Could injury risk be predetermined?

Since Rowntree's paper, this issue's Classic (p 69), was published the 5362 children, born in 1946, who were its target population, have been studied repeatedly throughout the intervening years. This, the National Survey of Health and Development, is the first of several British birth cohorts to have been studied systematically. At the most recent data collection, in 1989, 3854 men and women from that original population were alive (7% had died), were living in Britain (11% lived abroad), and had not refused cooperation (10% were refusals). Of that population 85% gave information at age 43 years. 

At the beginning of this long term study Rowntree concluded that social factors were of little consequence for injury, but that developmental factors were of considerable significance. In the subsequent years of the study these same developmental factors have also proved to have significant predictive value for other aspects of physical health in later life. Poor development in terms of birth weight, or height and weight gain in the first four years of life, were independently associated with raised blood pressure at 36 and 43 years, and with poor respiratory function and raised risk of chronic obstructive pulmonary disease. Signs of delayed development were also associated with adult mental health, in that children who first walked and talked significantly later than the study population average were at raised risk of schizophrenia compared with others.

One hypothesis that tries to explain these links suggests that they are a reflection of “biological programming” in utero, that is processes that are “hardwired” into the child from birth. Although possibly offering support for this hypothesis, the findings make it clear that biological programming could most usefully be seen in its social context, at both the familial and the wider social level. We therefore developed the notion, based largely on findings from the National Survey of Health and Development and the second follow up study of a British cohort, that there were three chains of influence that independently may link childhood development with adult health.

The first is biological programming, namely, that development in utero and in early life establish for some significant systems the biological parameters within which the individual may safely function in adulthood. Thus, for instance, poor development of the respiratory system will place the individual at greater risk of damage from smoking compared with those whose development was better. Accordingly, children growing up in a time of extensive parental smoking would carry the associated risks throughout their lives.

The second hypothesis is that the effects of adverse early life social factors, particularly a low level of parental concern for the child’s education, are associated with reduced social chances in adult life, including poor educational attainment and consequent raised risk from adverse health related habits.

The third hypothesis is that adverse family circumstances in early life, such as parental divorce, are associated with long term raised risk of emotional difficulties and behaviour problems in the children of such families.

Each of these hypotheses posits that early life contains the elements of adult life health, but whilst the biological hypothesis involves a “sleeper effect”—a process thought to be laid down in utero and infancy and triggered in later life by social and behavioural circumstances, the second and third hypotheses propose a process of cumulative effect, beginning with social and family circumstances in early life.

Such cumulative processes are relevant to the development of risk of injury. Long term psychological follow up studies have consistently shown that children who experience dysfunctional family circumstances early in life are at increased risk of injury, as well as antisocial behaviour. The development of such risk is hypothesised to be a process rooted in poor child rearing behaviour, parental disharmony or separation, and continuing with poor parental response. All of this is likely to begin with a pattern of attention seeking behaviour in the child, followed by an escalation of behaviour problems and school failure.

It is not yet clear whether these apparent long term processes have, as has been suggested, a neurobiological or autonomic aspect, or whether they are more usually the product of a cascade of interlinked psychological, educational, and social difficulties. Nevertheless, such findings raise the hope that intervention in the hypothesised cascade should be possible, and ought to be the subject of experimental intervention studies. However, these findings also offer the prospect that, because of the rise in numbers of dysfunctional families, there may well be a continuing increase in injury and antisocial behaviour.

It looks, therefore, as if Rowntree's finding of little significance in the social factors in relation to injury may have been the result of her selection of broadly defined, demographic, social factors, rather than those associated with the psychological circumstances of childhood, no doubt in response to contemporary scientific approaches. Recently completed work in the National Survey of Health and Development adds weight to the view that psychological factors in early life may be of relevance to injury risk in adulthood. A study of the aetiology of unnatural deaths (due to injury or suicide) of cohort members between ages 16 and 50 years found childhood enuresis, and adolescent instability and low levels of anxiety, to be risk factors. Future work on injury in this same 1946 birth cohort will continue to explore the relationships of the experience of dysfunctional family circumstances in childhood and adolescent behaviour with raised risk of injury in later life; family dysfunctionality has already been found to be associated with behaviour problems and adult mental health.

This cohort study and the others that followed in Britain and elsewhere have provided a wealth of information about childhood injury, and the reader is well advised to seek out these valuable publications, beginning with the pioneering report by Rowntree reprinted in this issue.

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In most parts of the world, motor vehicle injuries are the leading cause of death and disability from trauma among children and adolescents. Great strides have been made in improving occupant protection, but many issues remain. What does the current crisis over the risks of airbag injuries to children in North America mean for the rest of the world? Will our global economy result in these same risks (that is same airbag design) to children riding in cars in Cape Town, Paris, and Delhi? Most infants travel in special child restraint devices, but many are inadequately restrained at age 3, 4, and 5. What changes are needed in product design (both vehicle and restraint devices), legislation and regulation, and education to insure that all children are adequately restrained?

Making regulations work

Abe Bergman, one of the grandfathers of injury control and a practitioner of what he calls “political medicine” for the last three decades, often remarks that getting a law passed or a regulation changed is relatively easy. The difficulty lies in getting it implemented in a way that achieves the desired outcome. Regulation and legislation have become part of the holy trinity of injury control, along with education and product/environmental modification. Why are some regulations effective in accomplishing the goal of reduced morbidity and mortality from injury, while others are ineffective, or even worse, harmful? What are the barriers to implementing injury control regulations? What are some of the successful regulations which have made a difference, and how has this been accomplished? What can we learn which will allow us to apply those same lessons in other communities and to different injury problems?

Intentional injuries: what should be the role of ISCAIP

Our journal, Injury Prevention, and the Society have focused primarily on unintentional injuries to children and adolescents. Nevertheless, intentional injuries are a major cause of death in many countries, in the form of child abuse of infants and young children, suicides of adolescents, and interpersonal violence among youth. Should the journal and ISCAIP expand to include these mechanisms of injury? Are the methods we use to study and prevent unintentional injury readily transferable to adolescent injuries?
suicide and homicide? Can the journal, given its size, accommodate a whole new set of submissions? Will ISCAIP lose some of its identity by expanding its mission? These and other issues will be discussed in a lively debate between discussants taking the pro position and those arguing the con.

Our hope is that each of us attending the conference will come away with an intriguing idea and the energy to apply it back home. So send us your comments. See you in Amsterdam!

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International Society for Child and Adolescent Injury Prevention
We invite you to join the International Society for Child and Adolescent Injury Prevention (ISCAIP). ISCAIP was created in 1993 for injury professionals around the world. The goal of ISCAIP is to reduce the number and severity of injuries to children and adolescents through international collaboration.

Membership fee
The annual membership fee for ISCAIP, including a subscription to Injury Prevention, is:
£85 (US $155) for individuals
£125 (US $230) for non-profit or charity institutions
£250 (US $435) for corporate institutions
If you would like to receive a brochure describing ISCAIP in greater detail, please write to the address below.

How to join
Please complete this form and return it to ISCAIP, c/o CAPT, 18–20 Farringdon Lane,
London EC1R 3AU, UK

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Signature of cardholder

*When paying by credit card, the account will be charged in pounds sterling and converted accordingly (we much prefer this method of payment).