

Crossroads: 1987 Presidential Address—Trauma Association of Canada

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I am greatly privileged at the conclusion of my mandate to address, not only my young and growing Trauma Association of Canada but also the prestigious and well established American Association for the Surgery of Trauma.

This historic crossroads of our two associations here in Montreal, Quebec, Canada, is an exceptional occasion for recognition, exchange, and liaison in our common endeavour to thrust the number one health problem in North America. We were very proud this year to name our annual lecture after Doctor Fraser Gurd, who was President of A.A.S.T. in 1968 at the time of your last meeting in Montreal. Doctor Gurd's father was also President in 1941 when A.A.S.T. met earlier in Montreal. The tradition was well established and continued with Doctor Gurd's "spiritual son" David Mulder being successively President of both Associations. So my task has been made easy and most pleasant in sharing with you my views and thoughts of the situation in Canada.

Canada and United States have always been close commercial partners with 70% of our imports and 80% of our exports being exchanged with the Americans. The North-South axis is not a strategy but the mere recognition of a fact based on geographic and demographic reality.

Our former Minister of Commerce in Quebec, Bernard Landry, used the metaphor "That a small or medium size enterprise dealing from Montreal would have to cover across the country 5,000 km to reach a 20-million consumer population; going south, within 1,000 km only, the target population will be 75 million, and within 1,500 km, 115 million, including major cities of eastern United States" (Fig. 1). The situation is the same in the West where natural commercial partners are in Seattle, Portland, San Francisco, and Los Angeles, keeping in mind that the distance between Vancouver and Los Angeles is half the distance between Vancouver and Montreal (1).

During this last round of negotiations, we can feel from here the blowing breeze of a free trade between our two countries across the longest undefended border in the world.

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"Canada is a nation built on the reward of hard work by people not intimidated by geography or climate" (2). This sense of reality from the President of Air Canada has carried this government owned company to world recognition. Mr. Jeannot's background as a physicist led him to introduce in 1960 the concept of electromagnetic recording of aircraft parameters that evolved as the black box introduced the same year by the Americans. During the worst part of last February he added: "We can push the cold aside by experiencing the warmth of satisfaction that comes from knowing we have accomplished something of value."

Canada is a huge piece of land, the second largest after the U.S.S.R., with 27 million people, a tenth of the population of the United States. Besides highly concentrated agglomerations in the East, the population density in the United States is dispersed rather evenly, whereas in Canada, there are only three cities with a population of 1 million or more, and 80% of the population has settled in a small perimeter along the South, with less than 10 inhabitants per square kilometer for the largest part of the country (Fig. 2). People up North will in no way be considered second-class citizens, creating a tremendous challenge when it comes to medical care, particularly in emergency and critical situations.

In the German system any accident site is within 15 minutes of a trauma facility by ground or air ambulance. The province of Quebec, with 6 million population in an area equal to that of five European countries, with a population density surpassing that of the United States, could never conceive such a system (Fig. 3). Facing the impossibility to emulate, we are compelled to innovate.

Health care in Canada is essentially a provincial prerogative and the Ontario Government last year was the first to officially embark in a designation process. Toronto, with a metropolitan population of 3.4 million, took advantage of the verification review committee of the American College of Surgeons and was recently visited. Based on available data and the modified ratio of 500 per million population, the committee estimated initially about 1,600 major trauma patients with Injury Severity Scores (155) of 16, justifying four Level I trauma centres. Sunnybrook, the only officially designated trauma centre in the country, receives 400 such cases per year, but these include referrals from outside Toronto. The other major hospitals receive a hundred or less, showing strong evi-

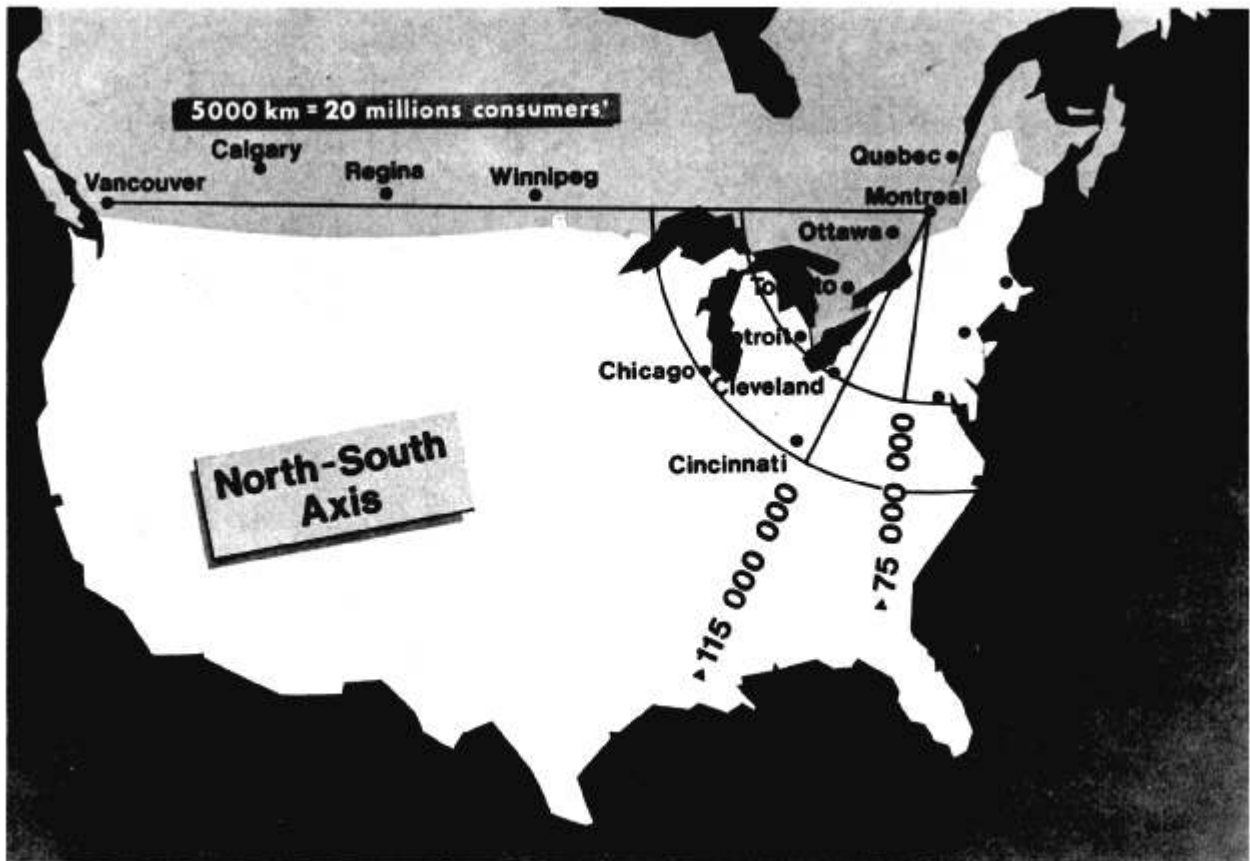


FIG. 1. Natural North-South axis: shorter distance and larger population.

dence that the concept of trauma centres will have to be addressed and adapted to Canadian needs.

A good step in that direction is the experience of the small province of Manitoba introduced by the founding President of Trauma Association of Canada. Doctor Charles Burns, by virtue of education, organisation, and trauma registry, established a very effective provincial program between community hospitals acting as regional units and the University hospital acting as a comprehensive trauma centre, without official government recognition of a designation process (3).

In Canada, the A.T.L.S. course of the Committee on Trauma of the American College of Surgeons was received with enthusiasm and most provinces have joined. Region XI is represented by the western provinces, and Region XII by Ontario, Quebec, and the Maritimes. A regional concept of care has to go through an exchange and a common language process between the individuals and institutions so beautifully provided by the A.T.L.S. Program. In the province of Quebec, besides regional faculties based on the four universities, in Montreal, Quebec, and Sherbrooke, we have created two extra faculties in large concentrations of the northern and southern periphery of Montreal. The course was then expanded in the community where we found great participation and unexpected facilities. But also, to our astonishment, this decentralised approach established a

true provincial network that will support all trauma activities including regional planning and designation process.

A.T.L.S. gave a booming impetus to the Committee on Trauma of the American College of Surgeons, who introduced several programs that we are now considering and adjusting to Canadian needs. An "after-A.T.L.S." course addressing the community surgeon is under development by our Education Committee and will be introduced at our next annual meeting as a postgraduate course. Pre-Hospital Trauma Life Support will be of great value in many areas of our country. An Advanced Pediatric Life Support course is now in its final stage under the Canadian Association of Pediatric Surgeons, and should be introduced this fall.

I am personally convinced that A.T.L.S. has probably done more than any other program, despite its limitations, obviously; mistakes, probably; controversies, definitely. If A.T.L.S. is an exceptional teaching model, it is even more a tool for communication. Although we realise that English is an international language, if the course is to be translated in French and Spanish, it will become to the great merit of Americans a true ambassador for the cause of trauma around the world.

Our number one problem is motor-vehicle accidents that represent between 40 to 60% of the 12,000 to 15,000 trauma deaths each year in Canada.

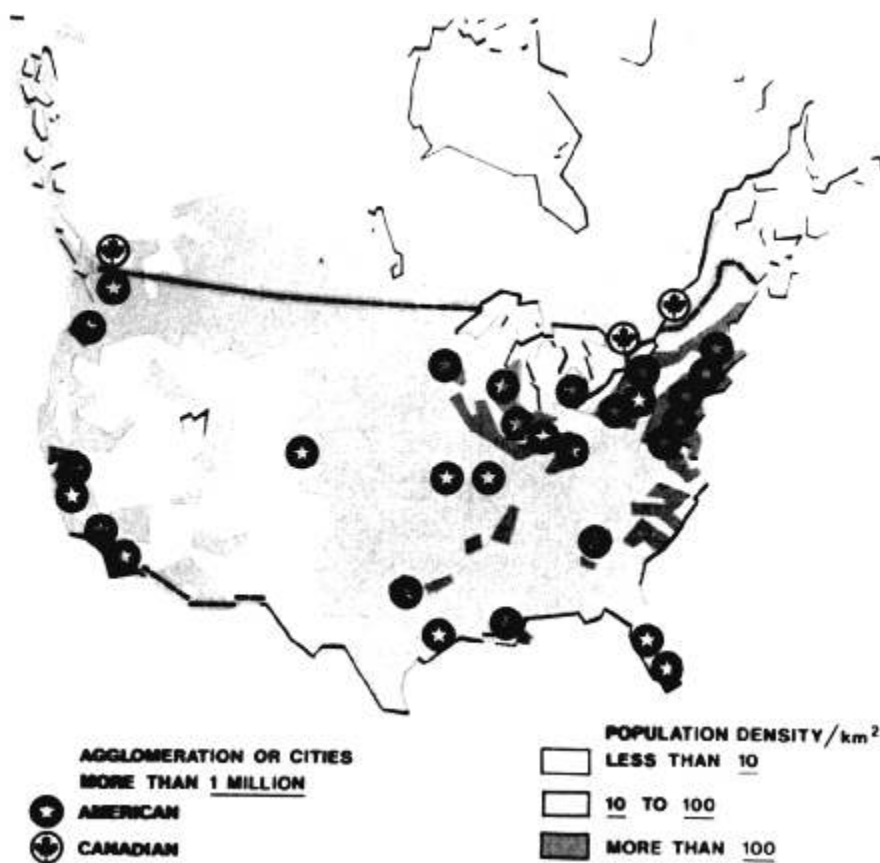


FIG. 2. In Canada the population density is less than 10 inhabitants per square kilometer for the largest part of the country.

The decline is not continuous but somewhat “sporadic” and influenced by the same economical factors that prevail in the United States, including the oil crises and the recession of the early 1980’s (Fig. 4).

To our astonishment, homicides have remained fairly constant throughout the last decade and below the line of 10% or under the figure of 1,000 (4).

Homicides are also influenced by the same socioeconomic factors as the United States: they are concentrated in larger cities in areas of low income and high unemployment. This problem has never been addressed specifically; we certainly have our ghettos, our Rambos and the like, but if criminal violence is in no way comparable between North and South, the major factor appears to be a strict and severe gun control that has also been reinforced for leisure and sport activities in Canada.

What we do have is criminal negligence. Each year in Canada, 4,000 fires have their origin in upholstered furniture and more than 1,500 in mattresses, causing hundreds of deaths and injuries, and costing millions in dollars (5).

Fire statistics show that cigarettes are responsible for 60 to 70% of these fires. Several strategies have been proposed: influencing attitudes by providing appropriate fire safety information and education, or implementing flammability safety performance standards have been met with discouraging results from the start. Self-extin-

guishing cigarettes appeared as the logical solution, since they eliminate the source of ignition. Despite several studies, including one from the Department of Consumer and Corporate Affairs in Canada, the results are somewhat conflicting and inconclusive and the nail to the coffin is probably the fact that modifying combustion of cigarette components might introduce pyrolysis products that could be even more carcinogenic. In 1983, the World Health Organisation declared at an international symposium in Winnipeg that cigarette smoking is the single most important cause of preventable illness and premature death in the whole world. In Canada, more than 30,000 premature deaths annually are directly related to smoking, and given our current level of knowledge surrounding tobacco and its health consequences, were it to be discovered or invented tomorrow, no government would allow it to be sold. In the last few years, the Canadian government has launched a campaign against smoking, and just a few months ago, 70% of Canadians pooled were in favor of a ban on tobacco advertising and a ban on smoking in the work place (6).

In 1975, 47% of adult Canadians surveyed were smokers, down to 34% as of May 1987; the decrease is interpreted as modest but encouraging. For the good of all Canadians for their health, their dollars, and their houses, the obvious solution addressing the real issue is no smoking.

POPULATION DENSITY

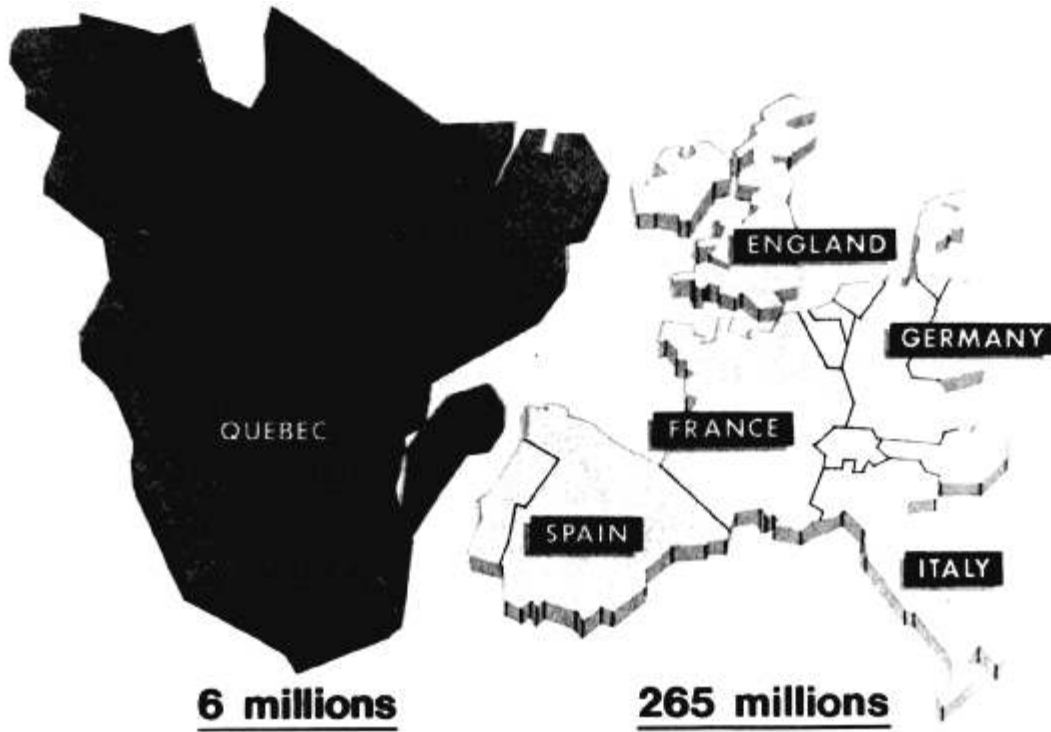


FIG. 3. The province of Quebec with a population of 6 million covers the surface of 5 European countries.

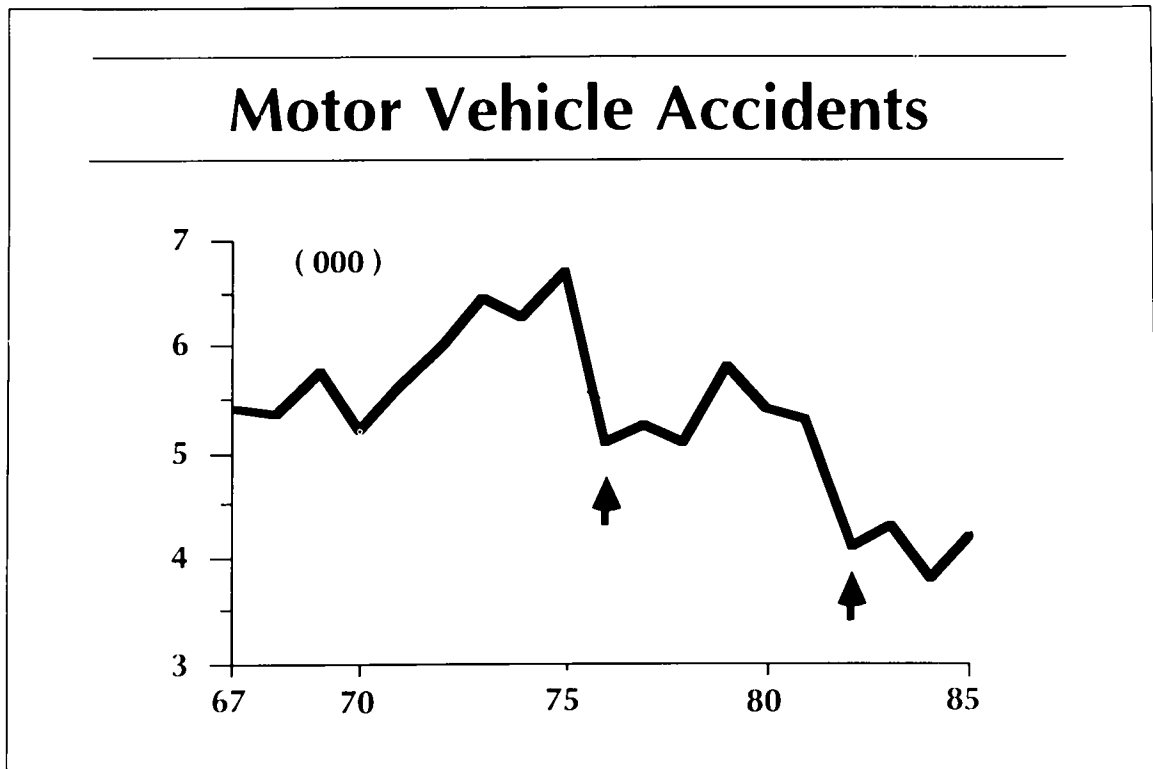


FIG. 4. Motor vehicle accident fatalities. Arrows represent a significant reduction after the oil crisis and the recession period.

Quite comparable to the United States, more than 80% of traveling kilometers in Canada are covered by road and 15% by air. Statistics from Transport Canada show that the safest way to travel is to purchase a ticket in a large aircraft, and the most dangerous is to provide your own transportation in a small plane. The comparison holds for busses that are by far safer than private cars, although the situation is underestimated when one looks at the time factor (Fig. 5).

If we look at distance, the comparison is even more striking since small planes and cars cover shorter distances. It is of interest to note that there are 15,000 small or private planes in Canada, and 3,000 commercial aircrafts; there are more than 10 million cars for only 68,000 busses (7).

Traveling by train is very secure and could be an appealing alternative. It is very unpopular in our vast country and accounts for 1% only of traveling time or distance. Although the technology that has made the train indispensable in countries like France or Japan could be available to us, and despite significant financial support from the government to maintain this dying industry, if Canadians were to be finally attracted for reasons of safety and economy this system would have to be adapted to the new needs, since 90% of the rail system in Canada is single track, and would become wide open to human error.

With increasing numbers of vehicles and kilometers driven, the constant decrease in mortality results from a delusional effect, and one might speculate a saturation

point where traffic would be so heavy that it would become impossible to kill each other. In the meantime, prevention becomes of paramount importance.

Doctor Trunkey, in an editorial in the *Journal of Trauma*, made a plea for surgical leadership, and I quote: "Fifty per cent of trauma deaths occur within minutes of the accident, and the only way to reduce this carnage is through prevention. I urge every surgeon to become involved in prevention issues within their community." And he concluded: "I strongly believe that we as surgeons have an obligation to provide this leadership" (8).

Compulsory seatbelt legislation was introduced in Canada in 1976, and after 10 years, eight of ten provinces joined. At all times, provinces with no legislation had a wearing rate below 30%, the lowest figure being 3%, but they all reached at least 60% after a compulsory program. Eighty per cent in Nova Scotia is an impressive figure, after a 3-year program, but 78% in British Columbia might be more promising in the long run, since they joined in 1978 and have progressed constantly since then. New Brunswick, with a compliance rate of 4.2% in 1982, went up to 66.5% in 1983 and this first year of implementation was gratified by 25% reduction in mortality, all other factors being equal (Fig. 6).

May I quote Doctor Brandan Dooley, who was invited to report to our Association the Australian experience: "The introduction of compulsory seatbelt wearing has been the single most important measure in reducing the number of deaths and injuries on the road. It reduces the suffering and cost for the victims and relatives, and it

Mortality Rate		
	<u>Traveler-Hrs.</u> (millions)	<u>Traveler-Km</u> (billions)
<u>AIR TRANSPORT</u>		
Commercial	0.14	0.264
Private	12.0	85.0
<u>ROAD TRANSPORT</u>		
Bus	0.01	0.286
Private Car	0.61	17.1

FIG. 5. Mortality rates in air and road transport. Time factor (traveler-hours in millions). Distance factor (traveler-kilometers in billions).

SEAT BELT - WEARING RATE 1986

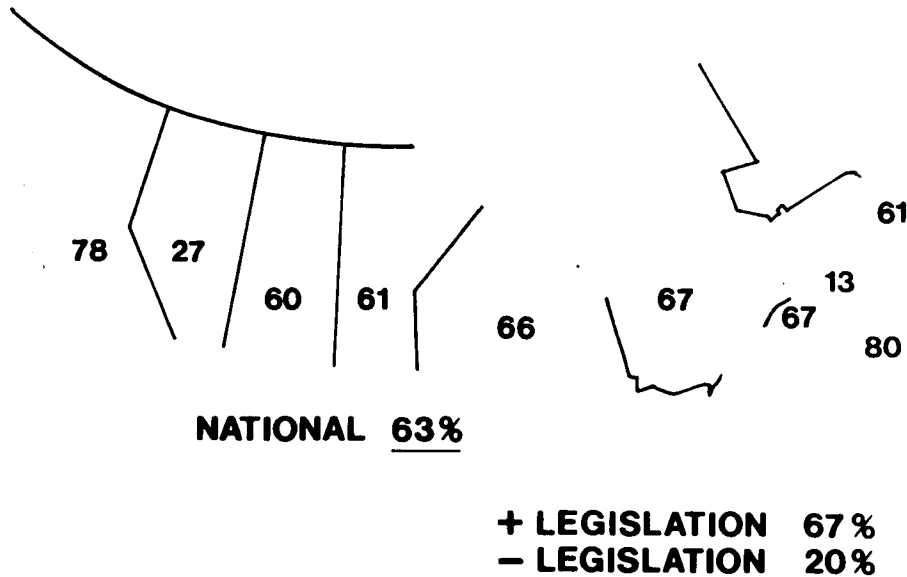


FIG. 6. Numbers represent percentage for each province in the year 1986.

certainly reduces the workload for those who treat the casualties. While prevention of the road crashes is not influenced directly by restraint, high wearing rates increase the level of driver responsibility” (9).

I am proud to announce that the last two delinquent provinces, Prince Edward Island in the Maritimes, and Alberta, in the West, have joined during 1987, for a historical national consensus (10).

The United States government, with poor response from the individual states, seemed to tackle the problem differently, and the industry by law will introduce the seatbelt as a standard passive feature by 1989. Ford has a rail to adjust the shoulder belt, but the lap belt still has to be buckled by the driver or the occupant. General Motors has the three-point system as a built-in feature attached to the door that appears somewhat cumbersome. The conversion from active to passive restraints might very well be the appropriate answer, but I strongly urge the industry to consult authorities like Ted Lapidus or Ralph Lauren if they are to be competitive in a ready-to-wear fashion.

Looking at prevention programs, one cannot overlook what has been referred to as the Japanese miracle. This very small archipelago is the actual size of the province of Newfoundland in the Maritimes, with 120 million people, a population density 300 times that of Canada.

The Japanese joined the industrialised world with an

unsurpassed progress that revolutionised their lifestyle while in keeping with their tradition and culture. Road traffic accidents in Japan increased every year until 1970, when the number of casualties reached the toll of one million: more than 20,000 deaths and 980,000 injuries (Fig. 7). The reaction was prompt and efficient. The government created a central agency with generous funding that introduced the following measures: constant surveillance for speed limit and stronger regulation for heavy-weight transport vehicles. Alcohol-related deaths were brought down to 11%, and motorcycles larger than 750 cc were still manufactured, but prohibited in Japan. Huge infrastructures for pedestrians and cyclists were developed. Road safety programs were introduced in schools, and education for drivers, with a driver’s licence requiring a course of 75 hours, valid for 3 years. The result: 50% reduction in 5 years (11).

Unfortunately, preventive measures have a tendency to stabilise with time, a phenomenon so typical of human nature. Blaise Pascal, probably the most beautiful mind that has ever existed, created at the age of 19 years the “Pascaline,” a small calculator that ultimately became in our modern time a computer or an artificial brain with neurons made of microprocessors. Our society is now in the midst of an era with new dimensions to our planet Earth, a new source of power from the information unveiled by Mother Nature (12), providing unlimited

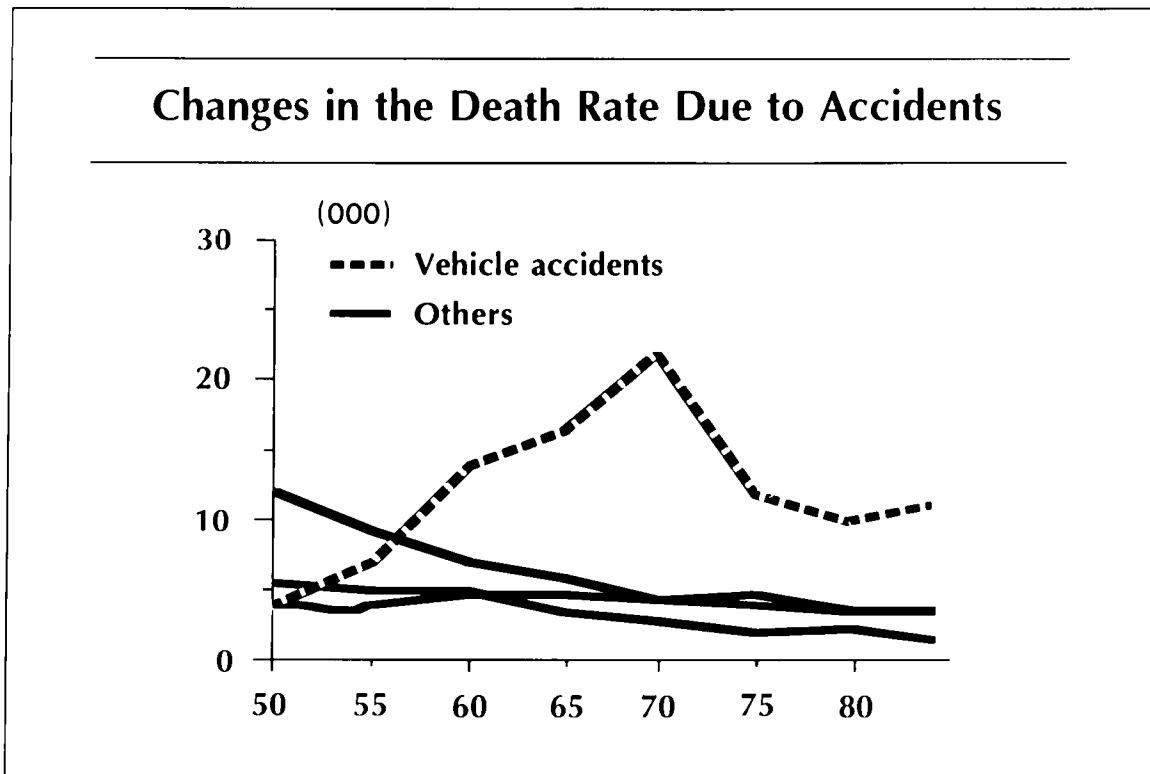


FIG. 7. Changes in accident death rate in Japan. Peak: 20 thousand fatalities in 1970.

extension to our intelligence and infinite opening to our imagination, that should permit us to perceive the year 2000 with a more favorable environment and greater respect for life.

Performance is a relative phenomenon: a ratio between talent and the level of accomplishment. Car drivers find themselves between these two extremes in an unstable balance between risk and security.

Brain injury is a sensitive and reproducible index of energy transfer in human collisions (13). Cars are tested at 48 km (30 m.p.h.), and this mathematical gymnastic quantitates the degree of damage with a maximum number of 1,000 compatible with survival (Fig. 8). The lap belt alone is obviously nonprotective and has to be supplemented either by the three-point system, that is the shoulder harness, or the air bag.

At a time when it could be argued that speed by itself is a significant factor in accidental injury, it is difficult to compare our roads to race tracks where drivers' performance and mechanical and road conditions are optimal, supplemented by the fact that all vehicles travel in the same direction at comparable speed limits with surprisingly high secondary prevention. We occasionally witness miraculous landings that leave the driver, the six-point seatbelt, and the seat as the final product, but this performance in professional car racing is beyond our capabilities, and we should restrain ourselves from the negative effect of a positive economy to increase again the speed limits on the roads. Here again in Canada, climate and geography impose tremendous investments

to maintain road infrastructures and safety at a suboptimal level.

Half of the cars in Canada are compact or small in size. An updated status report from the American Insurance Institute for Highway Safety confirmed that the death rate of small cars is still more than double that of large cars (14). The industry that has been so creative in terms of design and performance should now invest in security and come up with innovative solutions, particularly in lateral collisions where protection is really minimal.

Whether a car is small or large, the David against Goliath fight between cars and heavy vehicles is just not fair, and the only possible protection from being gulped by those dinosaurs of our modern times is strong and reinforced regulations.

The snowmobile is a noisy and pollutant device that was introduced by Bombardier as an original response to our long and cold winters, but the absence of regulation resulted in catastrophic consequences, including the "guillotine syndrome," where drivers of snowmobiles or "skidoos" travel cross country and hit clothing lines at neck level.

If proper regulations have been finally carried out, it seems that we have not learned our lesson. The stupid adult tricycle was again introduced without regulation. In 1972, 37,000 all-terrain vehicles (ATV) were imported into Canada to reach a market of 100,000 per year by 1984. During the same year, it was estimated in the province of Quebec that ATV's have reached the same

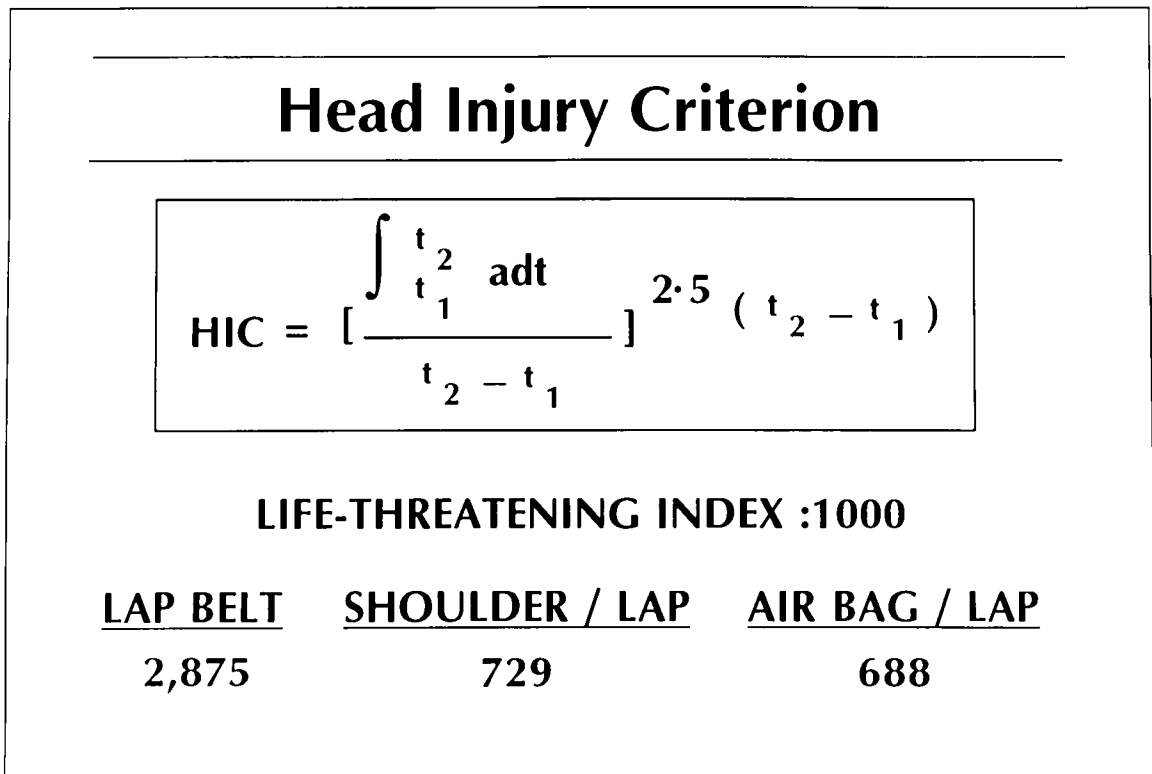


FIG. 8. Head injury criterion (H.I.C.). Mathematical figure that integrates time and energy transfer.

number as motorcycles, that is 110,000. They are very unstable because of a high centre of gravity; a study from ten hospitals has shown that two thirds of the injuries are indeed the result of turnovers (15). I strongly feel that organisations like ours with expertise and authority should take affirmative action, not only to impose proper regulations for all new devices that flood our market, but in such an example as the ATV to promote its extermination.

Bicycling can be a rewarding activity and has become very popular among Canadians who want to take maximum advantage of the short favorable season. Unfortunately the number of accidents has paralleled the enthusiasm and represents one third of recreational and sports injuries.

Mopeds are innocent little engines that now flourish with a very fast-growing market. Although they are regulated like motorcycles, they appear as a hybrid between the bicycle and the motorcycle, and obvious violations seem to be well tolerated. Moped driver's licence is allowed at the critical age of 14 years.

If we are to see increasing interest both in mopeds and bicycles, we should consider very seriously the data reported last June at the Canadian Multidisciplinary Road Safety Conference, from a country where two-wheel riding is identified as a lifestyle. In the Netherlands, bicycle and moped riding account for about 9% of the total kilometers traveled on the road each year (16). In the year 1982, in all categories, minor, major, or fatal injuries, the addition of bicycle and moped is always higher than

car accidents, showing that the relative risk per kilometer is substantially higher (Fig. 9).

In Canada, skiing is positive thinking or self defence against hypothermia. We are witnessing a genuine ski boom and a downhill reassuring slope shows a constant decline in the number of injuries at a time when the number of skiers is increasing tremendously. There are some 800,000 skiers in the province of Quebec only, but unfortunately in the last 3 years, seven deaths were reported, all young males going downhill at very high speeds. Although there is a significant improvement in all aspects of safety, this new phenomenon should alert us as a serious threat to recreational skiers (17).

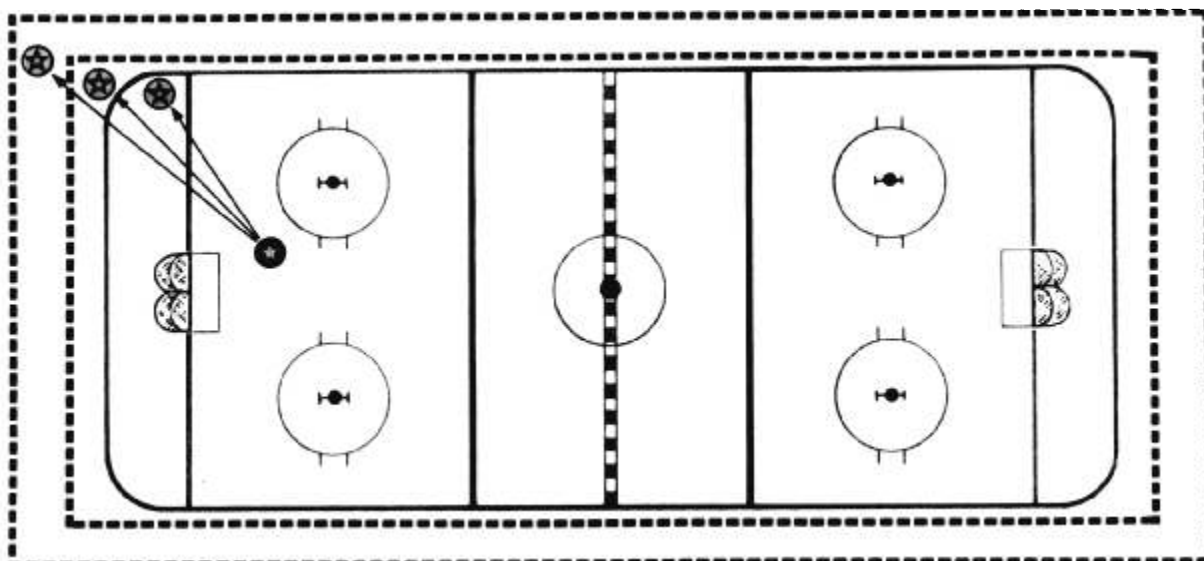
Hockey belongs to our tradition, our culture, and our image. Regulation in amateur hockey has progressed, but the helmet with full-face protector is mandatory for the young under 17 years only, that is only one third of the estimated 300,000 players in the province of Quebec (18). In professional hockey, wearing the helmet has been mandatory since 1979, but for the newcomers only, the oldtimers being protected by the grandfather law. It is an aphorism to say that most injuries result from contact. For almost two decades, professional hockey in North America has been compared to Europe and eastern countries, with the aphorism that contact is directly related to the size of the ice. Since most contact and injuries take place near the goal or the corner, it is virtually impossible in large arenas for the defence to reach the attacking wing in the corner and come back in time to protect the goalie, so that skating has precedence to

Traffic Accidents			
Netherlands			
	<u>CYCLE</u>	<u>MOPED</u>	<u>CAR</u>
Minor Injuries	12,608	10,958	10,883
Major Injuries	3,993	3,168	3,729
Fatal Injuries	390	138	513

Ingrid Van Schagen, 1987

FIG. 9. Traffic and transportation statistics, The Netherlands, 1982.

HOCKEY ARENA



- ▶ **Europe:** 220 x 100 ft.
- ▶ **Standard:** 200 x 85 ft.
- ▶ **American:** 185 x 80 ft.

FIG. 10. Comparative sizes of hockey arenas. Most arenas in North America are intermediate or standard in size.

boxing. Most arenas in Canada and in the United States are of intermediate or standard size, but a few exceptions, like Boston and Buffalo, are particularly prone to contact (Fig. 10).

As an example, peewee hockey has become a spectacular attraction; eliminating contact almost abolished the incidence of fractures without interfering with the challenge to play and the pleasure to watch.

Eye injury is one of the most frequent and most disastrous problems in hockey. Full-face protection under the age of 17 years literally solved the problem, and residual injuries come from older amateurs or professional players. Last year, John Little, an ophthalmologist looking after the Habs, reported a 5-year survey: of the 41 regular players who belonged to the National League for at least 3 years, 14, that is one third, sustained a serious eye injury. Two of them, Pierre Mondou and Jean Hamel, had to abandon young and promising careers (18). I am afraid this time that our kids are teaching us a lesson!

Doctor C. Rollins Hanlon, the retiring Director of the American College of Surgeons, in his Martin Memorial Lecture entitled "The Delusions of Unity" (19) had these concluding words: "I have limited my remarks to some of the delusions of unity that inhere in organizational relationship. True unity is not brought about by membership any more than passengers on a jumbo jet are unified by the purchase of a ticket for a common destination." On behalf of my Association, I express the wish to share the same forum, that is the *Journal of Trauma*, but more importantly to combine our efforts, take advantage of our similarities, and share our disparities in a true sense of unity and partnership.

It has been a most rewarding experience to serve as the President of Trauma Association of Canada/L'Association Canadienne de Traumatologie, and to conclude

at this crossroads with the American Association for the Surgery of Trauma, this is a unique opportunity to reinforce and seal the links with our fellow Americans for the accomplishment of the formidable task to address all aspects of trauma in North America.

Thank you.

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Due to a printing error, the order of authors' names for "Different Kalcemia in Abdominal Trauma" (28: 526) was not as the authors wished. The correct order is: G. Zavagli, M.D., M. Pampolini, M.D., G. Cavallini, M.D., G. Cavallesco, M.D., and G. Ricci, M.D. Doctor Zavagli's institutional affiliation is with Patologica Medica, and Doctor Pampolini is with Patologica Chirurgica at the University of Ferrara in Italy.