Prevention is the key

As a pediatrician two of the most frequent questions that I have encountered have been: 'What is your area of concentration and concern?' (to which I reply — injury prevention in the area of child health) and the ensuing question, 'Why is that such a problem? Isn't it rather strange for a person in your field to have an interest in childhood injury?' In retrospect, I can well understand these questions, especially because I never anticipated that I would acquire such an avid interest in childhood injuries as I have today. The only real knowledge that I had about injuries was from the information I memorized to pass my medical license examinations: 'injuries were the leading causes of death for persons aged 1–24'. It was, however, my clinical experience that forced me to seriously commit my work to injury prevention.

In September 1985 I was involved in trying to resuscitate a 14 year old girl who had drowned in a school swimming pool while playing there after her regular swimming lesson. Although pool drains are usually covered with an iron plate, while she was swimming, a boy removed the plate for fun and the water rushed into the drain, suctioning the girl into the hole. Her thigh was pulled squarely into the drain, and due to the high water pressure, it took 20 minutes to free her from the drain. After this, she was brought to my emergency room but was dead on arrival. We aggressively tried to resuscitate her for nine hours but were unsuccessful. This accident strongly confirmed that the treatment was useless and that she would not have died if preventative measures against such an injury had been taken. Unfortunately, each year there are similar drowning incidents reported in nationwide newspapers.

In 1987, I summarized all the injury cases that had been admitted to my pediatric department. They included poisonings, suffocations, burns, and scalds. The results were the same as data in former reports: in other words, injuries were not decreasing and injury prevention had not increased. I submitted an article concluding that injury prevention should be a primary focus.\(^1\) In the article, I also introduced the activities of the Injury Prevention Committee of the American Academy of Pediatrics, and asked the President of the Pediatric Society to assemble a similar committee in Japan. In 1989, the Japan Pediatric Society, which consists of about 15 000 pediatricians, formed a committee for the control and prevention of injuries. Currently six members work on recommendations for injury prevention every two years. Unfortunately, there are few activities that actively implement preventive recommendations. In contrast, there are more than 1000 pediatricians analyzing DNA in Japan but fewer than 10 are involved in injury prevention! From my hospital based data covering 10 000 injury cases, 85% are treated by neurosurgeons, orthopedic surgeons or general surgeons, whose primary focus is acute care. Only 5% of these cases are handled by pediatricians. Here, in Japan, the prevention of injuries is managed by different groups such as the Ministry of Transportation, the Police Department (traffic injuries), Ministry of Education (school related injuries), the Ministry of Economic Planning (consumer safety), etc. There is no organization such as Kidsafe in Japan, but I believe that it is imperative that future steps are taken to create such a system and to foster international networking to save the lives of healthy children.

The numerous injury cases I have treated have impressed upon my mind the increasing importance for pediatricians worldwide to have a greater interest in injury prevention; to create injury prevention activities; and to submit articles that will alert other medical professionals. I believe that this journal offers positive encouragement to concerned practitioners and offers insight and advice about injury prevention to those who may be frustrated by the slow progress being made in this area.

Prevention is foremost. Prevention is more important than treatment because proper prevention eradicates the need for treatment. Although this is more easily said than done, we must work together to discover the best solutions in this demanding field. Initial steps, like baby steps, must be made at the individual level to develop and evaluate small projects in the field. These small steps will, I hope, lead to bigger ones taken by domestic groups and even larger steps by international organizations that will foster the growth of the still new field of injury prevention. This journal, successive international meetings, and information exchange helps to pave the way for an injury free path along the highway of child health.

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Remarks from the Haddon Memorial Plenary Session

I am delighted to be here in Melbourne to participate in the Haddon Memorial Plenary at the Third International Conference on Injury Prevention and Control.

I would like to begin by providing a little background for those of you who didn’t have the privilege of knowing and working with Bill Haddon as I did. He was one of those rare scientists who make major breakthroughs by tearing up the old rules and rewriting them. He had the ability to ask the truly insightful questions. His pioneering work led to the systematic development of countermeasures to combat the major public health problem of motor vehicle injuries. His legacy is the number of scientists throughout the world.
who continue to build on the foundations he laid by asking questions and seeking answers in the field of injury control.

In the early 1960s, motor vehicle crash injuries and deaths in the United States were growing rapidly, but very few effective public policies had been directed toward them. The overwhelming focus was on persuading motorists to 'drive safely'. At that time, there were scattered research projects related to crash deaths and injuries, some of which later proved to be important, but there was no logical framework for establishing research or countermeasure priorities. There were people who considered themselves 'highway safety professionals', but there was no structure or paradigm for the field. Countermeasures were chosen because they seemed like good ideas, not because there was evidence of effectiveness. If the so-called professionals were asked what their mission was, the typical answer would have been 'accident prevention'. Thus restraint systems, crashworthiness designs, breakaway signs, and better emergency medical care were not part of the mission. The broader area of what today is called injury control was not even in its infancy.

Bill Haddon played a central role in changing this. His career began with an unusual mix of superb credentials — an undergraduate degree in food technology from Massachusetts Institute of Technology, and an MD plus master's in public health from Harvard. There was little, however, in his early research on human body lice to suggest a career in injury control.

The crucible was his first position in the New York State Public Health Department. Early in his tenure, he was assigned as liaison to the Governor’s Traffic Safety Coordination Committee. In 1958, the then-acting secretary to the governor was Daniel Patrick Moynihan, who more recently has had a distinguished career as one of the US Senate's leading intellectuals. Senator Moynihan describes Haddon’s first committee meeting this way: ‘After each proposal, a dark, somewhat gloomy Norwegian in the back of the room, would say ‘Hey, I’m sorry, could I ask for the research papers on this? What are the data?’”

Thinking Haddon was a spy for the opposition party, Moynihan asked Haddon to stay after the meeting and says now that over a beer, ‘We began to talk and I realized we had no data, we had no information of any kind. We did not know what we were talking about, we just thought we did’.

Haddon soon was publishing scientific papers on injury control. He was the first to formulate several of the most basic and widely used concepts in the injury control field. Haddon pointed out that there are no sharp scientific distinctions between injury and disease. He explained that injuries are caused by acute exposure to physical agents such as mechanical energy, heat, electricity, chemical, and ionizing radiation interacting with the body in amounts or at rates that exceed the threshold of human tolerance.

Haddon disliked the word ‘accident’, which is a descriptive, not an etiologic, term. It also has connotations of fate, luck, or chance suggesting that a scientific approach to the problem will not be productive. Bill tried to exorcise the word ‘accident’ from the vocabulary of injury prevention. Early in his work, Haddon developed a conceptual framework that is a disarmingly simple way of systematically identifying countermeasure options for reducing motor vehicle crash losses. In what became known as the ‘Haddon matrix’, the time sequence of a crash is divided into three phases — precrash, crash, and postcrash. These phases interact with three sets of crash factors — human, vehicle, and physical environment. Each cell of the matrix provides opportunities for interventions to reduce losses. The Haddon matrix presents a simple, yet elegant, way of demonstrating why the factors that cause crashes to occur need not play a role in many of the options available for reducing crash losses.

Haddon’s ideas influenced widely diverse disciplines and organizations. His seminal article on strategy options for reducing losses, ‘On the escape of tigers: an ecologic note’ was reprinted numerous times in public health, engineering, and medical journals. His strategies could be applied to preventing harm in all kinds of energy transfer. They could be used, in his words, to reduce ‘the harmful interactions with people and property of hurricanes, earthquakes, projectiles, moving vehicles, ionizing radiation, lightning, configurations, and the cuts and bruises of daily life’. After ‘Energy damage and the ten countermeasure strategies’ was reprinted more than 50 times and translated into several languages, Haddon lost count.

He traveled widely, lecturing throughout the world on traffic safety, and was especially interested in mentoring and teaching. I have already mentioned Senator Moynihan, who is widely acknowledged as one of the best thinkers in the US Senate. As Moynihan freely acknowledges, ‘Haddon made me his pupil. He taught me how epidemiologists approach a problem of public health’. In 1960, Moynihan drafted the following proposition for the Democratic National Convention that nominated John Kennedy: ‘The highway death problem provides an excellent opportunity for the federal government to begin fulfilling its responsibility in the field of highway safety. Traffic accidents constitute one of the greatest, perhaps the greatest, of the nation’s public health problems’. This may seem like pretty tame stuff today, but in 1960 it was revolutionary.

Haddon had many other pupils over the years — Susan Baker, Leon Robertson, Jess Kraus, Dinesh Mohan, to name a few. He loved to go to the University of Minnesota each year to teach students about the epidemiology of injuries at the annual graduate seminar sessions in epidemiology. Many of the researchers he influenced directly are now, in turn, influencing a new generation of injury control researchers.

The seeds that Moynihan and Haddon began spreading in the late 1950s and early 1960s took hold. In 1966, monumental legislation was passed creating what became the National Highway Traffic Safety Administration in the United States, and Bill Haddon was appointed its first director. This legislation established, for the first time, a comprehensive set of motor vehicle safety standards — performance criteria that new vehicles must meet — addressing both crash prevention features and, most importantly, features intended to reduce the severity of injuries during the crash event itself. These standards became the foundation for the improvements in vehicle safety that have been made over the past quarter century. The new federal legislation also empowered the United States government to impose standards for state governments to address important non-vehicle issues such as motorcycle helmet use laws and alcohol impaired driving.

Haddon was the first researcher to articulate the principle of automatic protection for motorists. After leaving the government, he became head of the Insurance Institute for Highway Safety. His commitment to the automatic protection of air bags outlasted the opposition of the automakers. His stubborn support to the principle of automatic crash protection is one of the main reasons why every new car sold in the United States this year has an air bag.

When some grew discouraged about the refusal of the automobile industry and the government to put air bags in cars, Haddon counseled patience. ‘You’ve got to take the long view’, he said. ‘Look how long it took to get automatic couplers on trains. Twenty years’. During the 19th cen-
tury, railroad workers frequently were maimed when coupling rail cars. But automatic couplers, invented in 1873, were not installed by rail companies until an 1893 law required them. As it turned out, this 20 year frame was about right for air bags, too.

The federal safety standards that Haddon set have been credited with preventing thousands of crash deaths and hundreds of thousands of serious crash injuries each year in the United States. But that is only part of it — those initial vehicle safety standards were adopted, sometimes almost as written by Haddon and his associate Bob Brenner, in many other developed countries. For Bill, this was especially gratifying because he was always trying to spread his ideas far and wide. He visited Australia on more than one occasion to expound his views. Peter Vulcan can tell you how influential one of those early visits was.

Because of Haddon’s vision and accomplishments, tens of thousands of people are either alive or uninjured. Automobiles are safer to operate and more protective. They are less subject to damage and easier and less expensive to repair. Air bags are saving hundreds of lives each year and preventing thousands of injuries. And the broad field of injury control is growing in acceptance as a discipline for scientific study.

Because of Haddon’s pioneering work, we now have data to guide this field. We have good scientific papers — this morning we are going to hear five examples. A former chairman of the institute once predicted that if we could continue his work, Bill Haddon will have saved more lives than anyone since Louis Pasteur. The papers presented in this session were chosen as exemplars of the work that will help bring about this prediction.

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(This paper was given at Third International Conference on Injury Prevention and Control, Melbourne, 22 February 1996.)

Health status measurement: the special case of children and youth

If we were able to define health, perhaps we would have an easier time coming to grips with the challenge of developing health status measures. Health, Sir Geoffrey Vickers once said in another context, is a successive redefinition of the impossible. If this is the case (as it must be), then conceptualizations of health will change over time. The development of health status measurement over the past 150 years is testimony to this truisim. Health status was initially measured by mortality rates, and the international Classification of Diseases (ICD) brought international standards to the effort to develop comparable ways to code cause of death. Much later, the focus on prevention and treatment of diseases led to efforts to collect information on causes of morbidity, first using the ICD and then a more ‘practice friendly’ coding system known as the ICHPPC (International Classification of Health Problems in Primary Care). Growing recognition of the importance of physical dysfunction to health and well being in populations was associated with the development, by the World Health Organization, of a system to classify impairments, disabilities, and handicaps. Growing recognition of the importance of primary care within a health system, and of the importance of people’s perceptions of their health problems, has recently led to a classification of health problems, known as the ICPC (International Classification of Primary Care); this organizes, in a standard way, the description of health experiences that are not resolvable to a diagnosis or that reflect people’s experiences with their illnesses in physical or mental terms, albeit still within a biomedical framework.

We have, however, entered a new era. We are coming to recognize that biomedically defined illness, whether characterized by diagnoses or by problems, is no longer sufficient to represent the impact of illness on people in specific or on society in general. Thus, the field of health status measurement has added consideration of functional status and quality of life. Functional status is the representation of medical morbidity in the daily life of people — how it affects their perceptions of themselves and how it influences their behavior in daily activities. Quality of life is conceptually broader, taking into account how people feel about their lives and what they are able to do. In practice, however, most quality of life measures are forms of functional status measures but represented by an overall score rather than by a profile of different domains; these scores can then be aggregated to characterize populations rather than individual patients.

Functional status measures, which include a variety of domains, have great utility in assessment of population and patient needs and in evaluations of the efficacy and effectiveness of interventions to improve health or prevent its deterioration. We now know, and Dr Kopjar’s paper in this issue of the journal has provided further evidence, that manifestations of illness or injury are found in a variety of aspects of health, not even limited to the physical, mental, or role functioning domains. That is, to measure health is to measure not only conventional biopsychosocial representations of physical or mental disorder but also to assess people’s own characterization of their physical and mental health and their functioning.

Health status measurement is now moving increasingly towards the use of multidomain approaches such as the SF-36, which was developed for adults. These are ‘generic’; that is, they are not specific to any type of illness but, rather, intended for use is assessing the general health of populations and detecting systematic differences across specific population subgroups or for documenting the general impact of health services interventions. Because they are ‘generic’, they are unlikely to be sensitive enough to capture those aspects of illiness or injuries that are
Remarks from the Haddon Memorial Plenary Session.

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