Reflections of an Accidental Traumatologist: The Trauma Association of Canada at Twenty-one

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Twenty-first anniversaries have a particular significance to the British and irrespective of voting age, drinking age, or driving age, 21 is generally accepted as the “coming of age” or final transition into adulthood. This year happens to be the 21st anniversary of the inaugural meeting of the Trauma Association of Canada (TAC), held in Vancouver in September 1984. This milestone provides me with the focus for my address today: What was the vision for TAC back then? Have we as an Association “come of age,” and where do we go from here?

Before doing that, however, I wish to briefly address another, more personal milestone. This is also the 21st anniversary of my decision to leave the United Kingdom to begin a trauma fellowship at the University of Washington in Seattle. I had already been bitten by the trauma bug and had spent several months with the Red Cross in the war zone that was the Thai-Cambodian border in the 1980s. This move to the United States, however, proved to be that irrevocable step that took me into a career as a trauma surgeon—a step, I confess, I made with some trepidation. Only a few years earlier, I had considered that a career in surgery was inconsistent with any reasonable lifestyle and to be avoided despite its seductive appeal. Pursuing trauma surgery seemed, at the time, the epitome of self-destructive behavior! Hence my title reference to being an accidental, or at least a reluctant, traumatologist.

How wrong I was! As my own career in trauma comes of age, I can say that it has been a hugely enjoyable and rewarding one and I would like to acknowledge those mentors who have guided me along the way. They include John Nicholls in England who started me on this path, Jim Carrico and Ron Maier who taught me what trauma and service were all about and also how much fun it could be, and David Hoyt and Peg Fridlund in San Diego who taught me all I needed to know about systems and then some. My thanks, too, go to my wife Chris, who has supported me through this sometimes-arduous road trip through the Far East, United Kingdom, and the United States, and for finally steering our family back to her native British Columbia in Canada. Thanks also to my three sons Jonathan, Mark, and Philip, for all those interesting moments that I will never forget and that have enriched my life immensely, as well as provided me with a constant reality check on my life.

My first contact with TAC was at the joint meeting with the American Association for the Surgery of Trauma in Halifax in 1995, and I joined the TAC the following year when I moved to Vancouver. By then, TAC was in its 13th year, having come into being in 1983 as a numbered association under the umbrella of the Royal College of Physicians and Surgeons of Canada. TAC evolved out of the Canadian Association of General Surgeons (CAGS), Committee on Trauma under the leadership of Dr. Charles Burns, chair of the Committee and TAC’s first president. TAC’s raison d’être was the need for a national multidisciplinary forum...
for trauma care providers and as an organization to foster regular scientific meetings on trauma care in Canada.

The Association’s Goals were quickly elaborated (Fig. 2) and bear reviewing because they clearly define the priorities for trauma care in Canada and for our fledgling Association those two decades ago. Mission statements, objectives and bylaws have all followed and are available for review on the Association’s website. I do not propose a detailed progress report on each of these goals but I do wish to highlight some notable achievements, give an overview of our “balanced scorecard,” and identify areas for future attention. The first three goals all relate to optimal care of the trauma patient, recognizing the need to address prehospital as well as hospital services and have a comprehensive systems approach to trauma care—all still relatively novel ideas back then and not always comprehended by our Health Ministries even today. Remember this was 1983, seven years earlier, the American College of Surgeons, Committee on Trauma (ACS COT) had developed its document Optimal Hospital Resources for Care of the Seriously Injured with specific guidelines for trauma centers of various level designations but had not yet implemented its verification process. There was, however, no corresponding Canadian document and no clear consensus on whether the US guidelines were applicable to Canadian trauma care or even if the US guidelines were soundly evidence based. The lack of data relating to injury in Canada compounded these difficulties.

The following decade saw the TAC develop two major initiatives and a review of these forms the primary text of my address. The first was to define optimal care guidelines for trauma care in Canada and became the focus for the Accreditation Committee under the chair of Dr. Charles Burns. The other was the development of a National Trauma Registry initiative to address the injury information shortfall, initially spearheaded by Dr. Burns and subsequently shepherded along to fruition by Dr. Judith Vestrup and, later, Dr. Barry McLellan.

TRAUMA SYSTEMS, NATIONAL GUIDELINES AND ACCREDITATION

The guidelines ultimately crafted by the Accreditation Committee and released in 1993 were a synthesis of a critical appraisal of the ACS COT guidelines, Canadian common sense, and pragmatism that shied away from some of the more controversial US recommendations, yet set a standard for trauma care not widely available in Canada at the time. Some debate ensued as to whether these guidelines should be incorporated into and audited by the Canadian Council on Health Facility Accreditation or whether TAC itself should promote and administer the program. In February 1996, Dr. Barry McLellan, then President of TAC, circulated a letter to CEOs of all major trauma centers in Canada announcing the development of a trauma center accreditation program that would be administered by TAC under the umbrella of the Royal College, with site visits performed by TAC executive members. The primary thrust of the TAC guidelines and the accreditation process has been to encourage and evaluate performance improvement and overall institutional commitment to trauma care. In the 9 years since the program’s inception, 19 trauma centers in six Canadian Provinces have successful achieved full TAC accreditation at their appropriate level designation, with many now preparing for re-accreditation. In addition, a seventh province, Quebec, has implemented its own accreditation process for its designated trauma centers using guidelines developed from the ACS COT document and similar to the TAC guidelines.

Revised TAC guidelines were developed in 2003 under the chair of Dr. George Assuras, with minor changes in trauma center criteria but with a major paradigm shift that recognized the importance of evaluating the entire trauma system and its various constituent parts including hospital, prehospital, injury prevention, rehabilitation, and administrative components. In this respect, TAC leads as the only national trauma association taking an integrated systems approach to evaluating trauma care in a given jurisdiction. The first system-oriented TAC accreditation took place in 2004 with a review of the Calgary Health Region Trauma Services, which proved highly successful for all involved, albeit extremely labor intensive. System accreditation requests for the coming year have recently been received from three other provinces indicating continued commitment to the process. In this enterprise, TAC has contributed immensely to improving the quality of Canadian trauma care and is to be congratulated on this flagship program.

Members of our association have also been involved in the evaluation of the efficacy of the accreditation process. As governments and funding authorities increasingly demand that care be evidence-based, it has been incumbent upon all of us to demonstrate that what we have advocated does indeed improve care, both process and outcomes, and is not merely self-interest based dogma. Indeed, in my own province of British Columbia, developing convincing outcomes data has been a prerequisite to obtaining the necessary funding for system implementation. In this endeavor, the performance improvement documented by trauma system implementation in Quebec and Ontario and trauma program implementation in Vancouver has contributed significantly to the
1. Authority to designate trauma centres
2. Formal designation process
3. Use of national standards during designation process
4. Accreditation/verification required for designation
5. Authority to limit trauma centres based on need
6. Pre-hospital triage protocols for trauma patients
7. Process for monitoring trauma centre performance
8. State (province)-wide coverage of trauma system

Fig. 3. Criteria defining trauma system implementation after West et al.

worldwide evidence supporting the efficacy of trauma systems with designated trauma centers and national, audited standards for trauma care. The future task of the TAC Accreditation Committee will be to strengthen the evidence-base for this program by assimilating new information as it becomes available into our guidelines and accreditation process.

In an era that is also demanding more public accountability in health care, the Calgary Trauma Program has taken the bold and groundbreaking step of publishing its annual performance data, not only in its annual report, but also publicly on its web site. Liverpool Hospital in Sydney, Australia is the only other trauma center, of that I am aware, to have posted its outcome data in the public domain and can be credited with pioneering this initiative. Both centers are to be congratulated on pushing the envelope on performance reporting. I commend their websites as outstanding examples in trauma program reporting setting benchmarks that we should all strive to attain.

In both endeavors, rigorous scientific underpinning of national trauma performance guidelines and the public dissemination of performance scorecards, TAC and our colleagues in the Trauma Coordinators of Canada (TCC) have plenty of work left to do. Skeptics continue to dog the progress toward nationwide or provincewide trauma systems implementation and resourcing trauma systems consistent with guidelines and optimal performance. In a recent survey of TAC members and leaders in trauma care in Canada, it is apparent that many jurisdictions still lack any systems approach to trauma care. Eight structural and operational criteria, developed by West et al. and adopted by the American College of Surgeons, have been used to define the degree to which trauma systems have been implemented (Fig. 3). Six provinces (British Columbia, Alberta, Ontario, Quebec, Nova Scotia, and New Brunswick) have indicated that they satisfy six or more of these eight criteria; the remaining four provinces and all three territories met three criteria or less.

Fig. 4. Organizational chart illustrating the administrative infrastructure of the Nova Scotia Trauma Program.

Systems implementation in Canada appears to have been driven in many provinces by individual trauma programs in large trauma centers, with an incremental expansion of mandate to cover surrounding rural areas over time. Some provinces—notably Nova Scotia, Quebec, and Ontario—have benefited from provincial governmental mandates to ensure a comprehensive provincewide system is in place along with the necessary provincial infrastructure (Fig. 4). Others, such as British Columbia, have benefited from provincial health care restructuring resulting in the formation of a few large health authorities mandated to take regional perspectives on provision of health services including trauma. Many of us, however, have had to rely on a grassroots approach to system implementation, working with our institutions and health authorities to gradually expand trauma system coverage and integration within our jurisdictions. Each of these approaches are achieving success with greater degrees of organizational development and performance improvement than was present only a few years ago. The national dichotomy, however, is notable, with have and have-not jurisdictions. The territories and the predominantly rural provinces, which lack large population centers with major trauma centers, have seen very little progress toward trauma system development and have limited data available for outcome or performance appraisal. This is regrettable because injury rates in rural jurisdictions and the territories (Fig. 5) remain higher than rates in urban areas and preventable death from injury in these jurisdictions continues to be largely unaddressed.

Also notable in this whole national endeavor is the lack of any federal leadership or initiative on trauma systems implementation along with a complete lack of dedicated funding to realize a nationwide injury control or trauma systems implementation program. In this regard, we lag behind our neighbors in the United States, whose Centers for Disease Control and Prevention has a section on injury and there is dedicated (albeit modest) federal funding for trauma systems implementation. The one ray of hope on the federal horizon is the development of an Injury Prevention Strategy for Canada, which is in the final report stage, although this initiative does not evaluate or address the need for organized, coordinated trauma care.
Based on these observations, the following are self-evident:

- Trauma systems are maturing in the more populous provinces.
- Systems implementation is often locally driven by trauma programs.
- TAC’s national guidelines and accreditation process are generally supported.
- Large areas of Canada are still devoid of organized trauma care.
- National and provincial forums to address systems implementation are lacking.
- Federal support for trauma systems implementation is absent.
- Credibility gap concerning value of trauma systems remains at the level of federal and some provincial governments.

What can TAC and TCC do to address these issues? I would propose the following two broad initiatives:

- Existing trauma programs and systems in the ‘have’ provinces adopt adjacent territories and rural provinces, and include them in system design and planning. This includes crossborder transfer agreements, registry, and performance improvement support.
- TAC and its executives need to address the current credibility gap by targeting federal and provincial ministries of health with evidence identifying performance gaps and supporting trauma systems implementation.

In regard to the first initiative, some progress has been achieved, with many provinces supporting their neighboring provinces and/or territories in an ad-hoc fashion. More can be done, however, particularly with regard to formalizing transfer agreements, development of outreach educational and telemedical support, registry participation, and support for performance improvement. Alberta, British Columbia, Ontario, and Nova Scotia programs have obvious opportunities in supporting this proposal. I also hope that, as our national accreditation process continues to mature, an integral component of the evaluation process for each provincial system will be the support provided to neighboring territories. It remains self-evident that expanding trauma system coverage in Canada will have to be driven locally for the immediate future, given the current void in political initiatives regarding trauma systems implementation both in the have-not provinces as well as federally.

With regard to the second issue of provincial and federal lobbying, the path is less clear. Both federal and provincial TAC initiatives have been pursued in the past and many of us are involved in lobbying our own provincial governments and health ministries. Trauma consistently fails to achieve the same political attention enjoyed by heart disease, cancer, or even joint replacement. This is despite trauma’s significant public health impact as the second leading cause of years of life lost and an estimated annual cost to our society of $8.4 billion (Fig. 6). The ever-changing political landscape contributes to the problem with both federal and provincial major trauma initiatives derailed in recent years due to changes in either government or personnel within health ministries.

Public awareness and public accountability for the services we provide and the outcomes being achieved remain our most valuable ally and one we should increasingly look toward to mobilize the public and political awareness and motivation necessary for change to occur. Data are power and we should find constructive ways in using that power.

**INJURY SURVEILLANCE AND THE NATIONAL TRAUMA REGISTRY**

The second major project initiated by TAC in its early years was the development of a National Trauma Registry. This goal, recognized from the outset as critical to defining
trauma care needs in Canada, was passionately championed by Dr. Burns in the early years of the Association, but took more than a decade to achieve. In his 1990 Fraser Gurd Lecture, he presented a vision of a national registry based on the Manitoba trauma registry, which was the first population-based trauma registry recording all injury admissions. TAC’s Registry Committee, led by Dr. Judith Vestrup and subsequently Dr. Barry McLellan, recognized the need to adopt an epidemiologic approach to injury in Canada rooted in accurate injury data. The vision of a National Trauma Registry (NTR) was eventually realized by establishing a framework for a collaborative venture with the Canadian Institute for Health Information (CIHI). Following initial feasibility meetings in 1995, a NTR Advisory Committee was struck chaired by the then president of TAC, Dr. McLellan. A phased implementation approach was adopted with the initial goal being the establishment of a national minimal data set (MDS). The MDS receives data abstracted from each provincial discharge abstract database (DAD), containing demographic, diagnostic, and procedural information on all injury admissions to acute care hospitals. Bilateral agreements with each province have been signed permitting data sharing and reporting. The MDS now collects nationwide data and submits annual reports on injury statistics for Canada. With a million or more patients entered into the MDS to date, its potential is huge and is only just being realized.

Phase 2 of the NTR initiative involved the development of a comprehensive data set (CDS) with data contribution from major trauma centers across Canada with free-standing institutional trauma registries (Fig. 7). The CDS contains more detailed information on the more seriously injured patients across the country with an estimated 90% capture of all patients meeting entry criteria (Injury Severity Score >12). Two provinces and the three territories do not have trauma registries in place and do not contribute to the NTR-CDS. Trauma Registry CDS data are also summarized by CIHI in an annual report on major injury in Canada. Examples of data currently available from NTR have been demonstrated earlier (Figs. 5 and 6) indicating population based injury rates and admissions for injury in Canada. Figures 8, 9 and 10 illustrate comprehensive, national data on hospitalizations and hospital deaths due to injury in Canada along with a breakdown of deaths by mechanism of injury. Detailed diagnostic and procedure codes are available for every trauma admission in all acute care facilities in Canada since the NTR started reporting in 1997.

These two datasets house a wealth of information and provide for a multitude of opportunities including research, national trauma care planning, systems evaluation, trend analysis, and prevention programs. Future NTR proposals include the development of a death dataset (DDS) supported by provincial coroners data, which is near to fruition, and a more ambitious ambulatory data set, which will require wider provincial involvement in data collection than is currently avail-

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**Fig. 7.** Canadian Institute of Health Information’s (CIHI) National Trauma Registry is comprised of a minimal dataset (MDS) containing baseline data on all hospitalizations for trauma in Canada as well as a comprehensive dataset (CDS) containing registry data from contributing trauma centers. A death dataset (DDS) based on coroners’ data will be added shortly.

**Fig. 8.** Hospitalizations due to injury in Canada based on National Trauma Registry minimal dataset (CIHI).

**Fig. 9.** Hospital deaths due to injury in Canada based on National Trauma Registry minimal dataset (CIHI).
has defined trauma fellowship goals and objectives along with guidelines for the trauma content of critical care fellowships. A highly productive relationship has been developed with the Canadian Forces Medical Services with the realization of a civilian trauma center based Canadian Forces Trauma Training Centre in Vancouver providing core rotations for physician assistants along with predeployment and advanced trauma skill training for a wide range of military health professionals. The guidelines committee has brought together a web-based library of trauma practice guidelines from a variety of sources as a resource for our members.

TAC members have recently introduced two new educational initiatives to Canada, the Advanced Trauma Operative Management (ATOM) course and the Definitive Surgery for Trauma Care (DSTC) course. The first Canadian DSTC course was held in Vancouver in April 2005 with the support of our Australasian colleagues. Both these courses offer advanced training in surgical trauma care and will be of great benefit to our surgical trainees and any general surgeon involved in trauma care. These new courses augment the standard ATLS and TNCC courses provided by our members and widely available across Canada.

In the field of research, many of our members have been individually productive as this meeting again testifies. Two collaborative, TAC-sponsored research initiatives are deserving of special mention. The first is the Research Committee’s work in developing NTR-MDS based national outcome data under the leadership of Dr. Eric Bergeron, to which I have already alluded. The second initiative is the creation of the Canadian Trauma Trials Collaborative under the leadership of Dr. David Evans. This group has committed to the development of nationwide, multicenter prospective clinical trials with several projects underway or near to launching. This is a vitally important aspect of TAC’s research mandate and will undoubtedly result in new knowledge to assist in defining future optimal trauma care.

INJURY PREVENTION

TAC’s involvement in injury prevention remains a somewhat elusive goal and is representative of the current disconnect between prevention programs, injury surveillance, and trauma programs at the provincial and federal level. What is currently lacking is a coordinated injury control perspective at each of these governmental levels embracing and integrating all of these three endeavors. How can TAC facilitate this? The answer has to be at all levels: locally, provincially, and federally. We need to collaborate with our injury prevention colleagues and other stakeholders such as CIHI and Health Canada, in developing an integrated injury control perspective that we can take forward to our health ministers. In our own trauma centers, we should all keep an eye to prevention as an integral part of our practices, seeking opportunities to take corrective action where trends indicate emerging problems or sustained morbidity.

EDUCATION, TRAINING, AND RESEARCH

In the field of education, TAC has met its goal of holding annual scientific meetings which have now evolved into vibrant, stand-alone, multidisciplinary meetings as indicated by this year’s record of 300 delegates. The education committee

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Fig. 10. Percentage of hospitalizations and hospital deaths due to injury by mechanism: National Trauma Registry minimal dataset (CIHI).
MEMBERSHIP

The last group of goals from 1983 (Fig. 2) all relate to the viability of our Association and specifically its membership. Without members fully engaged to take on the challenges ahead, TAC cannot thrive. In the last few years, we have had great success in diversifying the membership to embrace all health care professionals involved in trauma care, with a greatly expanded associate membership and the emergence of TCC and TRISC as separate but integral components of our organization. We have had only limited success in sustaining the interest of our colleagues in emergency medicine and the trauma-related surgical subspecialties. It is my hope that, as our committees evolve into active working groups addressing the needs of trauma care in Canada, we can draw in this expertise and broaden TAC’s representation. This will enrich our trauma community, lead to better care, and ultimately benefit our patients. To this goal, I charge all members of TAC to get involved in the work of our committees and take an active role in structuring future trauma care in Canada.

In closing, I would like to acknowledge a young Frenchman touring England in the early 1980s who was brought into my hospital after a motorcycle crash. As a cocky third-year surgical resident, I removed his injured spleen, put his femur fracture in traction, and confidently reassured him all was well. Three days later, he was dead following a catastrophic fat embolus syndrome and probable pulmonary embolism. It was at that moment that I first became confronted with my own limitations in dealing with the serious systemic consequences of injury and the realization that my training in trauma had been wholly inadequate up to that point. That revelation unwittingly set me on my career path as a trauma surgeon.

As trauma care providers and representatives of this organization, we reflect on what we have accomplished and what remains to be done to define our collective future path. As the next generation of Canadian surgeons, emergency physicians, and trauma nurses prepare to take on leadership roles in our association, there is much work still to be done in reducing the burden of injury in Canada. We can, however, be satisfied in knowing that their work will be based on a solid foundation of a comprehensive National Trauma Registry, evolving trauma systems implementation, and excellence in trauma care that has been developed and advanced by members of this association. For that we can all pause and take our due credit. I am proud to be a member of this association, which has provided some of the most rewarding experiences of my career. It is clear to me that TAC has more than “come of age” and has moved forward as an organization providing leadership, advocacy, and expertise in injury control in Canada.

As traumatologist by accident rather than design, it has been hugely rewarding and a great honor to have served as your association’s president for the last year, for which I thank you all sincerely.

REFERENCES

3. American College of Surgeons Committee on Trauma: Optimal Hospital Resources for Care of the Seriously Injured. Chicago, IL: American College of Surgeons, 1976.