yong Huang, Peter M. Krein, and Brent W. Winston. Mapping the synergistic effects of TNFα-and IFNγ-stimulated induction of complement factor B in macrophages. Presented at the Annual Meeting of the Canadian Society for Immunology Meeting, March 2001

Connie Mowat, Sabine Bisson, Stephen Robbins and, Brent W. Winston. TNFα stimulation and activation of MEKK1 and Caspase 8 in lipid rafts. Presented at the Annual Meeting of the Canadian Society for Immunology meeting, March 2001
Publications


Submitted/In Press


Yong Huang, Peter M. Krein, and Brent W. Winston. Characterization of IFNγ regulation of the complement factor B gene in macrophages. Submitted to the European Journal of Immunology for Publication.

Yong Huang, Peter M. Krein, and Brent W. Winston. Complement factor B gene regulation: Synergistic effects of TNFα and IFNγ in macrophages. Submitted to the Journal of Immunology for publication.

Peter M. Krein, Peter Sabatini, William Tinmouth, Francis Green, and Brent Winston. IGF-I immunoreactivity is increased in the lungs of patients with fibroproliferative ARDS. Submitted to the American Journal of Respiratory and Critical Care Medicine.

Chapters


R. JOHNN HURLBERT

Publications


Hurlbert, RJ. Surgical Site Complications Associated with a Morphine Nerve Paste used for Post-operative Pain Control after Laminectomy (letter). Infec Control Hosp Epidemiol 21:5, 2000

In Preparation

Vecil GG, Hurlbert RJ. Modified Brooks posterior wiring technique with transarticular screws for complex atlanto-axial instability

Kaibara T, Hurlbert RJ. Anterior cervical fixation and load sharing: superior fusion results

Dumont A., Theodore N, Sonntag, VKHS, Hurlbert RJ. Long-term follow-up of post-operative pain control with a morphine based analgesic paste

Presentations

Role of Steroids in Neurological Injury. Orthopedic Trauma Association – Trauma Management and Controversies, Calgary, AB, July 14-16, 2000


Posterior Cervical Anatomy and Techniques of Instrumentation: Second Annual Western Canada Spine Course, University of Calgary, Calgary, AB, October 27-29, 2000

Combined Anterior and Posterior Cervical Approaches: Second Annual Western Canada Spine Course, University of Calgary, Calgary, AB, October 27-29, 2000


JAMES N. POWELL

Publications

McCormack RG, Brien D, Buckley RE, McKee MD, Powell J, Schemitsch EH. Fixation of fractures of the shaft of the humerus by dynamic compression plate or intramedullary nail. J Bone Joint Surg (Br) 2000; 82-B:336-9

J. DEAN SANDHAM

Liquivent in ARDS, April 2000

ROBERT HARROP


5. ADMINISTRATION

This year’s activities included:

• change in Regional Trauma Services personnel – Jane Bartlett assumed manager role in July 2000
• continued participation in the development of the ACICR proposal for a provincial trauma network
• completion of initial phase of formation of Trauma Coordinators of Canada
• Trauma Coordinators Of Canada Managerial Meeting May 2000 in Halifax, NS
• maintaining links to Province Wide Services
• maintaining links to Trauma Program in Edmonton
• supporting the implementation of the DI Picture Archiving And Communication System (PACS) on unit 71 and the emergency department at FMC

Human Resources Activities:

• successful recruitment of a part-time data analyst (FMC & ACH) and part-time pediatric trauma coordinator at ACH

Committee Representation:

Calgary Health Region:

• HOPE Advisory Committee
• Regional Injury Control Executive Committee, CHR
• Peter Lougheed Centre Trauma Committee
• Rockyview Hospital Trauma Committee
• Foothills Medical Centre Adult Trauma Care Committee
• Foothills Medical Centre Trauma Resuscitation Committee
• Trauma Update Organizational Committee
• The University of Calgary Surgical Undergraduate Education Committee
• The University of Calgary, Critical Care Fellowship Steering Committee
• Trauma Quality Improvement, FMC
• Trauma Audit Committee, ACH
• Regional Trauma Executive
• Emergency Managers Committee
• Patient Care Managers Committee
• PARTY Advisory Committee
• Site Managers Group
• FMC Disaster and Emergency Response Planning Committee
• ACCN Provincial Advisory Committee
• Calgary Injury Prevention Coalition Communications Committee
• Canadian Intensive Care Foundation, Golf for Life Organizing Committee
• ICU Executive Committee
• ICU Quality Council Committee
• ICU Research Committee
• ICU CQI

Provincial:
• Advisory Trauma Provincial Working Group, Alberta Centre for Injury Control Research
• Alberta Ambulance Medical Review Committee
• American College of Surgeons, Alberta Chapter
• Alberta Ambulance Advisory and Appeal Board

National:
• Trauma Association of Canada Executive Committee
• Trauma Association of Canada Abstract Review Panel
• Royal College of Physicians & Surgeons of Canada Corresponding Member, Test Committee for General Surgery
• Trauma Coordinators of Canada

International:
• American College of Surgeons, Alberta Chapter
• American College of Surgeons ATLS® Subcommittee
• American College of Surgeons
  • Committee on Trauma
• Editorial Review Panel, Journal of Trauma
• Editorial Board, INJURY

Regional/Provincial/National Liaisons:

Trauma Services continues to be involved with prevention, acute care and rehabilitation activities and groups both within and outside the Calgary Health Region.

• PARTY program – participate regularly in PARTY presentations (annual report available from Lynda Vowell)
• Provincial Trauma System
• liaison continues within the ACICR
• trauma managers, coordinators and data analysts meet regularly to ensure consistency with the Alberta Trauma Registry (ATR) and provide a forum to review and plan trauma activities
• liaison with educational centres has continued – i.e., member of Mount Royal College Adult Critical Care Nursing Advisory Council
• Emergency Nurses Interest Group
• Emergency Nurses Association
6. DATA MANAGEMENT:

Data collection and management continues to be an integral component of the Regional Trauma Services program.

The management of data gathered at both the Foothills Medical Centre and the Alberta Children's Hospital provides the basis for the Alberta Trauma Registry, and is a cornerstone for regional system operations and quality improvement initiatives. This data also supports the work being done towards the establishment of a provincial trauma network.

Collection of data from the Peter Lougheed Centre and Rockyview Hospital is accomplished through chart review. Specific charts are reviewed based on injury discharge data and/or identification of major trauma patients by staff at those two sites.

The following summarizes the injury data for the fiscal year April 1, 2000 – March 31, 2001 at the four acute care sites within the CHR:

<table>
<thead>
<tr>
<th>Monthly Discharges*</th>
<th>ISS&gt; 12</th>
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<tbody>
<tr>
<td>FMC</td>
<td>2736</td>
</tr>
<tr>
<td>ACH</td>
<td>713</td>
</tr>
<tr>
<td>PLC</td>
<td>1035</td>
</tr>
<tr>
<td>RGH</td>
<td>1431</td>
</tr>
<tr>
<td>Total</td>
<td>5915</td>
</tr>
</tbody>
</table>

*based on injury discharge codes
Performance Indicators

Foothills Medical Centre
PERFORMANCE INDICATORS

As part of Regional Trauma Services quality improvement process, several indicators throughout the continuum of care are monitored on a regular basis as a measure of performance. Some of the indicators stem from audit filters set out by the American College of Surgeons’ Committee on Trauma. Other indicators were developed at the FMC and the ACH as site specific performance indicators. The following is a summary of these indicators for the FMC for patients who meet the inclusion criteria for the Alberta Trauma Registry (patients with an ISS \( \geq 12 \) and who are admitted to the hospital or die in the emergency department at the FMC).

PREHOSPITAL

Known Transport Time by Calgary EMS

Time spent transporting patient to trauma centre, direct from scene, by Calgary EMS (responder):

- **Yes** = Transport time is known (time responder left scene and time responder arrived at trauma centre);
- **No** = Transport time is unknown (time responder left scene and/or time responder arrived at trauma centre).

- **Minimum** - Time spent transporting patient to trauma centre by Calgary EMS (responder) where transport time is known (time responder left scene and time responder arrived at trauma centre).
- **Maximum** - Time spent transporting patient to trauma centre by Calgary EMS (responder) where transport time is known (time responder left scene and time responder arrived at trauma centre).
- **Average** - Time spent transporting patient to trauma centre by Calgary EMS (responder) where transport time is known (time responder left scene and time responder arrived at trauma centre).

**Note**: Transport time information provided by Calgary EMS.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calgary EMS time documentation</td>
<td>183</td>
<td>82.4%</td>
<td>39</td>
<td>17.6%</td>
</tr>
<tr>
<td>Minimum</td>
<td>2 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>47 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>16.6 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Region of Injury Event When Direct from Scene by Ground Ambulance

Includes all patients transported direct from scene to trauma centre by ground ambulance with known region of injury event (within region 4 and outside region 4):

- **Yes** = Patients transported direct from scene to trauma centre by ground ambulance with known region of injury event within Calgary Health Region (region 4);
- **No** = Patients transported direct from scene to trauma centre by ground ambulance with known region of injury event outside Calgary Health Region (region 4).

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct from scene by ground ambulance</td>
<td>223</td>
<td>92.9%</td>
<td>17</td>
<td>7.1%</td>
</tr>
<tr>
<td>within region 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>outside region 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Region of Injury Event When Direct from Scene by STARS Air Ambulance (rotary wing)

Includes all patients transported direct from scene to trauma centre by STARS Air Ambulance with known region of injury event (within region 4 and outside region 4). Ground EMS may be involved in patient care at scene but method of transport to trauma centre is by STARS Air Ambulance.

**Yes** = Patients transported direct from scene to trauma centre by STARS Air Ambulance with known region of injury event within Calgary Health Region (region 4);

**No** = Patients transported direct from scene to trauma centre by STARS Air Ambulance with known region of injury event outside region 4.

<table>
<thead>
<tr>
<th>n=52</th>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct from scene by rotary wing (STARS Air Ambulance)</td>
<td>24</td>
<td>46.2% within region 4</td>
<td>28</td>
<td>53.8% outside region 4</td>
<td></td>
</tr>
</tbody>
</table>

GCS <= 8 at Scene With or Without Mechanical Airway

Includes all patients with first GCS <= 8 at scene recorded by medical personnel:

**Yes** = Patients with first recorded GCS at scene <= 8 with mechanical airway as intervention at scene;

**No** = Patients with first recorded GCS at scene <= 8 without mechanical airway as intervention at scene.

Mechanical airway includes intubation (nasal and oral), cricothyroidotomy and tracheostomy

**Note**: 146 patients excluded from analysis due to lack of GCS documentation at scene or missing patient care record.

<table>
<thead>
<tr>
<th>n=93</th>
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<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCS &lt;= 8 at scene with mechanical airway</td>
<td>41</td>
<td>44.1%</td>
<td>52</td>
<td>55.9%</td>
<td></td>
</tr>
</tbody>
</table>

GCS <= 8 at Trauma Centre

Includes all patients arriving at trauma centre regardless of GCS at scene:

**Yes** = Patients with first recorded GCS at trauma centre <= 8;

**No** = Patients with first recorded GCS at trauma centre >8 or no documented GCS or arrived intubated.

<table>
<thead>
<tr>
<th>n=679</th>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCS &lt;= 8 on arrival at trauma centre</td>
<td>21</td>
<td>3.1%</td>
<td>658</td>
<td>96.9%</td>
<td></td>
</tr>
<tr>
<td>* of this 149 arrived at trauma centre intubated, 25 had no GCS documentation and 484 GCS&gt;8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*
INTERFACILITY TRANSFER

Transfers from Within Region 4

Transfers from PLC to trauma centre (PLC may have been the primary or secondary hospital).

- Total injury discharges from PLC for 2000/2001 – 1035
- Includes all PLC ISS >/= 12:
  - Yes = ISS >/= 12 patients transferred to trauma centre;
  - No = ISS >/= 12 patients not transferred to trauma centre.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLC ISS &gt;/= 12</td>
<td>16</td>
<td>29.1%</td>
<td>39</td>
<td>70.9%</td>
</tr>
</tbody>
</table>

Transfers from RGH to trauma centre (RGH may have been the primary or secondary hospital).

- Total injury discharges from RGH for 2000/2001 – 1431
- Includes all RGH ISS >/= 12:
  - Yes = ISS >/= 12 patients transferred to trauma centre;
  - No = ISS >/= 12 patients not transferred to trauma centre.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGH ISS &gt;/= 12</td>
<td>16</td>
<td>40%</td>
<td>24</td>
<td>60%</td>
</tr>
</tbody>
</table>

Transfers from ACH trauma centre to FMC trauma centre (ACH may have been the primary or secondary hospital).

- Total injury discharges from ACH for 2000/2001 – 713
- Includes all ACH ISS >/= 12:
  - Yes = ISS >/= 12 patients transferred to trauma centre;
  - No = ISS >/= 12 patients not transferred to trauma centre.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACH ISS &gt;/= 12</td>
<td>4</td>
<td>5.1%</td>
<td>74</td>
<td>94.9%</td>
</tr>
</tbody>
</table>
Transfers from Outside Region 4

Time Spent at Primary Hospital Prior to Transfer to Trauma Centre <= 2 Hours
- Includes all patients transferred to trauma centre from primary hospital outside of Region 4 with a known length of stay (known arrival to primary hospital time and known departure from primary hospital time):
  - **Yes** = Patient spent <= 2 hours at primary hospital prior to transfer to trauma centre;
  - **No** = Patient spent > 2 hours at primary hospital prior to transfer to trauma centre.

**Note:** 108 patients excluded from analysis due to unknown primary hospital length of stay

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 2 hours at Primary Hospital</td>
<td>81</td>
<td>40.7%</td>
<td>118</td>
<td>59.3%</td>
</tr>
</tbody>
</table>

Transfers From Outside Region 4

Time spent at secondary hospital prior to transfer to trauma centre <= 2 hours
- Includes all patients transferred to trauma centre from secondary hospital outside of Region 4 with a known length of stay (known arrival to secondary hospital time and known departure from secondary hospital time):
  - **Yes** = Patient spent <= 2 hours at secondary hospital prior to transfer to trauma centre;
  - **No** = Patient spent > 2 hours at secondary hospital prior to transfer to trauma centre.

**Note:** 8 patients excluded from analysis due to unknown secondary hospital LOS

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 2 hours at Secondary Hospital</td>
<td>3</td>
<td>23.1%</td>
<td>10</td>
<td>76.9%</td>
</tr>
</tbody>
</table>

Transfers From Outside Region 4

Injury Time to Trauma Centre < 4 hours
- Includes all patients transferred from another hospital (outside region 4) with known time to trauma centre (time of injury event and time of arrival to trauma centre):
  - **Yes** = Patients with known time to trauma centre (time of injury event *and* time of arrival to trauma centre) < 4 hours;
  - **No** = Patients with known time to trauma centre (time of injury event *and* time of arrival to trauma centre) <= 4 hours.

**Note:** 133 patients excluded from analysis due to unknown time of injury or unknown time of arrival at trauma centre

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury time to trauma centre &lt; 4 hours</td>
<td>42</td>
<td>25%</td>
<td>126</td>
<td>75%</td>
</tr>
</tbody>
</table>
RESUSCITATIVE PHASE

Trauma Team Activations

Includes all patients with ISS $\geq 12$ who came through the trauma centre Emergency Department (ED) (excludes direct admits):

- **Yes** = Trauma Team was activated;
- **No** = Trauma Team was not activated.

**Note:** There were a total of 764 activations in 2000/2001. Activations often occur for major mechanism of injury where ISS is subsequently found to be less than 12.

<table>
<thead>
<tr>
<th>n=642</th>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trauma Team Activations</td>
<td>361</td>
<td>56.2%</td>
<td>281</td>
<td>43.8%</td>
</tr>
</tbody>
</table>

Trauma Team Leader Response Time $\leq 20$ Minutes

Includes all patients where Trauma Team was activated and Trauma Team Leader time of arrival known:

- **Yes** = Trauma Team Leader response time $\leq 20$ minutes;
- **No** = Trauma Team Leader response time exceeded 20 minutes.

**Note:** 50 Trauma Team activations excluded from analysis due to lack of time documentation

<table>
<thead>
<tr>
<th>n=311</th>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trauma Team Leader Response $\leq 20$ minutes</td>
<td>303</td>
<td>97.4%</td>
<td>8</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

GCS $\leq 8$ at Trauma Centre And Mechanical Airway Intervention in Emergency Department

Includes all patients with first recorded GCS $\leq 8$ at trauma centre:

- **Yes** = Patient left trauma centre ED with a mechanical airway;
- **No** = Patient left trauma centre ED without a mechanical airway.

**Note:** Mechanical airway includes intubation (nasal and oral), cricothyroidotomy and tracheostomy

**Note:** 25 patients excluded from analysis due to unknown GCS

<table>
<thead>
<tr>
<th>n=21</th>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GCS $\leq 8$ on arrival to ED with mechanical airway</td>
<td>17</td>
<td>81%</td>
<td>4</td>
<td>19%</td>
</tr>
</tbody>
</table>
**Emergency Department Length of Stay <= 4 Hours**

Includes all patients who came through the trauma centre ED with a known length of stay (time of arrival to trauma centre ED and time of departure from trauma centre ED):

- **Yes** = Patients with ED length of stay <= 4 hours;
- **No** = Patients with ED length of stay > 4 hours.

**Note**: 31 patients excluded from analysis due to unknown ED length of stay

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED LOS &lt;= 4 hours</td>
<td>322</td>
<td>52.7%</td>
<td>289</td>
<td>47.3%</td>
</tr>
</tbody>
</table>

**DEFINITIVE CARE**

**Craniotomy for Acute Epidural or Subdural Hematoma Within 4 Hours of Arrival at Trauma Centre**

Includes all patients who received a craniotomy at trauma centre:

- **Yes** = Patient craniotomy within 4 hours of arrival to trauma centre;
- **No** = Patient craniotomy > 4 hours after arrival to trauma centre.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craniotomy within 4 hours of arrival to centre</td>
<td>34</td>
<td>89.5%</td>
<td>4</td>
<td>10.5%</td>
</tr>
</tbody>
</table>

**Laparotomy at Trauma Centre**

- Includes all patients requiring emergent laparotomy:
  - **Yes** = Patient required emergent laparotomy, and laparotomy performed within 1 hour of arrival to trauma centre;
  - **No** = Patient required emergent laparotomy, and laparotomy not performed within 1 hour of arrival to trauma centre.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergent laparotomy within 1 hour of arrival to centre</td>
<td>17</td>
<td>37%</td>
<td>29</td>
<td>63%</td>
</tr>
</tbody>
</table>

**Note**: 57% (26) patients received laparotomy within 2 hours of arrival to trauma centre.

- Includes all hemodynamically unstable patients requiring laparotomy (BP<90 and/or pulse>130):
  - **Yes** = Hemodynamically unstable patient required a laparotomy within 1 hour of arrival to trauma centre and laparotomy was performed within 1 hour of arrival to trauma centre;
  - **No** = Hemodynamically unstable patient required a laparotomy within 1 hour of arrival to trauma centre and laparotomy was not performed within 1 hour of arrival to trauma centre.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>hemodynamically unstable patient with laparotomy</td>
<td>1</td>
<td>100%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
Therapeutic Laparotomy

Includes all patients who required a laparotomy. Therapeutic laparotomy is defined as discovery of an injury which requires suturing and or packing:

Yes = Patient treated with therapeutic laparotomy;
No = Patient treated with non-therapeutic laparotomy.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapeutic laparotomy</td>
<td>63</td>
<td>92.6%</td>
<td>5</td>
<td>7.4%</td>
</tr>
</tbody>
</table>

Gunshot Wound to Abdomen Managed Operatively

Includes all patients with gunshot wound to abdomen:

Yes = Patient with gunshot wound to abdomen managed operatively;
No = Patient with gunshot wound to abdomen managed non-operatively.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSW to abdomen managed operatively</td>
<td>3</td>
<td>100%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Operative Management of Femur Fracture Within 24 hours of Admission

Includes all patients with operative management of femur fracture:

Yes = Patient had operative management of femur fracture within 24 hours of admission to trauma centre;
No = Patient had operative management of femur fracture not within 24 hours of admission to trauma centre.

Note: In some trauma patients with major head or truncal injury, physiological status required delay of femur fracture repair. These patients have been excluded.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative management of femur fracture within 24 hours of arrival to trauma centre</td>
<td>32</td>
<td>88.9%</td>
<td>4</td>
<td>11.1%</td>
</tr>
</tbody>
</table>
Operative Management of Open Fracture Within 6 Hours (Grade III) or 12 Hours (Grade I, II)

Includes all patients with open long bone fracture (radius, ulna, humerus, tibia, fibula, femur):
- **Yes** = Patient with open long bone fracture had operative management performed within 6 hours for grade III; 12 hours for grade I or II after arrival to trauma centre;
- **No** = Patient with open long bone fracture did not have operative management performed within 6 hours for grade III; 12 hours for grade I or II after arrival to trauma centre.

**Note**: Time to repair for grade I, II, III open fractures based on Practice Guidelines – Orthopedic Trauma Group, FMC

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative management of open fracture within 6 hours (grade III) or 12 hours (grade I, II)</td>
<td>47</td>
<td>92.2%</td>
<td>4</td>
<td>7.8%</td>
</tr>
</tbody>
</table>

Unplanned Return to Operating Room

Includes all patients with at least 1 visit to operating room:
- **Yes** = Patient had unplanned return to operating room;
- **No** = Patient did not have unplanned return to operating room.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned return to operating room</td>
<td>3</td>
<td>0.8%</td>
<td>359</td>
<td>99.2%</td>
</tr>
</tbody>
</table>

Admitting Physician Was Surgeon or Intensivist

Includes all patients admitted to trauma centre (not including emergency department deaths or operating room deaths that were not admitted):
- **Yes** = Patient admitted to surgeon or intensivist;
- **No** = Patient admitted to physician other than surgeon or intensivist.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admitting physician surgeon or intensivist</td>
<td>652</td>
<td>98.3%</td>
<td>11</td>
<td>1.7%</td>
</tr>
</tbody>
</table>
**Delayed Diagnosis (> 48 hours post admission) or Missed Injury**

Includes all patients admitted to trauma centre (not including emergency department deaths, operating room deaths that were not admitted):

- **Yes** = Patient with delayed diagnosis or missed injury during hospitalization at trauma centre;
- **No** = Patient without delayed diagnosis or missed injury during hospitalization at trauma centre.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed diagnosis or missed injury</td>
<td>35</td>
<td>5.3%</td>
<td>629</td>
<td>94.7%</td>
</tr>
</tbody>
</table>

**Missed C-Spine Injury**

Includes all patients admitted to trauma centre (not including emergency department deaths, operating room deaths that were not admitted):

- **Yes** = Patient with missed c-spine injury within the first 48 hours of admission to trauma centre and spinal precautions removed;
- **No** = Patient with no missed c-spine injury indicated within the first 48 hours of admission to trauma centre.

**Note**: 61 patients had c-spine injuries

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missed c-spine injury</td>
<td>2</td>
<td>0.3%</td>
<td>662</td>
<td>99.7%</td>
</tr>
</tbody>
</table>

**Unplanned ICU Admission**

Includes all patients admitted to trauma centre (not including emergency departments deaths, operating room deaths that were not admitted):

- **Yes** = Patients with unplanned admission to ICU (admitted to ICU from other patient care unit);
- **No** = Patient without unplanned ICU admission.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned ICU admission</td>
<td>4</td>
<td>0.6%</td>
<td>660</td>
<td>99.4%</td>
</tr>
</tbody>
</table>

**Unplanned ICU Readmission**

Includes all patients admitted to ICU:

- **Yes** = Patient with unplanned ICU re-admission;
- **No** = Patient without unplanned ICU re-admission.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned ICU re-admission</td>
<td>9</td>
<td>3.8%</td>
<td>226</td>
<td>96.2%</td>
</tr>
</tbody>
</table>
### OUTCOME

#### Death During Transport

Includes all patients arriving at trauma centre:
- **Yes** = Patient was declared dead on arrival by emergency department physician;
- **No** = Patient did not die during transport.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death during transport</td>
<td>0</td>
<td>0%</td>
<td>679</td>
<td>100%</td>
</tr>
</tbody>
</table>

#### Death During First 24 Hours of Admission

Includes all patients who died:
- **Yes** = Patient died within first 24 hours of admission;
- **No** = Patient did not die within first 24 hours of admission.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death within first 24 hours of admission</td>
<td>36</td>
<td>44.4%</td>
<td>45</td>
<td>55.6%</td>
</tr>
</tbody>
</table>

#### Outcome and Probability of Survival

Includes all patients with TRISS valued and probability of survival > 20%:
- **Yes** = Patient died with probability of survival > 20%;
- **No** = Patient did not die with probability of survival > 20%.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death and probability of survival &gt; 20%</td>
<td>13</td>
<td>2.8%</td>
<td>454</td>
<td>97.2%</td>
</tr>
</tbody>
</table>

#### Mortality

Includes all patients arriving at trauma centre:
- **Yes** = Patient died;
- **No** = Patient did not die.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>81</td>
<td>11.9%</td>
<td>598</td>
<td>88.1%</td>
</tr>
</tbody>
</table>
**TRISS Methodology**

The TRISS methodology uses logistic regression to predict survival based on the Revised Trauma Score (RTS), injury severity score (ISS), mechanism of injury (blunt vs. penetrating) and patient age. Unexpected deaths are trauma patients with a predicted probability of survival (TRISS) of 0.5 or more that die and unexpected survivors are trauma patients with a predicted probability of survival (TRISS) of 0.49 or less that survive.

The TRISS ‘z’ statistic measures the statistical significance of the difference between the actual number of survivors among a set of patients and the number expected from outcome norms. W measures the clinical significance of the differences between the actual and unexpected survivors. W is the number of survivors more than would be expected from the outcome norms per 100 patients treated. W can be calculated if the z score is greater than 1.96. Due to the physiologic parameters used in the Revised Trauma Score, patients who do not have a recorded Glasgow Coma Scale (GCS) will not have a TRISS value calculated.

**FMC z and W Score**

Fiscal Year: April 1, 2000 – March 31, 2001

<table>
<thead>
<tr>
<th></th>
<th>z Score</th>
<th>W Score</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Blunt</td>
<td>2.00</td>
<td>1.92</td>
<td>453</td>
</tr>
<tr>
<td>Adult Penetrating</td>
<td>1.32</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
<td>Pediatric</td>
<td>0.024</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Total Subset</td>
<td>2.21</td>
<td>2.08</td>
<td>469</td>
</tr>
</tbody>
</table>

Data: 1995 – 2001

<table>
<thead>
<tr>
<th></th>
<th>z Score</th>
<th>W Score</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Blunt</td>
<td>3.31</td>
<td>1.58</td>
<td>2229</td>
</tr>
<tr>
<td>Adult Penetrating</td>
<td>1.26</td>
<td>-</td>
<td>107</td>
</tr>
<tr>
<td>Pediatric</td>
<td>0.56</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Total Subset</td>
<td>3.51</td>
<td>1.62</td>
<td>2346</td>
</tr>
</tbody>
</table>
WEB PAGE

For further Trauma information, please access the Trauma web page:

http://www.crha-health.ab.ca/clin/rts/index.htm
Alberta Children’s Hospital
TRAUMA REPORT
ALBERTA CHILDREN’S HOSPITAL
FISCAL YEAR: 2000-2001

Dr. Robin Eccles, Chair, ACH Trauma Committee
Ms. Cathy Dobson, Regional Pediatric Trauma Coordinator

PEDIATRIC TRAUMA PROGRAM

Again there have been changes in key personnel in the pediatric trauma program. Dr. Robin Eccles continued on as Chair of the Trauma Committee. Unfortunately, we lost Ms. Cathy Dobson as Regional Pediatric Trauma Coordinator in December of 2000, when she went on maternity leave. Her position was not filled again until late April 2001, in a new fiscal year.

As well, there was a gap in services for a Data Analyst for the Trauma Registry. However, the Pediatric Trauma Program now has a dedicated Data Analyst as of March 2001. We attempted to expand the role of the Regional Pediatric Trauma Coordinator to a 1.0 FTE position as a Clinical Nurse Specialist, but were unsuccessful in obtaining bridge funding for this from the Alberta Children’s Hospital Foundation.

TRAUMA SERVICE ACTIVITIES

The Pediatric Spinal Cord Injury Clinical Practice Guidelines were finalized and released this year after much dedicated work from Dr. Cheri Nijssen-Jordan, Ms. M. Butler, and others.

The Trauma Committee Community Membership subcommittee had its first meeting in October 2000. It was a very productive and moving event with numerous recommendations arising that could make valuable contributions to the care of the pediatric trauma patient and their family.

The Trauma Committee reviewed the audit filters and performance indicators and made recommendations for changes and additions. Additions include auditing the use of the Alberta Children’s Hospital transport team in trauma transports, and for hypothermia in the Emergency Department.

The Trauma Association of Canada Accreditation recommendations are at the same status as in the last fiscal year. Pediatric rehabilitation services are still in need of a dedicated physiatrist.

COMMITTEE REPRESENTATION

- Alberta Children’s Hospital Trauma Committee
- Trauma Committee Community Member
- Trauma Audit Review Committee
- Child Health Advisory Council
- Regional Injury Control Committee
- Regional Injury Executive Committee
- Calgary Injury Prevention Coalition
- Trauma Advisory Provincial Working Group
- Regional Critical Care Education Committee
- ACH Nursing Education Team
EDUCATION

- Advanced Paediatric Life Support: two modified courses were carried out for Emergency and Pediatric residents
- Paediatric Advanced Life Support: PALS courses offered frequently at the Alberta Children’s Hospital coordinated by Ms. Marguerite Butler, Clinical Resource Nurse
- Trauma Rounds: Trauma Rounds are offered monthly at 0700 hours on the fourth Thursday of the month. The Pediatric Human Patient Simulator has been used with a trauma scenario for resident education in handling a major trauma patient

RESEARCH

- The pilot study for the Role of CT scan in Minor Head Injuries has been done. A MRC grant has been applied for in order to complete the next phase of a multi-center study. Dr. C. Nijssen-Jordan is the coordinator of the study.

REGIONAL PEDIATRIC TRAUMA COORDINATOR

The Regional Pediatric Trauma coordinator role continues to evolve and expand. Some of the roles and responsibilities over the past fiscal year are listed in the summary below:

1. DATA MANAGEMENT

- Review all trauma cases through the ACH
- Determine if the cases meet Alberta Trauma Registry (ATR) criteria
- Collect ATR data and enter into database
- Generate reports, analyze data

2. QUALITY IMPROVEMENT

- Compile Trauma Audit reports every 6-8 weeks for regular Trauma Audit Committee review of quality improvement and case management issues.
- Developed policies and procedures related to spinal care and the use of Aspen® collars.
- Participated in the development of objectives and criteria for the newly formed “Trauma Committee Community Membership” subcommittee. This included interviewing a family that has had experience with the Trauma system at the ACH, in order to provide feedback or bring up any issues related to the Trauma care received. The feedback and discussion with the family provided insight into some strengths and weaknesses of the trauma system from the family perspective.
- Ongoing participation with the Alberta Centre for Injury Control and Research (ACICR) in the development of a comprehensive and efficient Provincial Trauma System.

3. EDUCATION

- Presented annual Trauma Registry statistics at Trauma Rounds
- Presented Pediatric Case Studies at Best Practice Nursing Rounds
- Instructed PALS courses: April 18, 19, June 15, 16
- Participated in ENPC (Emergency Nursing Pediatric Course)
- Taught Trauma Orientation to new Emergency and ICU staff
- Organized inservices for Aspen collar application for staff
- Taught spinal immobilization and logrolling at the first annual “Nursing Skills Fair”
Edited and provided feedback on Trauma Protocols developed by ACICR
Attended first annual ‘Trauma Coordinators of Canada’ meeting in Halifax
Presented Pediatric Case presentations at ENIG Conference in Red Deer

Submitted by Dr. Robin C. Eccles, MD, FRCS(C), FRACS
Pediatric General Surgeon
Chair, Trauma Committee
### ACH TRAUMA ROUNDS

#### 2000

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 19</td>
<td>Forum on Plastic Surgery: Advances in Trauma and Burn Care</td>
<td>Dr. Donald McPhalen MD FRCSC, Division of Plastic Surgery.</td>
</tr>
<tr>
<td>May 17</td>
<td>Hypothermia in Traumatic Brain Injury</td>
<td>Dr. Catherine Ross MD, FRCPC, ICU/Pediatrics.</td>
</tr>
<tr>
<td>September 20</td>
<td>Pine Lake Disaster &amp; Code Orange Response</td>
<td>Dr. Robin Eccles MD, FRCSC, FRACS, Chair, Pediatric Trauma Committee</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ms. Cheryl Bourassa, Disaster Response Coordinator.</td>
</tr>
<tr>
<td>October 26</td>
<td>Pediatric Spinal Cord Injury Guidelines</td>
<td>Dr. Cheri Nijssen-Jordan, MD, FRCPC, Director of Emergency</td>
</tr>
<tr>
<td>November 23</td>
<td>Seat Belt Injuries – Abdominal and Spine Focus</td>
<td>Dr. Paul Beaudry, MD, Division of General Surgery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dr. Carmen Brauer, MD, Division of Orthopedic Surgery.</td>
</tr>
</tbody>
</table>

#### 2001

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 25</td>
<td>Hypothermia: Current Management and Outcomes</td>
<td>Dr. Catherine Ross, MD, FRCPC</td>
</tr>
<tr>
<td>February 22</td>
<td>Isolated Limb Injuries</td>
<td>Dr. Elaine Joughin, MD, FRCSC, Division of Pediatric/Orthopedic Surgery</td>
</tr>
<tr>
<td>March 22</td>
<td>Gunshot Wounds in Teenagers</td>
<td>Dr. David Sigalet, MD, FRCSC, FACS, Division of Pediatric/General Surgery</td>
</tr>
</tbody>
</table>
Performance Indicators

Alberta Children's Hospital
**PERFORMANCE INDICATORS**

As part of the Regional Trauma Services quality improvement process, several indicators throughout the continuum of care are monitored on a regular basis as a measure of performance. Some of the indicators stem from audit filters set out by the American College of Surgeons’ Committee on Trauma. Other indicators were developed at the FMC and the ACH as site specific performance indicators. The following is a summary of these indicators for the ACH for patients that meet the inclusion criteria for the Alberta Trauma Registry (patients with an ISS \(\geq 12\), and who are admitted to the hospital or die in emergency departments at the ACH).

**Mode of Arrival**

- Indicates what type of transportation method was used by the patients arriving at the trauma centre, and is based on a known location of injury event.
- Includes those who were transported from the scene (or from a first/second hospital) to the trauma centre from *within* the CHR (n=31; 40.3%), and those who were transferred from the scene (or from a first/second hospital) to the trauma centre from *outside* of the CHR (n=46;59.7%).

**Note:** Not included are those patients who arrived from an unknown (undocumented) location or patients who were injured while an inpatient at the trauma centre.

<table>
<thead>
<tr>
<th>Mode of Arrival</th>
<th>Patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRANSPORT WITHIN CHR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients who came from within the CHR</td>
<td>31/77</td>
<td>40.3</td>
</tr>
<tr>
<td>Ground ambulance</td>
<td>21</td>
<td>67.7</td>
</tr>
<tr>
<td>STARS Air Ambulance (rotary wing)</td>
<td>2</td>
<td>6.5</td>
</tr>
<tr>
<td>Private vehicle</td>
<td>8</td>
<td>25.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mode of Arrival</th>
<th>Patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRANSPORT OUTSIDE CHR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients who came from outside the CHR</td>
<td>46/77</td>
<td>59.7</td>
</tr>
<tr>
<td>Ground ambulance</td>
<td>17</td>
<td>37</td>
</tr>
<tr>
<td>STARS Air Ambulance (rotary wing)</td>
<td>18</td>
<td>39.1</td>
</tr>
<tr>
<td>Fixed wing aircraft</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Private vehicle</td>
<td>3</td>
<td>6.5</td>
</tr>
<tr>
<td>Unknown mode</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Pre-hospital Performance Indicators

**GCS ≤8 at Scene / Mechanical Airway**

- Includes patients with GCS ≤ 8 at scene recorded by medical personnel. Mechanical airway includes intubation (nasal and oral), cricothyroidotomy and tracheostomy.
- **Yes** = Patients with first recorded GCS ≤ 8 at scene and had mechanical airway as intervention.
- **No** = Patients with first recorded GCS ≤ 8 at scene did not have a mechanical airway as intervention.

**Note:** 26 patients were excluded from analysis due to no GCS documentation at scene, or patient care record was missing.

<table>
<thead>
<tr>
<th>Pre-hospital Performance Indicator</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCS ≤8 at scene / mechanical airway</td>
<td>2</td>
<td>40%</td>
<td>3</td>
<td>60%</td>
</tr>
</tbody>
</table>

**Interfacility Transfers From Within CHR**

Interfacility transfers include patients who were transferred to the Alberta Children’s Hospital from the Foothills Medical Centre, the Peter Lougheed Centre, or the Rockyview General Hospital.

**Interfacility Transfers From Within the CHR**

<table>
<thead>
<tr>
<th>Patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foothills Medical Centre</td>
<td>1 1.3%</td>
</tr>
<tr>
<td>Peter Lougheed Centre</td>
<td>0 0%</td>
</tr>
<tr>
<td>Rockyview General Hospital</td>
<td>3 3.8%</td>
</tr>
</tbody>
</table>

**Transfers From Outside Region 4**

**Time Spent at Primary Hospital Prior to Transfer to Trauma Centre ≤ 2 Hours**

- Includes patients transferred to trauma centre from primary hospital outside of Region 4 with a known length of stay. Length of stay is defined as a known time of arrival to primary hospital and known time of departure from primary hospital.
- **Yes** = Patients spent ≤ 2 hours at primary hospital prior to transfer to trauma centre.
- **No** = Patients spent > 2 hours at primary hospital prior to transfer to trauma centre.

<table>
<thead>
<tr>
<th>Transfers From Outside Region 4</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time spent at primary hospital prior to transfer to trauma centre ≤ 2 hours</td>
<td>9</td>
<td>40.9%</td>
<td>13</td>
<td>59.1%</td>
</tr>
</tbody>
</table>
**Time Spent at Secondary Hospital Prior to Transfer to Trauma Centre <\= 2 Hours**

- Includes patients transferred to trauma centre from secondary hospital outside of Region 4 with a known length of stay. Length of stay is defined as a known time of arrival to secondary hospital and known time of departure from secondary hospital.
- **Yes** = Patients spent <\= 2 hours at secondary hospital prior to transfer to trauma centre.
- **No** = Patients spent > 2 hours at secondary hospital prior to transfer to trauma centre.

<table>
<thead>
<tr>
<th>Transfers From Outside Region 4</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time spent at secondary hospital prior to transfer to trauma centre &lt;= 2 hours</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Injury Time to Trauma Centre < 4 Hours**

- Includes all patients with a known time to trauma centre. (Time of injury event and time of arrival to the trauma centre.)
- **Yes** = Patients with known time to trauma centre < 4 hours.
- **No** = Patients with known time to trauma centre \(\geq 4\) hours.

<table>
<thead>
<tr>
<th>Transfers From Outside Region 4</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury time to trauma centre &lt; 4 hours</td>
<td>25</td>
<td>56.8%</td>
<td>19</td>
<td>43.2%</td>
</tr>
</tbody>
</table>

**Resuscitative Phase**

**Emergency Department Length of Stay <\= 8 Hours**

- Includes all patients who went through the trauma centre Emergency Department with a known length of stay in the Emergency Department. Length of stay is defined as a known time of arrival to the Emergency Department and known time of departure from the Emergency Department.
- **Yes** = Patients with a length of stay in the Emergency Department <\= 8 hours.
- **No** = Patients with a length of stay in the Emergency Department > 8 hours.

<table>
<thead>
<tr>
<th>Resuscitative Phase</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency department length of stay &lt;= 8 hours</td>
<td>64</td>
<td>97%</td>
<td>2</td>
<td>3%</td>
</tr>
</tbody>
</table>
GCS <= 8 at Trauma Centre / Mechanical Airway

- Includes patients with a first recorded GCS <= 8 in the Emergency Department (regardless of GCS at scene). Mechanical airway includes intubation (nasal and oral), cricothyroidotomy and tracheostomy.
- Excludes 18 patients that arrived at the trauma centre already intubated, and 8 patients with an unknown GCS, and 52 patients who had a GCS greater than 8.
- Yes = Patients had a mechanical airway as intervention in the trauma centre Emergency Department.
- No = Patients did not have a mechanical airway as intervention in the trauma centre Emergency Department.

<table>
<thead>
<tr>
<th>Resuscitative Phase</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCS &lt;= 8 at trauma centre / mechanical airway</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Definitive Care

Craniotomy for Epidural or Subdural Hematoma Within 4 Hours of Arrival at Trauma Centre

- Includes all patients who received a craniotomy at trauma centre.
- Yes = Patients received a craniotomy within 4 hours of arrival to the trauma centre.
- No = Patients did not receive a craniotomy within 4 hours of arrival to the trauma centre.

<table>
<thead>
<tr>
<th>Definitive Care</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craniotomy for epidural or subdural hematoma within 4 hours of arrival at trauma centre</td>
<td>5</td>
<td>55.6%</td>
<td>4</td>
<td>44.4%</td>
</tr>
</tbody>
</table>

Gunshot Wound to Abdomen Managed Operatively

- Includes all patients with a gunshot wound to the abdomen.
- Yes = Patient with gunshot wound to the abdomen was managed operatively.
- No = Patient with gunshot wound to the abdomen was managed non-operatively.

<table>
<thead>
<tr>
<th>Definitive Care</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gunshot wound to abdomen managed operatively</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
Operative Management of Femur Fracture Within 24 Hours of Admission

- Includes all patients with operative management of femur fracture.
- **Yes** = Patient had operative management of femur fracture within 24 hours of admission to trauma centre.
- **No** = Patient did not have operative management of femur fracture within 24 hours of admission to trauma centre.

<table>
<thead>
<tr>
<th>Definitive Care</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative management of femur fracture within 24 hours of admission</td>
<td>3</td>
<td>100%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Unplanned Return to Operating Room

- Includes all patients with at least 1 visit to the operating room.
- **Yes** = Patient had an unplanned return to the operating room.
- **No** = Patient did not have an unplanned return to the operating room.

<table>
<thead>
<tr>
<th>Definitive Care</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned return to operating room</td>
<td>1</td>
<td>2.9%</td>
<td>34</td>
<td>97.1%</td>
</tr>
</tbody>
</table>

Admitting Physician Was a Surgeon or an Intensivist

- Includes all patients admitted to the trauma centre (not including emergency department deaths).
- **Yes** = Patient was admitted to a surgeon or an intensivist.
- **No** = Patient was admitted to a non-surgeon or non-intensivist.

<table>
<thead>
<tr>
<th>Definitive Care</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admitting physician was a surgeon or an intensivist</td>
<td>64</td>
<td>83.1%</td>
<td>13</td>
<td>16.9%</td>
</tr>
</tbody>
</table>

Delayed Diagnosis or Missed Injury

- Includes all patients admitted to the trauma centre.
- **Yes** = Patient had a delayed diagnosis or missed injury during hospitalization at trauma centre.
- **No** = Patient did not have delayed diagnosis or missed injury during hospitalization at trauma centre.

<table>
<thead>
<tr>
<th>Definitive Care</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed diagnosis or missed injury</td>
<td>3</td>
<td>3.9%</td>
<td>74</td>
<td>96.1%</td>
</tr>
</tbody>
</table>
Missed C-Spine Injury

- Includes all patients admitted to the trauma centre.
- **Yes** = Patient had a missed c-spine injury within the first 48 hours of admission to the trauma centre and spinal precautions were removed.
- **No** = Patient did not have a missed c-spine injury within the first 48 hours of admission to the trauma centre and spinal precautions were removed.

```
<table>
<thead>
<tr>
<th></th>
<th>n=77</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Definitive Care</td>
</tr>
<tr>
<td>Missed C-spine injury</td>
<td>77</td>
</tr>
</tbody>
</table>
```

Unplanned ICU Admission

- Includes all patients admitted to the trauma centre.
- **Yes** = Patient had an unplanned admission to ICU.
- **No** = Patient did not have an unplanned admission to ICU.

```
<table>
<thead>
<tr>
<th></th>
<th>n=77</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Definitive Care</td>
</tr>
<tr>
<td>Unplanned ICU admission</td>
<td>77</td>
</tr>
</tbody>
</table>
```

Unplanned ICU Readmission

- Includes all patients admitted to the trauma centre ICU.
- **Yes** = Patients had an unplanned readmission to ICU.
- **No** = Patients did not have an unplanned readmission to ICU.

```
<table>
<thead>
<tr>
<th></th>
<th>n=46</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Definitive Care</td>
</tr>
<tr>
<td>Unplanned ICU readmission</td>
<td>46</td>
</tr>
</tbody>
</table>
```

Patient Received an Emergency DPL

- Includes all patients who arrived at the trauma centre.
- **Yes** = Patient received an emergency DPL.
- **No** = Patient did not receive an emergency DPL.

```
<table>
<thead>
<tr>
<th></th>
<th>n=68</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Definitive Care</td>
</tr>
<tr>
<td>Patient received an emergency DPL</td>
<td>68</td>
</tr>
</tbody>
</table>
```
GCS < 12 With CT of the Head

- Includes patients with a first recorded GCS < 12 in the trauma centre Emergency Department.
- Excludes 18 patients that arrived at the trauma centre already intubated, and 8 patients who had an unknown GCS, and 50 patients who had a GCS \( \geq 12 \).
- **Yes** = Patient had a first recorded GCS < 12 and received a CT of the head.
- **No** = Patient had a first recorded GCS < 12 and did not receive a CT of the head.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCS &lt; 12 with CT of the head</td>
<td>2</td>
<td>100%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Outcome

**Death During Transport**

Includes all patients who arrived at the trauma centre.
- **Yes** = Patient was declared dead on arrival by emergency department physician.
- **No** = Patient did not die during transport.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death during transport</td>
<td>0</td>
<td>0%</td>
<td>78</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Death During the First 24 Hours of Admission**

Includes all patients who died.
- **Yes** = Patient died within the first 24 hours of admission.
- **No** = Patient did not die within the first 24 hours of admission.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death during the first 24 hours of admission</td>
<td>4</td>
<td>57.1%</td>
<td>3</td>
<td>42.9%</td>
</tr>
</tbody>
</table>

**Death and Probability of Survival**

Includes all patients with a valued TRISS score and probability of survival > 20%.
- **Yes** = Patient died with a probability of survival > 20%.
- **No** = Patient did not die with a probability of survival > 20%.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death and probability of survival</td>
<td>0</td>
<td>0%</td>
<td>43</td>
<td>100%</td>
</tr>
</tbody>
</table>
Mortality

Includes all patients who arrived at the trauma centre.

Yes = Patient died.

No = Patient did not die.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Yes</th>
<th>% Yes</th>
<th>No</th>
<th>% No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>7</td>
<td>9%</td>
<td>71</td>
<td>91%</td>
</tr>
</tbody>
</table>

TRISS Methodology

The TRISS methodology uses logistic regression to predict survival based on the Revised Trauma Score (RTS), injury severity score (ISS), mechanism of injury (blunt vs. penetrating) and patient age. Unexpected deaths are trauma patients with a predicted probability of survival (TRISS) of 0.5 or more that die and unexpected survivors are trauma patients with a predicted probability of survival (TRISS) of 0.49 or less that survive.

The TRISS ‘z’ statistic measures the statistical significance of the difference between the actual number of survivors among a set of patients and the number expected from outcome norms. W measures the clinical significance of the differences between the actual and unexpected survivors. W is the number of survivors more than would be expected from the outcome norms per 100 patients treated. W can be calculated if the z score is greater than 1.96. Due to the physiologic parameters used in the Revised Trauma Score, patients who do not have a recorded Glasgow Coma Scale (GCS) will not have a TRISS value calculated.

ACH z and W Score

Fiscal Year: April 1, 2000 – March 31, 2001

<table>
<thead>
<tr>
<th></th>
<th>z Score</th>
<th>W Score</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Blunt</td>
<td>0.34</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Adult Penetrating</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Pediatric</td>
<td>0.88</td>
<td>-</td>
<td>39</td>
</tr>
<tr>
<td>Total Subset</td>
<td>0.94</td>
<td>-</td>
<td>43</td>
</tr>
</tbody>
</table>

Data: 1995 – 2001

<table>
<thead>
<tr>
<th></th>
<th>z Score</th>
<th>W Score</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Blunt</td>
<td>0.68</td>
<td>-</td>
<td>21</td>
</tr>
<tr>
<td>Adult Penetrating</td>
<td>0.43</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Pediatric</td>
<td>3.80</td>
<td>4.28</td>
<td>306</td>
</tr>
<tr>
<td>Total Subset</td>
<td>3.88</td>
<td>4.18</td>
<td>328</td>
</tr>
</tbody>
</table>
Trauma

Statistics

ISS ≥ 12

April 1, 2000 – March 31, 2001

Foothills Medical Centre
Alberta Children’s Hospital
MONTHLY TRAUMA TOTALS

Monthly trauma totals include patients with an Injury Severity Score (ISS) ≥ 12 and who are admitted to hospital or die in the emergency departments at the Foothills Medical Centre (FMC) and Alberta Children’s Hospital (ACH). Based on these inclusion criteria, these totals represent 24.8% of injury discharges at FMC and 11% of injury discharges at ACH (refer to page 15).

While the FMC experienced an increase (8%) in the annual trauma total, the ACH annual trauma statistics declined slightly (6%).

Due to a multiplicity of factors, including environmental, the month of July accounted for the largest monthly total at both sites.

![Graph showing monthly trauma totals for FMC and ACH]

Total: 680 (for monthly totals only, all other charts reflect n=679)
14 ED deaths, 1 operating room death not admitted (of 4 OR deaths)

![Graph showing monthly trauma totals for ACH]

Total: 79 (for monthly totals only, all other charts reflect n=78)
Includes 1 ED death in October
MALE/FEMALE RATIO

As noted in previous trauma reports, males continue to outnumber females in the total adult and pediatric trauma population.

Ratio:
00/01 – 2.7:1
99/00 – 3.2:1

Excludes 1 ED death

Ratio:
00/01 – 3.1:1
99/00 – 1.8:1
Excludes 1 ED death
AGE DISTRIBUTION

Data collected at the FMC continues to demonstrate the national trend; the majority of the trauma population (57.2%) are between the ages of 15-44, with the greatest representation in the 15-24 age range. In this fiscal year, 42.2% of the trauma population were 45 or older, compared with 39.8% in 1999/2000 and 40% in 1998/1999, suggestive of the aging of the population.

At the ACH, the data indicates a slight decrease in the percentage of trauma patients ≥ 10 years of age, 50% this year compared to 51% in 1999/2000.
MECHANISM OF INJURY

As in previous years, mechanism of injury is reported by three broad categories: transportation, falls and violence. These are in keeping with the focus of the CHR’s injury control initiatives.

Transportation continues to be cited as the “number one” mechanism of injury (MOI) in data collected at FMC and ACH, accounting for 52.4% and 46.2% of the registry cases respectively.

Falls resulting in major injury accounted for 27.5% (187) of patients at FMC. At ACH, falls constituted 24.4% of cases; a marked decrease from 48% in 1999/2000.

Violent causes of injury represent 7.2% of FMC, and 6.4% of ACH trauma registry totals. Limitations of the ISS scoring system in evaluating penetrating injuries may lead to under-representation of violence in the overall picture of violent trauma.

“Other” mechanisms of injury contributed to 12.8% of the total at FMC. At ACH 23.1% (18) patients were admitted for “other MOI”, as opposed to 8% (7) in 1999/2000. The “other” category is further delineated later in this report.
The following breakdown of each category (transportation, falls, violence and other) illustrates further detail regarding mechanism of injury:

**MECHANISM OF INJURY – TRANSPORTATION**

![Graph showing the breakdown of transportation injuries for 2000/2001 and 1999/2000.](image)

- **2000/2001**: 52.4%
- **1999/2000**: 48%

**Mechanism Breakdown**:
- **MVC**: 265
- **Off Road**: 24
- **Pedal**: 22
- **Pedestrian**: 41
- **Railway**: 2
- **Aircraft**: 2

- **2000/2001**: 46.2%
- **1999/2000**: 37%

**ACH**

![Graph showing the breakdown of transportation injuries for 2000/2001 and 1999/2000.](image)

- **2000/2001**: 46.2%
- **1999/2000**: 37%

**Mechanism Breakdown**:
- **MVC**: 16
- **Off Road**: 6
- **Pedal**: 9
- **Pedestrian**: 4
- **Air**: 1

00/01 – 52.4%
99/00 – 48%
MECHANISM OF INJURY - FALLS

- 2000/2001: 27.5%
- 1999/2000: 29%

00/01 = 27.5%
99/00 = 29%

- FMC: 99
- Same Level: 68
- Other/Unspecified: 20

00/01 = 24.4%
99/00 = 48%

- Multi-level: 14
- Same Level: 5

ACH
MECHANISM OF INJURY - VIOLENCE

### FMC

- Unarmed Assault: 14
- Assault with Object: 18
- Assault with Firearm: 2
- Self-inflicted: 10
- Unknown Assault: 3
- Legal Intervention: 2

- 2000/01: 7.2%
- 1999/00: 11%

### ACH

- Unarmed Assault: 5

- 2000/01: 6.4%
- 1999/00: 6%
MECHANISM OF INJURY - OTHER

00/01 – 12.8%
99/00 – 11%

00/01 – 23.1%
99/00 – 8%
TYPE OF INJURY

Type of injury categories are used to broadly describe the type of force that results in injury. In both the adult and pediatric population, the majority of injuries are the result of blunt forces.

Blunt: 00/01 – 94.1%; 99/00 – 91.7%
Penetrating: 00/01 – 3.2%; 99/00 – 4.8%
Burn: 00/01 – 1.6%; 99/00 – 1.9%
Other: 00/01 – 1%; 99/00 – 1.6%
Other types of injury include drowning, smoke inhalation, hanging, electrical

Blunt: 00/01 – 93.6%; 99/00 – 96%
Penetrating: 00/01 – 0; 99/00 – 0
Burn: 00/01 – 2.5%; 99/00 – 0
Other: 00/01 – 3.8%; 99/00 – 4%
DIRECT VS TRANSFER

Direct means the patient was transported “directly” from the scene to a trauma centre; whereas, transfer means the patient was initially treated at another facility and then “transferred” to a trauma centre. In 2000/2001, 50.2% of patients were transported directly from the scene to the FMC, and 49.8% were transported from another facility; a shift from the prior year when 59% of patients came directly from the scene, and 41% were transferred.

The ACH continues to receive similar numbers of patients directly (52.6%) and from transfers (47.4%).

00/01: direct – 50.2%; transfer – 49.8%
99/00: direct – 59%; transfer – 41%

00/01: direct – 52.6%, transfer – 47.4%
99/00: direct – 49%, transfer – 51%
TOTAL AIR VS GROUND

Air transport includes fixed wing and rotary wing aircraft. Ground transport refers to ground (road) ambulance transport. In situations where both modes of transport are utilized to get patients to FMC or ACH, only the air transport portion will be represented in this collection of statistics. Other means of transport include private vehicle, walk-ins or unknown (not documented on the chart).

![Bar chart showing transport modes to FMC and ACH]

Walk-in: 2
Unknown mode of arrival: 2
Inpatient at time of injury: 1

1 patient unknown mode of arrival
GENDER/AGE/MECHANISM OF INJURY PATTERN - FMC

Data from 2000/2001 indicates that transportation accounts for the majority of trauma for males between the ages of 15-55. After this age, falls become the more prevalent cause of major injury.

In the female population, the leading MOI is transportation in the 15-84 year age range. At that point, falls then surpass transportation.
GENDER/AGE/MECHANISM OF INJURY PATTERN - ACH

Transportation is the leading cause of injury in males in all age categories above one year. Under one year of age, the leading mechanism of injury is violence.

Violent mechanisms of injury in females are seen in the four and under age category. Transportation related injuries occur most often in the 10-14 year old age category.
PROCESSES OF CARE AND RESOURCE UTILIZATION

Trauma Team Activations

At FMC, activation of the trauma team is initiated either by the emergency physician, or through the pre-hospital process of communication. Three levels of response are available, with the personnel who respond dependent upon the level of response activated.

The primary method of tracking trauma team activations (TTAs) is through the use of the TTA call-out sheet (completed by the unit clerks in the Emergency Department). The following illustrates the number and level of TTAs from April 1999 to March 2000. As illustrated, there were 720 level I & II trauma team activations (compared with 643 in the year prior) and 17 activations with a level not specified.

### Monthly Trauma Team Activation’s 2000/2001

<table>
<thead>
<tr>
<th>Month</th>
<th>Level I</th>
<th>Level II</th>
</tr>
</thead>
<tbody>
<tr>
<td>April/00</td>
<td>10</td>
<td>49</td>
</tr>
<tr>
<td>May/00</td>
<td>20</td>
<td>48</td>
</tr>
<tr>
<td>June/00</td>
<td>19</td>
<td>47</td>
</tr>
<tr>
<td><strong>Total per Quarter</strong></td>
<td><strong>49</strong></td>
<td><strong>144</strong></td>
</tr>
<tr>
<td>July/00</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>August/00</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>September/00</td>
<td>18</td>
<td>73</td>
</tr>
<tr>
<td><strong>Total per Quarter</strong></td>
<td><strong>53</strong></td>
<td><strong>193</strong></td>
</tr>
<tr>
<td>October/00</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>November/00</td>
<td>9</td>
<td>60</td>
</tr>
<tr>
<td>December/00</td>
<td>17</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total per Quarter</strong></td>
<td><strong>39</strong></td>
<td><strong>165</strong></td>
</tr>
<tr>
<td>January/01</td>
<td>8</td>
<td>45</td>
</tr>
<tr>
<td><strong>Total for year (I&amp;II)</strong></td>
<td><strong>149</strong></td>
<td><strong>547</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Level I</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>February/01</td>
<td>22</td>
<td>9</td>
</tr>
<tr>
<td>March/01</td>
<td>24</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total (I &amp; other)</strong></td>
<td><strong>46</strong></td>
<td><strong>22</strong></td>
</tr>
<tr>
<td><strong>Totals for All</strong></td>
<td><strong>195</strong></td>
<td><strong>569</strong></td>
</tr>
</tbody>
</table>

At the ACH, three groups of personnel can be activated for trauma, however, the initial response team is primarily in-house emergency department staff. Activation of the trauma team is through the emergency department, and is one component of pediatric trauma resuscitation.
PHYSICIAN SERVICE ANALYSIS

The majority (38.4%) of trauma patients at the FMC site are admitted under the services of general surgery. At the ACH, the ICU service is responsible for the majority of trauma admissions.

This analysis does not reflect transfers of care, nor consulting service involvement.

14 ED deaths – no admitting service
1 (of 4) OR deaths – no admitting service
1 excluded from other category – admitting service appropriate
38.4% admitted to general surgery

1 ED death – no admitting service
ICU TRAUMA ADMISSIONS

In 2000/2001, the number of trauma admissions to the ICU equated to 34.6% of the monthly trauma totals – a decline from 38% in 1999/2000, and 39% from 1998/1999.

The ICU admission rate at the ACH is steady at 60% of trauma patient totals.

235 patients went to ICU, however, there were 9 patients with 1 re-admission and 1 patient with two re-admissions for a total of 245 admissions
- 00/01 – 34.6% of patients went to ICU
- 99/00 – 38% of patients went to ICU

60% (46) ICU admissions
No ICU re-admissions
AVERAGE ICU LOS FOR TRAUMA PATIENTS

The average ICU length of stay (LOS) for trauma patients at FMC has declined from 7.4 days in 1999/2000 to 6.7 days this fiscal year.

The average ICU LOS for trauma patients at ACH has risen from 2.3 days in 1999/2000 to 3.3 days this fiscal year.
SURGICAL PROCEDURES

Trauma patients may undergo a variety of specialized surgical procedures. Orthopedic surgical procedures continue to be performed most frequently for the adult population, while at the ACH plastic surgery procedures were performed most often.

Total OR visits – 575, procedures – 873, hours – 1064
Orthopedic procedures account for 42.6% of all operative procedures

Total surgical procedures – 73
Plastic surgery procedures account for 35.6% of all operative procedures
AVERAGE LENGTH OF STAY

The average LOS for all trauma patients at FMC has decreased this fiscal year from 16.2 days to 14.5 days, with decreases also in the survivor/non-survivor groups.

At the ACH, data indicates an increased LOS across all three categories when compared with 1999/2000.

FMC Range all: 1-413, median 8, mode 5; SD 27, average 99/00 – 16.2
Range survivor: 1-413, median 8, mode 5; SD 27.9, average 99/00 – 17.1
Range non-survivors: 1-115, median 3.5, mode 1; SD 16.7, average 99/00 – 8.9

ACH Range all: 1-82, median 5, mode 1; SD 17, average 99/00 – 7.3
Range survivor: 1-82, median 6, mode 1; SD 17.6, average 99/00 – 7.9
Range non-survivors: 1-8, median 1.5, mode 1; SD 2.7, average 99/00 – 1.3
OUTCOMES BY AGE

Generally, outcomes for the elderly (65+) or the very young (<1) trauma patient are poor. However, this fiscal year there was an increase in the survivor rates for these two groups, when compared to 1999/2000 totals at both sites.
MAJOR MECHANISM OF INJURY/OUTCOME

At both the FMC and the ACH, data indicates that violence claims the highest percentage of non-survivors when compared with other mechanisms of injury.
OUTCOMES BY ISS

The Injury Severity Score (ISS) is an anatomical scoring tool that provides an overall score for patients with single system or multiple injuries. The ISS captured in the Alberta Trauma Registry ranges between 12 and 75. The higher the score the more serious the injury.

Data from both sites continues to show the majority of patients had an ISS between 16 and 25.

<table>
<thead>
<tr>
<th>ISS Range</th>
<th>FMC</th>
<th>ACH</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-15</td>
<td>131</td>
<td>15</td>
</tr>
<tr>
<td>16-25</td>
<td>356</td>
<td>40</td>
</tr>
<tr>
<td>26-35</td>
<td>70</td>
<td>2</td>
</tr>
<tr>
<td>36-45</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>46-55</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>56-65</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>66-75</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Survivors Non-survivors

- FMC: 131 survivors, 356 non-survivors
- ACH: 15 survivors, 40 non-survivors
TOTAL SURVIVORS/NON-SURVIVORS

Mortality rates at both FMC and ACH have decreased when compared with 1999/2000.

<table>
<thead>
<tr>
<th></th>
<th>Survivors</th>
<th>Non-survivors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FMC</strong></td>
<td>598</td>
<td>81</td>
</tr>
<tr>
<td><strong>ACH</strong></td>
<td>71</td>
<td>7</td>
</tr>
</tbody>
</table>

Mortality Rate:
00/01 – 11.9%
99/00 – 15%

Mortality Rate:
00/01 – 9%
99/00 – 10.7%
DISCHARGE LOCATION

The majority of trauma patients from both sites are discharged “home”. From the documentation in the chart, it is often difficult to determine which, if any, support services may be provided at “home”, thus “home with support” may be undervalued.

![Discharge Location Chart]

Home:  
00/01 – 53.9%  
99/00 – 47%
TRAUMA TOTALS

In 1992, the inclusion criteria for the Trauma Registry was an ISS ≥ 16. In 1993, this was revised to an ISS ≥ 12.

The following graph depicts a nine year span of patients from both sites (including the Bow Valley Centre 1992-1997) with an ISS ≥ 16.
Calgary Health Region Trauma Cases Projection

PROJECTED GROWTH IN ADULT MAJOR TRAUMA CASES FOR SOUTHERN ALBERTA

- For the past 5 fiscal years (1995/1996 through 1999/2000), the average annual adult major trauma case rate (based on adult major trauma patients treated at FMC) for Southern Alberta (Health Regions 1 through 5) has been 55 (± 7*) cases per 100,000 adults.

*7 is the standard deviation around the average

- Given a population growth rate of 3% and an average annual major trauma case rate of 55 per 100,000 (lower 48/upper 62), the chart below depicts the forecasted number of adult major trauma cases that would be admitted and treated at the FMC during the next five years.

- Expected utilization rates for Southern Alberta (RHAs 1-5) was derived using 5 year averages between 1995/96 and 1999/00 for defined age-gender cohorts. Maximum utilization rates were derived using the average +1 standard deviation for each cohort and minimum utilization rates were derived using the average -1 standard deviation.

Data Source: Health Assessment Unit
Burn Report
BURN REPORT

The Calgary Firefighter’s Burn Treatment Centre at the Foothills Medical Centre serves as the tertiary care facility for adults of Southern Alberta, South West Saskatchewan and South East British Columbia. Patients with other diagnoses such as frostbite and exfoliative disorders including toxic epidermal necrolysis may also be managed in the Burn Unit. Those requiring ventilatory support are treated in the Intensive Care Unit at the Foothills Medical Centre.

A multi-disciplinary team whose members include plastic surgeons, nurses, physiotherapists, occupational therapist, nutritionists, and social workers has been developed to care for the particular needs of this group of patients. The team meets weekly to discuss clinical issues, to address social concerns, to conduct educational sessions, and to engage in quality review procedures. Upon discharge, follow-up is arranged in outpatient clinics within the Rehabilitation Department at the Foothills Medical Centre, thus providing a degree of continuity of care during the often-lengthy process of rehabilitation.


Patients admitted to the Calgary Firefighter’s Burn Treatment Centre or the Foothills Medical Centre Intensive Care Unit with diagnosis of burn or frostbite:

Number of patients = 60  
Male – 45  
Female – 15

Number of admissions = 65

Age Distribution

Total Length of Stay (days) = 1527

Average Length of Stay (days) = 23.5
Range = 1-139
<14 days: 35 of 65

Site of Injury

29 of 60 had facial burns  
24 of 60 had burns to the hands
Location of Accident

Home 31 (17 within the dwelling)
Work 21
Motor Vehicle 2
Other 6

Type of Burn/Injury
Thermal – flame/contact 42
Chemical 1
Scald 10
Electrical Contact 1
Electrical Flash 5
Frostbite 1

Other Factors involved in Etiology
Cooking Oil 5
Gasoline 13
Tar 3
Seizure 4

Body Surface Area Involvement
<20% 51
21 – 40 6
41 – 60 2
61 – 80 1

Requirement of Surgical Treatment
50 procedures in 25 patients = 131 hours (Avg. 2.6 hours each procedure)
35 patients had no surgery

Smoke Inhalation
6 of 60 required intubation and ventilation in ICU
2 of 60 were intubated prophylactically for suspected heat injury to the upper airway for less than 24 hours

Mortality
1 of 60

The number of admissions has remained relatively stable in recent years, reflecting a balance of general decline in burn injury incidence seen across North America and the increasing population in Calgary and Southern Alberta. The age distribution reflects the characteristic pattern of relatively high incidence in young adults with another smaller peak in old age. Functional impairment, temporary or chronic, through substance abuse, physical or mental disability, neurological disease or old age is often a contributory factor, particularly with incidents in the home. 35% of accidents producing thermal injury occur in the workplace.

Coincident smoke inhalation injury has a major effect on morbidity and mortality in burn patients. The sole death in this twelve month period occurred in a forty-one year old male from a house trailer fire who suffered ten percent total body surface area burn but a severe inhalation injury, complications of which led to his death after 115 days in the Intensive Care Unit.

Submitted by Dr. Robert Lindsay
Calgary EMS Statistics
Calgary EMS Transport Statistics

This data was calculated from a randomly selected sample of major trauma patients transported to the Foothills and the Childrens Hospitals from April 1, 2000, to March 31, 2001.

- **Requested Data: average, minimum, maximum, and median time from scene to trauma centre:**
  - At a 98% confidence level the mean transport time for major trauma patients (as defined by PHI) from the scene to the Foothills Medical Centre is between 10 minutes 40 seconds (639.79 seconds) to 14 minutes 10 seconds (844.04 seconds).
  - The minimum transport time from scene to Foothills Medical Centre of the selected sample was 2 minutes 16 seconds (136 seconds).
  - The maximum transport time from scene to Foothills Medical Centre of the selected sample was 28 minutes 28 seconds (1708 seconds).
  - The median transport time from scene to Foothills Medical Centre of the selected sample was 11 minutes 32 seconds (692 seconds).
  - At a 98% confidence level the mean transport time for major trauma patients (as defined by PHI) from the scene to the Alberta Children’s Hospital is between 10 minutes 47 seconds (649.69 seconds) to 18 minutes 48 seconds (1127.55 seconds).
  - The minimum transport time from scene to Alberta Children’s Hospital of the selected sample was 7 minutes 36 seconds (456 seconds).
  - The maximum transport time from scene to Alberta Children’s Hospital of the selected sample was 29 minutes 45 seconds (1785 seconds).
  - The median transport time from scene to Alberta Children’s Hospital of the selected sample was 12 minutes 44 seconds (763.5 seconds).

Submitted by:
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Injury Control
INJURY CONTROL REPORT

Injury and Injury Control Defined:

Injury is defined as the damage that occurs from the transfer of mechanical, thermal, chemical or electrical energy or the damage resulting from an absence of heat or oxygen. Injuries can be classified as either intentional or unintentional.

Injury Control is based on the application of an epidemiological approach whereby injuries are not viewed as random, chance events but rather as predictable and preventable. Factors of the host, the agent and the environment contribute to injury outcomes and an injury control system addresses the full spectrum from primary prevention through treatment and rehabilitation. Priorities for injury control in the Calgary Health Region were established during the Regional Program Design Committee process initiated in 1996 and include the following:

- prevention of motor vehicle collisions
- prevention of violence (domestic and suicide)
- prevention of falls
- development of a regional injury surveillance system
- enhancement of the regional trauma system
- early integration of rehabilitative and community services into the care of the injured.

An Injury Control Approach:

A Regional Injury Control Committee, with representation across all injury control sectors, was established in 1998 and continues to meet on a regular basis to identify injury control issues and to coordinate activity within the identified priority areas. Regular updates are provided about the activities in the prevention, acute care and rehabilitation areas and opportunities for joint effort are explored. Over the past year the committee has been involved in the following key activities:

- support to injury prevention priority areas
- input to the development of a Provincial Trauma System Proposal,
- participation in the evaluation of the Alberta Centre for Injury Control and Research
- exploration of strategies to address the shortage of rehabilitation beds and services in the region.

Linkages to community based injury prevention organizations is achieved through the Calgary Injury Prevention Coalition (CIPC), a multi-stakeholder network that has been in existence since 1992. The CIPC is a key mechanism for coordination of injury prevention activities and the infrastructure for the coalition is supported by the Injury Prevention and Control Team within the regional Healthy Communities portfolio.

Burden of Illness:

In the Calgary Health Region (CHR), injuries are the leading cause of death for people between the ages of 1 and 49 and when compared with other disease conditions in this same age group account for the highest volume of potential years of life lost (PYLL). In 1999, the most recent complete year of available mortality data, there were 324 injury related fatalities in the Calgary Region. This represents a population adjusted injury fatality rate of 35.33 per 100,000. Alberta Health and Wellness sets a provincial benchmark for age standardized injury mortality rate per 100,000 population. The Calgary Health Region rate is below this benchmark of 45 deaths per 100,000, but it is still significantly higher than the rates which have been achieved in some
European countries. Table 1 below highlights the number of fatalities and potential years of life lost for all injuries and also for each of the five major injury causes for Calgary Health Region residents which include motor vehicle related events, falls, suicide violence and workplace incidents.

**TABLE 1:**

![1999 Injury Related Fatalities and Potential Years of Life Lost for Calgary Health Region residents](image)

Table 1 note: Workplace related mortality was determined utilizing place of injury codes “farm”, “mine”, “quarry”, “industrial plant” and is not mutually exclusive from the other injury categories.

In 2000/2001 there were 5565 injury related hospitalizations and 62,650 injury related visits to the emergency department. Adjusting for population, this represents an injury hospitalization rate of 601 per 100,000 population and an injury related emergency department visit rate of 6764 per 100,000 population. Table 2 and Table 3 below summarize the hospitalization and emergency department numbers and rates for all injuries and also for each of the major injury causes.

**TABLE 2:**

![Fiscal year 2000/2001 Injury related hospitalizations and rate per 100,000 for Calgary Health Region residents](image)

Table 2 note a): Workplace hospitalizations were determined by utilizing visits paid through Worker’s Compensation Board and this classification is not mutually exclusive of the other injury categories.

Table 2 note b): Adjusted rates are standardized to the estimated 1999/2000 mid-year population of the Calgary Health Region. Population estimates are from the Alberta Health Registry Database.
Injuries are experienced across the lifespan by Calgary Health Region residents, however some groups have a higher risk for specific types of injuries and some profiles emerge around the major injury issues. In the area of motor vehicle injuries, those in the 16 to 24 age group are most at risk and particularly males 16-54 are affected. Women age 75 years and older represent a specific risk group for hospitalization due to a fall injury while the <16 age group is most at risk for visiting the emergency department because of a fall injury. Suicide is the overall leading cause of injury related death with a significant percentage occurring in young adults. As a result, suicide represents one of the largest single contributions to premature death. See Injury Statistics section for additional age and gender related breakdown.

The societal and economic impacts of injury are enormous. In addition to the direct costs for hospitalization, physician fees, rehabilitation or long term care, there are the indirect costs associated with loss of future productivity, disability and premature death. When the monetary impacts are combined with the personal and social impacts of injury, such as loss of independence and disruption of family life, the tremendous toll injury takes on society is realized.

**Injury Control Highlights:**

**Motor Vehicle Related:**

Traffic injuries contribute significantly to the morbidity and mortality in Region 4 and have been a target for the development of integrated and comprehensive injury control strategies. A major traffic safety public awareness and social marketing campaign has been undertaken over the previous three years with involvement of CHR stakeholders as well as community partners such as The Calgary Police Service and the City of Calgary, Transportation Department. In 2000, the focus of the initiative was narrowed to intersection safety and the impact of red light violations. This focus reflected the study of key high collision intersections in the city and the opportunities for road engineering, enforcement and education strategies. Red light running is a driving behavior which contributes significantly to serious injuries and fatalities.
Television, radio, transit and billboards were used to convey the “Red Means Stop” message over an eight week period. In addition to direct funding from the Calgary Health Region and the City of Calgary of $230,000.00, an additional $200,000.00 of in-kind partner contributions were realized. Target audience exposure levels ranging from 23% to 96% were achieved in all of the campaign mediums. Opportunities to continue to profile the message have also been supported, including participation in the development and advertising for the Calgary Police Service portable red light camera program. The police have also initiated a fixed red light camera system during this same time period to address the serious issue of red light violations.

An intersection safety survey completed soon after the campaign indicated generally high awareness of the seriousness of red light collisions and strong support for the effectiveness of red light cameras in both changing attitudes and reducing collisions. A traffic safety general awareness survey completed in early 2001 indicated that almost half of the regional residents stated that traffic safety had become more of a concern in the past six months. Almost half of respondents also strongly agreed that death and injury caused by motor vehicle collisions is as big a health issue as cancer, heart disease or AIDS. The percentage of respondents who strongly agreed with the statement that “information about traffic safety prompts them to think about their own driving behavior” increased significantly in the 2001 survey.

Occupant restraint initiatives are another important area of traffic safety promotion. Calgary Health Region staff work with partners such as The Calgary Police Service, Calgary EMS, The Calgary Fire Department, and Interfaith Thrift Stores to provide child car seat inspection clinics, car seat round up programs, Check Stops and Think, Think Again sessions. Think, Think Again is a program which allows ticketed drivers to attend an education session to have a ticket for non use of occupant restraints revoked. Twenty six sessions were completed in 2000/2001.

Falls:

The Older Adult Falls Prevention Committee of the CIPC is involved in a number of fall prevention strategies aimed at reducing the number of fall injuries experienced by seniors. Work to date has included the development of a dynamic database of resources related to the topic that was constructed through direct interaction with the target group and a comprehensive literature review. Initial fall prevention messages derived from the database have gone through focus group testing with representatives of the target audience. Other activities include the exploration of peer led workshops for fall prevention, development of a profile of fall injuries in older adults and compilation and development of resource materials. The coalition committee is also linked to the Regional Senior Health Program and the Healthy Aging Initiatives.

The CIPC Child Working Group, Playground Subcommittee, is involved in a number of school and community based strategies targeting fall prevention in playgrounds. These strategies include public education, partnership development, demonstration projects, advocacy for upgrade of existing playground facilities, community leadership development and development of funding proposals to enable playground improvements. A comprehensive playground resource manual for community groups has been developed and is being piloted with a number of groups.

Violence and Suicide:

Action on the nine comprehensive recommendations from the Regional Suicide Response Plan has been delayed over the past year due to the reorganization of the mental health portfolio within the Calgary Health Region and with the Alberta Mental Health Board. Approval has now been given to hire a full time suicide response coordinator within the Health Promotion/Disease Prevention group of Healthy Communities with strong links to the injury prevention and control
group. Initial priorities will focus on suicide surveillance and linking with the Medical Examiner's Office, as well as on training and on the provision of resource materials for regional staff.

The Youth In Focus Committee of the CIPC has also taken a suicide prevention focus over the past year. Coalition funds have been utilized to provide Applied Suicide Intervention Skills Training (ASIST) to youth serving organizations in the Calgary Region. A total of 28 coalition members received the training and follow up activities are planned.

Injury prevention and control staff support the activities of the Domestic Violence Health Interest Group of the Calgary Health Region. Universal screening for domestic violence at Calgary Health Region sites is continuing to develop with a current focus on screening protocols and procedures in emergency departments. In addition, 2200 posters and domestic violence “Help Cards” were distributed to physicians offices across the region to reinforce the impact of violence on health and to encourage physicians to screen in their client contacts.

Surveillance System Development:

Steady progress has been achieved in the development of an injury surveillance system for the Calgary Health Region. Quarterly injury data on all injuries as well as data broken down by the five major injury causes is now collected on a regular basis. Additional in-depth study of the falls data and investigation of sport and recreational injury data is planned for the next year. Data-sharing agreements continue to be streamlined with both the Calgary Police Service and Calgary Emergency Medical Services. Calgary Police Service collision data is now directly downloaded to the Quality Improvement, Health Information area of the Calgary Health Region. These agreements will facilitate data linkage and timely data sharing.

Other Initiatives:

1. CIPC Youth Risk Reduction Strategies:

The Calgary Injury Prevention Coalition (CIPC) sponsors a broad social marketing campaign in the Calgary Region aimed at improving the risk management skills of youth aged 12-24 years. A variety of strategies are utilized including a social marketing campaign, school based activities such as Smartgrad and community based activities such as Youth Week. All activities incorporate smartrisk messaging with the core themes as follows:

- Buckle Up
- Drive Sober
- Look First
- Wear the Gear
- Get Trained

Significant progress has been achieved in engaging local organizations in the smartrisk language and programming. Canada Olympic Park has received seed money from CIPC over the past two years to support the development of smartrisk messaging at the park. This year COP has fully incorporated smartrisk into their business plan and have included the messaging in all park activities and advertising.

A similar approach is under development at Shaw Millenium Skateboard Park, however progress is slow due to the complexities of the partners involved. A Smartgrad resource package for schools was developed and broadly distributed to high schools this year and an interactive computer based display unit was developed and pilot tested. Evaluation of all of these strategies is ongoing.
2. Safe Community Designation:

The Calgary Injury Prevention Coalition has continued to work towards the designation of Calgary as a World Health Organization (WHO) Safe Community in collaboration with The City of Calgary – Safer City Initiative. CIPC and regional injury prevention and control staff have been heavily involved in the work to develop indicators and evaluation criteria for the Safer City Initiative including the regular tracking of injury data. The designation is expected for May of 2002.

Submitted by Nancy Staniland
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INJURY STATISTICS

Age and gender distributions
for all injuries and the five major injury causes

April 1, 2000 to March 31, 2001
Age and Gender Distribution of Fiscal 2000/2001 Injury Related Hospitalizations for residents of the Calgary Health Region

Note: All Injuries hospitalizations were determined by utilizing ICD9-CM codes E800-E848, E850-E869, E880-E929 and E950-E999

Age and Gender Distribution of Fiscal 2000/2001 Injury Related Emergency Department Visits for residents of the Calgary Health Region

Note: All Injuries emergency department visits were determined by utilizing ICD9-CM codes E800-E848, E850-E869, E880-E929 and E950-E999
Note: Fall related hospitalizations were determined by utilizing ICD9-CM codes E880-E886 & E888.

Age and Gender Distribution of Fiscal 2000/2001 Fall Related Hospitalizations for residents of the Calgary Health Region

Age and Gender Distribution for Fiscal 2000/2001 Fall Related Emergency Department Visits for residents of the Calgary Health Region
Region Trauma Services Annual Report 2000/2001

Age and Gender Distribution of Fiscal 2000/2001 Motor Vehicle Related Hospitalizations for residents of the Calgary Health Region

Note: Motor vehicle related hospitalizations were determined utilizing ICD9-CM ecodes E810-E819.

Age and Gender Distribution of Fiscal 2000/2001 Motor Vehicle Related Emergency Department Visits for residents of the Calgary Health Region

Note: Motor vehicle related emergency department visits were determined utilizing ICD9-CM ecodes E810-E819.
Age and Gender Distribution of Fiscal 2000/2001 Suicide related Hospitalizations for residents of the Calgary Health Region

Note: Suicide related emergency department visits were determined utilizing ICD9-CM codes E950-E959.

Age and Gender Distribution of Fiscal 2000/2001 Suicide Related Emergency Department Visits for residents of the Calgary Health Region

Note: Suicide related emergency department visits were determined utilizing ICD9-CM codes E950-E959.
Note: Violence related hospitalizations were determined utilizing ICD9-CM ecodes E960-E969.

Age and Gender Distribution of Fiscal 2000/2001 Violence Related Hospitalizations for residents of the Calgary Health Region

Note: Violence related hospitalizations were determined utilizing ICD9-CM ecodes E960-E969.

Age and Gender Distribution of Fiscal 2000/2001 Violence Related Emergency Department Visits for residents of the Calgary Health Region

Note: Violence related emergency department visits were determined utilizing ICD9-CM ecodes E960-E969.
Note: Workplace related hospitalizations were determined by utilizing visits paid through Worker's Compensation Board and this classification is not mutually exclusive of the other injury categories.

Note: Workplace related emergency department visits were determined by utilizing visits paid through Worker's Compensation Board and this classification is not mutually exclusive of the other injury categories.