0022-5282/89/2906-0709$02.00/0
THE JOURNAL OF TRAUMA

Vol. 29, No. 6
Printed in U.S.A.

Papers from the Annual Meeting of the Trauma Association of Canada, September 21–24, 1988, Ottawa

Traumatology Today: Old Dogma, New Directions—Presidential Address to the 5th Annual Meeting of the Trauma Association of Canada/L'association canadienne de traumatologie

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Traumatology today is based on too much dogma and not enough hard facts. As Altschule speculated recently: "The replacement of observation in medicine by what seems to be sound logic . . . seems to be motivated by an emotional need for certainty where certainty is not possible" (1). Although logic may not have entirely replaced observation in traumatology, I believe that we have used logic to create dogma and to formulate policies on trauma system design and establish trauma treatment protocols far beyond what the available data can support.

I will begin by describing several recent examples of this phenomenon. Since I also wish to say something positive, however, I will summarize what I consider the two major issues in traumatology today and recommend three new areas of activity that I think our Association members should emphasize over the coming year. By poking holes in a few "sacred balloons" I'll probably offend some of you; I know I'll offend many authorities in our field. Nonetheless I urge you to keep in mind the words of Sir Francis Bacon: "If a man begin with certainties he shall end in doubts; but if he will be content to begin with doubts, he will end in certainties" (2).

What is dogma? Webster's Dictionary gives three definitions: 1) something held as an established tenet; *esp*: a definite authoritative tenet; 2) a code of such tenets; and 3) a point of view or tenet put forth as authoritative without adequate grounds (3).

The third definition is particularly apt. The trauma literature is laced with this type of dogma. It has three common subspecies: 1) the opinion of all-knowing experts whom nobody dares question; 2) conventional wisdom, which nobody bothers to question; and 3) the consensus of panels of experts (also known as ad hoc committees or task forces), which few want to question, probably because so many were on the panel.

The treatment of splenic injuries, for example, has been based on dogma in the form of expert opinion for almost 100 years. Early in this century Kocher stated: "Injuries of the spleen demand excision of the gland. No evil effects follow its removal while the danger of hemorrhage is effectually stopped" (4).

In 1932, MacIndoe raised the spectre of delayed rupture of the spleen. On the basis of a single personal case and a review of the literature, he wrote that, "Secondary hemorrhage takes place in a high proportion of minor splenic injuries, and is then associated with the same mortality as for splenic rupture in general" (5).

By the end of the Second World War, surgical dogma dictated that all injured spleens should be removed. The spleen was considered expendable, the operation was simple and safe, and the dark cloud of delayed hemorrhage hung over anyone who dared to differ. By the 1970's, this attitude, at once cavalier and conservative, had brought us to the point where iatrogenic injury was the leading indication for splenectomy at most large teaching hospitals.

Everything seemed quite straightforward, until two new observations came to light. First, in 1952 King and Schumacker reported that children whose spleens had been removed had a tendency to develop overwhelming post-splenectomy infections which could be rapidly fatal (6). The clinical picture of these infections is frightening. The first manifestations are fever, delirium, nausea, and vomiting. Coma and death follow in a few hours. The reported incidence of such infections varies from 0 to 3.0%, but is probably less than 1% after splenectomy for trauma (7). Second, in the 1950's and 1960's, surgeons at The Hospital for Sick Children in Toronto noted that the injured spleen, like most other organs and tissues in the human body, had some ability to heal on its own.

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Presented at the 1988 Annual Meeting, September 21–24, 1988.
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The first paper documenting this phenomenon was published in 1968 (8). As a result of these observations, many pediatric surgeons began to treat selected cases of splenic injury nonoperatively. This approach was very controversial, to say the least.

The dogma of splenic injury treatment reached its peak in an article in the *Medical Post* on August 16, 1986 (9). In a report on an American College of Surgeons trauma symposium, it quoted two prominent trauma surgeons who strongly denounced nonoperative treatment of splenic injuries. One of them stated that " ... we have more experience in managing kids than any pediatric surgeon you will ever see." He went on to say that selective nonoperative treatment of splenic injuries leads to unnecessary deaths, excessive use of blood products, and is a waste of money because of prolonged hospitalizations. He made these statements without supplying any data to show that operative treatment is better. In fact, I could not find one single report in the Index Medicus over the last 10 years by these or any other trauma experts on the routine operative treatment of splenic injuries in children. By contrast, many published reports have documented the safety and efficacy of selective nonoperative treatment (10,11). Here are our own data from a recent 5-year review that we presented to the American Pediatric Surgical Association in May 1988 (12).

From 1981 to 1986, we treated a total of 75 patients with splenic injuries. Sixty-five were treated nonoperatively; all survived. Of the ten patients operated on, four had splenorrhaphies, three had total splenectomies and one a partial splenectomy, and in two cases the spleen stopped bleeding spontaneously. Total splenic salvage was 96%. There was no case of delayed rupture. Three deaths occurred, all caused by other injuries.

Only 15 of the 65 patients who were treated nonoperatively received blood transfusions and ten of these had documented bleeding from other sites. Of 45 patients with isolated splenic injuries, six received transfusions, one required laparotomy, and none required splenectomy. Patients who were treated operatively received far more blood than those treated nonoperatively (Table I).

The mean time from admission to operation was 2.7 hours. No patient required laparotomy more than 6 hours after admission, and none required transfusion more than 12 hours after admission.

TABLE I
Blood transfusion requirements in splenic trauma

	No Operation (n = 65)	Operation (n = 10)
Patients receiving transfusion	15	9
Volume transfused*		
In patients who survived	22 ± 4 ml/kg†	83 ± 34 ml/kg
In patients who died	None	145 ± 56 ml/kg

* Total volume of blood products (packed cells and plasma) including prehospital phase.

† 11 ± 2 ml/kg in patients with isolated splenic trauma (n = 5).

On the basis of our published experience, we reached several conclusions. Selective nonoperative treatment is the "gold standard" for splenic injuries in children. It is successful in almost 90% of cases. Surgery is indicated only when blood loss exceeds 40 ml/kg body weight. Very few children with isolated splenic injuries require either blood transfusion or laparotomy and almost none require splenectomy. Finally, there are no data to support the argument that this method delays needed operations, increases the need for blood transfusions, or results in longer hospital stays.

So much for expert opinion.

The second type of dogma is conventional wisdom. It is often based on statistics that are quoted and requoted in different contexts without reference to their original source.

A good example is the often heard statement that trauma is the leading cause of death in children and young adults. This sweeping generalization, which first drew attention to trauma at a time when it did not receive the attention it deserved, has long since outlived its usefulness. What is meant by the word "trauma" in this statement? Usually, it refers to specific injury codes or E-codes from the International Classification of Diseases for air, water, railroad, and off-road vehicular accidents; home, farm, and industrial accidents; accidental poisonings by drugs and other chemicals; medical and surgical misadventures, submersions, suffocations, suicides, homicides, and burns. It even includes state-sanctioned homicide, which is on the rise in some countries. "Trauma" seems to include virtually any type of injury, not just the kind of blunt and penetrating injury that we are most concerned with. Lumping all these causes of death together obscures important details; you can't see the trees for the forest.

Statistics show that unintentional injuries, largely from motor vehicle accidents, are indeed the most important cause of premature mortality in the United States. In 1985, unintentional injuries caused the loss of more than 2.2 million years of potential life in persons up to age 65 years, according to the National Center for Health Statistics (13). When combined with suicide and homicide, accidental injuries were responsible for more years of potential life lost than cancer and heart disease combined (13).

Other statistical reports give a different impression. The 1987 statement of the City of Toronto Department of Public Health lists accidents as the fifth leading cause of death after heart disease, cancer, cerebrovascular disease, and pneumonia (14). It also documents an almost 50% reduction in the annual mortality rate due to accidents among Toronto residents between 1977 and 1987, from 44.6 to 23.7 per 100,000 population. In 1987, 1,013 Toronto residents died of ischemic heart disease, and 86 died of AIDS; 29 died of injuries sustained in motor

vehicle accidents (MVAs). Accidents of all types accounted for less than 3% of all deaths among Toronto residents in 1987 and MVAs didn't even make the list of the top 25 causes.

AIDS is now the leading cause of premature mortality in Toronto as reflected in years of potential life lost. It claims 1.5 times the number of years as all types of accidents combined (14). The Toronto Department of Public Health hardly mentions injuries in the text of its annual statement. Yet it clearly stresses that it received a special budget of $10.5 million for a campaign against AIDS, which included education, case followup, policy development, and advocacy. The United States figures suggest a public health problem running out of control; the Toronto data show a marked improvement over 10 years. Why the difference?

Clearly, injury statistics taken out of context can be very misleading. We must avoid using them as a drunk uses a lamp post, more for support than illumination. When quoting statistics, we must be sure they are relevant to the matter at hand and we must go back to original data whenever possible.

My colleagues and I at The Hospital for Sick Children in Toronto have recently completed a study of pediatric trauma deaths in Ontario in an attempt to better understand the trauma problem in our own province. With the help of the Ontario Coroner's Office and in particular James Young, our Deputy Chief Coroner, we checked the records of all accidental and violent deaths among Ontario children up to and including 15 years of age over a 3-year period from 1985 to 1987. We wanted to know more about who was dying and why, and what we could hope to achieve by establishing an optimal trauma system including prehospital care and a network of trauma centers.

We found that traumatic injuries, including suicide and homicide, caused 426 or 10% of the 4,430 deaths during this period (15). The average annual death rate was 142 or about 20 deaths per 100,000 children. Sudden Infant Death Syndrome caused almost as many deaths (129) as trauma.

The age distribution for injury deaths peaked in early infancy and again in adolescence. The times from injury to death were evenly distributed, unlike the trimodal distribution reported for adults. About half of the nonpreventable and a quarter of the preventable deaths occurred at the scene; almost all deaths occurred within 72 hours. In fact, most of the deaths after more than 24 hours were brain-dead children who had been kept on life support systems for the purpose of organ donation. Late deaths from sepsis, adult respiratory distress syndrome, and multi-organ failure did not occur.

Only about 30% of the patients who died had potentially survivable injuries, according to our own objective criteria; of these, almost half died at the scene or within 1 hour of the time of injury. Only about 13% or one in eighth of the pediatric trauma deaths in Ontario could have been prevented by a perfect trauma system covering every square mile of our province.

After studying the circumstances of each case in detail, we concluded that, although it may be true, the statement that trauma is the leading cause of death obscures the tremendous variety of physical and social factors and causes of injury, and the fact that most trauma deaths cannot be prevented by present treatment methods. We did not find much support for the current dogma that establishing a system of trauma centers would of itself save many lives.

The third and final type of dogma is dogma by consensus or dogma by committee. This type often crops up when a policy decision is required, usually by a governmental agency or someone trying to influence such an agency when there just aren't enough solid data to support the decision. The response is to convene a committee of experts and produce a consensus report.

A shining example of this phenomenon occurred in Toronto over the last few years. In 1982 the Metropolitan Toronto District Health Council (DHC) set up a task force to decide how many Level I trauma centers were needed in that city. At that time, Sunnybrook Medical Centre was being swamped by patients from outside Toronto and it seemed obvious that either Sunnybrook would have to curtail its other programs and expand its trauma unit or more trauma centers would have to open. The task force collected data from interested hospitals on how many patients they were actually seeing, but made no attempt to get population-based data. As it turned out, most of the patients reported were from outside Metro Toronto. Nevertheless, the task force estimated that there were about 1,400 trauma cases a year (16).

The next few years were punctuated by more meetings and interim reports. Finally, the DHC called in another expert panel from the American College of Surgeons. Five years after the question was first raised, these experts gave the opinion that only one additional trauma center was needed (17). Masses of reports, press releases, and correspondence had been produced and a depressing amount of time had been spent on this question but no one ever did a proper epidemiologic study. Here we are in 1988, and in spite of all this effort and the Toronto Department of Health's statistics, we still don't know how many severe trauma cases there are in Metro Toronto each year. If the same amount of money and effort had been used to study the issue scientifically, or even better, to set up a data registry to monitor it continuously, we would have the facts at hand to plan our trauma system rationally. The final report of the DHC Task Force was criticized by the City's Medical Officer of Health because of:

- lack of a clear definition of trauma,
- lack of hard data on injury rates,
- failure to consider the impact of alternate or com-

plementary strategies such as primary injury prevention, and
- failure to consider trends in demographics and injury rates over time (18).

Incidentally, all of the expert advice was ignored in the end. The decision on how many trauma centers Toronto needed was made on political grounds. Politicians undoubtedly find it easier to ignore recommendations that aren't based on solid facts.

Dogma by committee is also exemplified in the many long lists of minimal standards for trauma centers. Most stem from the American College of Surgeons (ACS) Guidelines on Hospital and Prehospital Resources for Optimal Care of the Injured Patient. Although these standards were originally meant to define an ideal system, they are being used more and more as minimal standards.

The ACS recommends that a Level I trauma center must have cardiopulmonary bypass available at all times, whereas a Level II center does not. But Ontario's only bona fide trauma center, Sunnybrook Medical Centre, does not have cardiopulmonary bypass. Our own review of the Ontario Coroner's records did not reveal a single example of a child dying for lack of this service.

The importance attached to these standards is illustrated by the fact that a paper by Trunkey et al. published in *J.A.M.A.* in June 1988 used adherence to the ACS Trauma Center Guidelines alone to measure the status of trauma system development across the United States (19). I would have preferred to see patient outcomes used to judge the quality of trauma systems. Obviously, the ACS guidelines have taken on a life of their own.

The Ontario Ministry of Health set up a task force of its own several years ago to produce trauma center guidelines for this province. They take up 23 pages and are mostly derived from the ACS standards. The Ten Commandments are a lot shorter and easier to understand. They are probably easier to obey as well. The preamble to the document includes this statement:

> "Unfortunately, there has been little system wide documentation of Trauma in Ontario. The lack of a complete and reliable data base poses a serious planning problem" (20).

If those of us on the panel, and I must confess that I was on it, had had our wits about us, we would have changed the mandate of the task force then and there from the development of minimal standards for trauma centers to the establishment of a provincial trauma registry. Instead, we soldiered on and produced a set of guidelines without proven relevance to the needs of the province. Belatedly, the government itself has seen the need for a trauma registry, which is being developed right now. The Ontario guidelines require pneumatic antishock garments for all Level I, II, and III trauma centers in Ontario despite the complete lack of evidence in the literature that these devices are effective. This is what I mean by dogma by consensus.

And where are the Ontario guidelines now? Right with the report of the DHC—gathering dust on shelves and in file drawers all over Ontario. We still don't have a provincial trauma system worthy of the name. Somehow, the experts seem to have missed the point, *unless* the point was merely to delay actually doing anything about the trauma problem.

I'd like to focus now on what I consider the basic issues in traumatology today. There are just two:

1) primary injury prevention; and

2) ensuring access to quality care.

The need for primary prevention is obvious—not just because we want to reduce needless suffering and economic loss but also because most trauma deaths are unavoidable after the injury event. I believe that by studying more closely our own patients and those who never make it to hospital we can develop more effective prevention strategies.

The second basic issue is provision of the best available treatment for all trauma victims from the moment of injury through convalescence. This includes access to the system, care in the field, rapid transport to a hospital staffed and equipped to resuscitate them, transport to a Level I or II trauma center if necessary, and, finally, access to high-quality rehabilitation and long-term followup services—in other words, a system of care. Today some trauma victims in our country don't have access to any of this care, some get part of it, but very few get all of it.

Both of these goals are within reach. We need no breakthroughs in basic science or new technology to prevent injuries and assure optimal care for all. But we do need money and people with the enthusiasm and resolve to tackle these problems. We, the Trauma Association of Canada, should be among the leaders.

How do we achieve these goals? I would like to suggest three lines of attack:

1) research in epidemiology and prevention;

2) more effective cooperation with government;

3) a model trauma system for Canada.

These are the new directions which I am proposing for our Association.

First of all, we must learn more about the epidemiology of trauma in Canada and stop quoting United States data out of context. We should look past the old saw that trauma is the leading cause of death and learn more about the basic nature of this "disease" of modern society.

Epidemiology is the study of disease in groups as opposed to individuals. It requires data from whole populations, such as a city, county, province, or country, not just from cases treated at a particular hospital or group of hospitals or by individual practitioners. Epidemiology stresses rates of disease and injury in different groups, that is, it requires both numerators and denominators.

It also stresses exposure, and thus requires data from individuals who are not injured or who don't die. As traumatologists, we must begin to think a bit like epidemiologists. But we must also kindle enough interest among card-carrying epidemiologists to study the problem themselves. I believe that new strategies for injury prevention will follow.

For example, we all know that motor vehicles are responsible for most trauma deaths in children. I've always assumed these were motor vehicles on public roads and highways, but an interesting study by Brison et al. (21), published in 1988 in the *American Journal of Public Health*, revealed a quite different aspect of this problem. These authors studied all fatal pedestrian injuries to young children in Washington State from 1979 to 1983. They found that 58% were not related to traffic, that is, they occurred on driveways, parking lots, and the like, not on public thoroughfares. They also found that light trucks or vans were involved in 76% of the non-traffic fatalities in contrast to 14% of the traffic fatalities. Tragically, many of these children were run over by their own parents, relatives, or neighbours. This epidemiologic study suggests new strategies for injury prevention, including safeguarding domestic driveways and reassessing the appropriateness of light trucks and vans as family vehicles.

By emphasizing this kind of epidemiologic research, we can resolve the apparently disparate reports on the magnitude and specific nature of the trauma problem in our own regions and in Canada as a whole. Equally important, we can establish methods such as trauma registries to track the problem into the future so that we can fine-tune our system of care and our prevention programs accordingly.

This emphasis on prevention fits well with the priorities of our Federal Government as outlined in the document "Achieving Health for All: A Framework for Health Promotion," recently published by the Federal Ministry of Health (22). Developing and implementing prevention programs that work will not be easy. There will be economic and social barriers, such as we have already seen regarding compliance with seatbelt laws. Just think of the tremendous resistance to gun control legislation in the United States. But we must get involved and meet this challenge head on. Those of us who are clinicians can continue to identify injury hazards such as lap belts, motorcycles, and all-terrain vehicles, and those of us who are properly grounded in epidemiology and biostatistics can quantify the injury problem better and test the effectiveness of new prevention and treatment programs objectively.

This leads me to the second new direction that I would like you to consider. Whether we like it or not, governments, particularly provincial governments, run the health care system in Canada today. They also provide most of the research money. Only governments have the power necessary to address the basic issues of prevention and treatment that I have been talking about. A lone scientist working in his lab may well find a cure for AIDS or even cancer, but he or she can't do much about trauma. We have to make personal contact with politicians and government officials to get our message across and influence what they actually do.

Trunkey attributes much of the recent improvement in access to trauma care and the quality of prehospital trauma care in the United States to the "Cranston" legislation (23). The version of this bill before the U.S. House of Representatives calls for:

1) grants for states to implement trauma systems;

2) creation of an advisory group on trauma systems;

3) studies by the United States Federal Government of the economic impact of trauma, the appropriateness of Medicaid payments, and the adequacy of radio frequencies for emergency medical services systems (EMS) communications.

We in Canada should be educating our own legislators and government officials and involving them more in solving the trauma problem.

In Ontario, this is beginning to happen. I must give credit to a small but important group of people in the Ministry of Health who are willing and anxious to work directly with providers of trauma care such as ourselves. As a result, the University of Toronto, which staffs all of Toronto's designated trauma centers, is close to an agreement with the Provincial Ministry of Health to set up a coordinating office with a trauma hotline for outside referrals.

This office will include a switchboard staffed 24 hours a day, 7 days a week, to receive calls from physicians in our referring hospitals. On-line computer access to the Metropolitan Toronto Central Resource Registry will provide up-to-the-minute information on Emergency Department status and ICU bed and OR availability in all Level I trauma centers. The switchboard staff will forward the referral calls directly to the trauma team leader in one of these centers. The team leader will accept the referral if appropriate, give advice to the referring physician, and arrange for transportation. The agreement also calls for data collection and a quality assurance program. The funding, including salary support for a medical director, will come from the Ministry of Health, through the budget of one of the trauma centres, but the reporting relationship will be through the University Trauma Committee. This agreement has only been possible because we have gone directly to the Ministry, bypassing our hospital administrators, and because both parties, government and providers, recognize the need for rapid access to the trauma centers, efficient utilization of resources, and accountability for the quality of care trauma patients receive. I am now personally convinced that working directly with government can be very fruitful and I would urge all of you to try it.

Both our incoming President Peter Lane and I have been working on the Ontario Trauma Registry Task

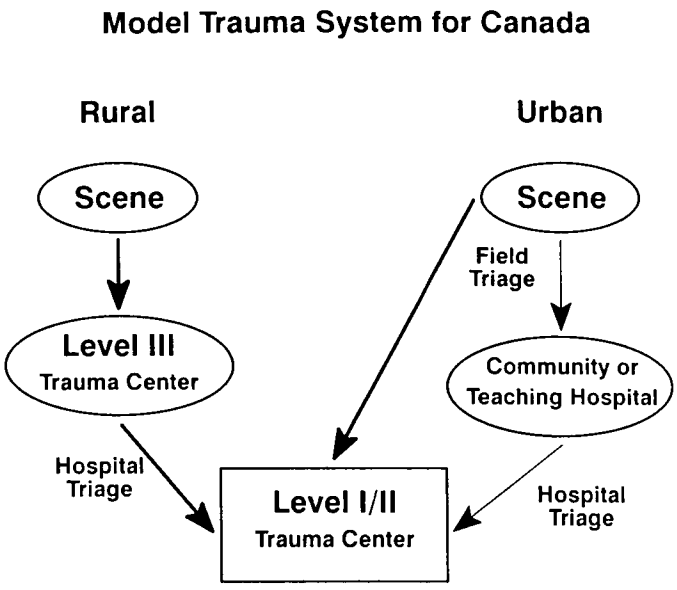

FIG. 1. A model trauma system for Canada.

Force to set up a provincial trauma registry. Because of the efforts of Judith Vestrup, the Chairman of our Registry Committee, officials in the Ontario Ministry of Health are now aware of the need to gather population-based data on trauma on an ongoing basis so that we can better understand the problem and marshall our resources to solve it. There will be two components to the registry. The first will be a complete record, with a minimum number of data elements, of all injured patients admitted to Ontario hospitals. We plan to use existing computerized data sources with a few simple additions, as suggested some years ago by Charles Burns (personal communication), whose pioneering work in this field has given us a useful model. Because it will include all admissions, this component will provide us with epidemiologic data for system planning. The second component will be a comprehensive data set for all severely injured patients treated at provincial trauma centers. This will help us study specific treatment and quality of care issues throughout the system. Again, this project has been possible only because our Ministry of Health wants it. Such a registry is feasible in every province in Canada and I would recommend it to you also. In the next few months the Trauma Association of Canada will be hosting a national conference at which we plan to outline our proposal for a model provincial trauma registry in greater detail.

When one looks south of the border at systems such as those in Maryland, Pennsylvania, San Diego County, and the city of Chicago, one realizes that it is possible, if not absolutely essential, for traumatologists to work effectively with government to achieve meaningful improvements in the trauma care system.

Finally, I would like to suggest that we develop a model trauma system for Canada, recognizing the limits of our geography and the fact that not all patients have or are ever likely to have direct access to Level I trauma centers (Fig. 1). We have all read about the German system where doctors in helicopters are taken directly to the accident scene to begin resuscitating trauma victims (24). We know about the system in some parts of the United States where trauma victims are triaged in the field and taken directly to designated Level I or II trauma centers. Neither system is feasible in most parts of Canada.

The famous "Study of Two Counties" suggested that designated trauma centers reduce injury mortality rates (24). This study has often been used to argue that all severely injured patients should be taken directly to Level I trauma centers. The question I ask is: do trauma centers get better results because only they can provide highly sophisticated care or because they do a better job with the basic ABC's and the recognition of common, treatable conditions such as intracranial or intra-abdominal bleeding? I suggest the latter. If so, it would make more sense in a country like Canada to take the lessons learned at the Level I centers out to the Level III centers in the community. A close examination of the preventable deaths in the Study of Two Counties, other studies of preventable deaths (26), and our own review of trauma deaths in Ontario (15) has led me to conclude that most preventable trauma deaths are due to failure to treat hypoxia or hypovolemia adequately or to recognize common injuries such as epidural hematoma, ruptured spleen, and pneumothorax.

Of the 11 preventable deaths in the Study of Two Counties, nine resulted from unrecognized or inadequately treated intra-abdominal hemorrhage, one from unrecognized pericardial tamponade, and one from sepsis from an unrecognized small-bowel perforation. All of these patients could have been treated definitively in a Level III trauma center or rapidly transferred to a Level I or II center after initial stabilization with crystalloid and blood.

According to my proposal, all trauma patients in larger towns and cities would be triaged directly to a Level I or II trauma center. In rural and suburban areas, many if not all injured patients, including those with severe multiple injuries, would be taken to Level III trauma centers. Those who required more sophisticated care would be transferred to a Level I or II center by paramedics according to written transfer agreements. The Level III trauma centers in rural and suburban community hospitals would have to develop their own trauma programs and staff their Emergency Departments at all times with physicians trained in Advanced Trauma Life Support. The Level I and II centers in turn would have to provide back-up to the Level III centers. Their trauma team leaders would be immediately available by phone to give advice, accept patients in transfer and help arrange transportation. Although some patients might die for lack of an immediate life-saving operation, I would like to re-emphasize that my own review of the Ontario experience and the literature suggests that the vast majority of preventable deaths are due to a failure to diag-

nose eminently treatable conditions such as epidural hematoma, tension pneumothorax, and ruptured spleen. The initial treatment of all of these conditions can be performed in virtually any general hospital in the country with a commitment to provide Level III trauma services, provided the Emergency Department staff is properly trained and equipped and has the backup they need from a Level I or II center. This model could be modified and adopted for use throughout Canada.

These are the new directions I would like our Association to pursue. Please take some time to think how each of you as individuals and all of us together can pursue them toward our goal of reducing the far too heavy toll that trauma exacts from our society.

There is much more that I would like to say, especially about primary injury prevention through the use of bicycle and motorcycle helmets, improvements in passenger restraint systems, compliance with seatbelt legislation, and reduction in impaired driving, but unfortunately there is not enough time. I will say that this is a very exciting period in the history of traumatology. We know many of the fundamental causes of injury and we have the tools available to do something about them. Although we've come a long way, we still have a long road ahead of us. We must strive not only to improve the system of care but also to look beyond treatment to more fundamental issues such as incidence rates, causes of injury, and primary prevention. We must forge new and stronger links with epidemiologists, the basic scientists of injury control, and with governments, the agents of change in our health care system. Let us shake off old dogma, scrutinize the so-called experts, question conventional wisdom, and resist the temptation to make policy by consensus when a study would do the job better.

I'd like to close by thanking the Trauma Association of Canada/L'association canadienne de traumatologie once again for the privilege and honour of serving as your President and by wishing Peter Lane good luck as he takes office.

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