

MEDICAL PRACTICE

Contemporary Themes

Why don't we prevent childhood accidents?

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Foreword from BPA and BAPS

Dr Jackson and Professor Wilkinson have done a necessary service in reminding the profession and the public of the stubborn problem of accidents in childhood with their damaging and too often fatal outcome. They write with the authority of long involvement and deep concern. Both are members of the joint accident and injuries committee of our two associations; and it is our members, called increasingly to injured and poisoned children in accident department and ward, who felt this article must be written. The problem is troubling colleagues and countries in Europe, and Dr Jackson and Professor Wilkinson believe we should follow the example of Sweden and establish a national committee for childhood accident prevention. This would be independent but work closely with government and bring together those already active in this field of social policy. Only by a body of this kind can the widening circle of overlapping organisations find a centre for further planned inquiry, preventive experiment, and critical evaluation, which are still needed. We hope their suggestion will meet the response they hope for; children and parents everywhere deserve that it should.

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Summary

Accidental injury is the most important epidemic in the Western world today, and is especially important as a cause of death and disability in childhood. Many environmental factors are important causes of accidents, but there is no organisation within which doctors, official bodies, industry, and voluntary bodies can pool their experience and co-ordinate their efforts to reduce these environmental risks. A joint committee on childhood accident prevention should be formed in this country similar to that which exists in Sweden.

Introduction

Accidental injury is the most important epidemic in the Western world today, and for over 25 years accidents have been the commonest single cause of death in children aged 1 to 15 years in the British Isles.

The word "accident" unfortunately and wrongly implies an unpredictable and therefore unpreventable event, but accidents are as capable of analysis as many other phenomena. The distress and disability they cause is incalculable, yet logical and sensible precautions, such as the compulsory wearing of seat belts, are resisted on the grounds that a person who is killed or injured through failure to take this elementary precaution harms only himself. This fatalistic acceptance by society of the idea that accidents are inevitable means that efforts to prevent them have often made little impact. The medical profession is far from blameless; doctors are still trained primarily to deal with the effects of injury and hardly at all to look at the personal and social factors in the background, and still less is the preventive aspect considered.

In this paper we analyse the causal factors and say what must be done by society and government.

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State at present

The part played by accidents as a cause of death in childhood is shown in table I. Fig 1 shows the changes in the four major causes of death in children aged 1 to 14 since 1950; although between 1950 and 1972 the total number of deaths fell from 7428 to 4794 there was no significant reduction in those due to accidents.

TABLE I—Major causes of deaths in children in England and Wales 1973¹⁶

	<1 Year		1-15 Years	
	No	%	No	%
Accidents	339	2.9	1438	26.2
Congenital abnormalities	2552	22.4	543	9.9
Respiratory disease	1620	14.2	584	10.6
Malignant disease	55	0.5	784	14.3
Total (all causes)	11407	100	5496	100

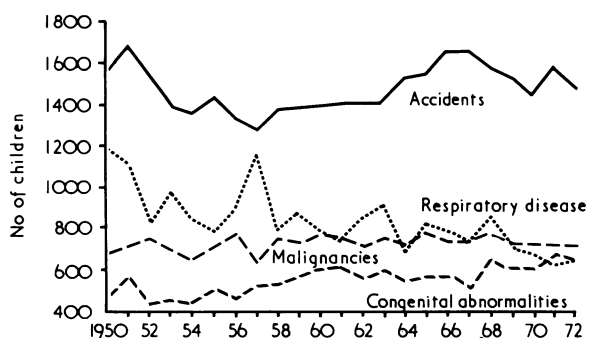


FIG 1—Major causes of death in children aged 1-14 years in 1950-72.

Between the ages of 1 and 15 years accidents cause more than a quarter of all deaths—more than the next two commonest causes combined. Accidents occur more often on the roads than anywhere else (table II) and affect especially pedestrians. Bicycles are associated with few deaths but with many non-fatal accidents, many of which are not reported to the police, mainly because they do not involve another vehicle. Some deaths in the under 5s listed under the headings of inhalation, ingestion, and suffocation might be better classified as sudden infant death syndrome. The number ascribed to homicide and injury purposely inflicted—that is, non-accidental injury—is probably underestimated. The many deaths that result from houses

TABLE II—Some causes of accidental deaths in childhood 1973

	Age (years):			Total
	≤4	5-9	10-14	
All road accidents:	193	332	201	726
Involving pedestrians	132	258	118	508
Involving cyclists	1	0	2	3
Inhalation and ingestion	183	6	3	192
Suffocation	60	7	17	84
Drowning	78	73	47	198
All burns:	103	27	13	143
Including conflagration	73	24	9	106
Homicide and injury purposely inflicted	74	14	14	102
All falls:	56	24	21	101
Including falls from buildings	19	6	6	31
Poisoning	29	1	4	34
Electrocution	12	2	4	18
Scalds	9	0	0	9

catching fire and from drowning are notable, as are the very few deaths resulting from electrocution.

Injuries account for one in five of all admissions to hospital in children over 1 year of age, and 140 000 children (or one child in 80 in the whole population) were admitted to hospital after an accident in 1972 (table III). At 1972 prices the cost of these admissions was about £10m yearly, or about £15m in 1975. Official figures for attendances at accident and emergency departments are not broken down by age, but a survey carried out by the joint accident committee of the British Paediatric Association and the British Association of Paediatric Surgeons in 1970¹ showed that children accounted for 20-32% of all patients attending accident and emergency departments. These figures were collected in November, and in the summer holidays there would undoubtedly have been a greater proportion of children.

Illingworth² found that one in six of all children resident in Sheffield attend the casualty department of the Sheffield Children's Hospital each year. Lade³ found that boys aged less than 5 years were most often injured in accidents at home, and de Fonseca⁴ found that the peak age group was among children under 1 year, when 11% of boys and 9% of girls had an accident at home.

Why do accidents happen?

In any accident there are three main factors: the child, the causative agent, and the exact circumstances in which it took place.

The age, sex, social circumstances, personality, and physical, emotional, and intellectual characteristics of the child may all play a causal part. The younger the child the greater is the responsibility of the parents to guard against the inevitable accidents that befall all children at some time, and whereas the younger child must be protected as much as possible from accidental injury the older child must be



FIG 2—(A) Partitions separating roof gardens provide easy access to parapet above (B) four-storey fall.

FIG 3—Ease with which railings over 10-foot drop may be climbed.

TABLE III—Number of children admitted to hospital in England and Wales 1972

	<1 Year	1-14 Years	Total
All admissions	191220	665450	856670
No (%) due to accidents ..	6990 (3.7)	134260 (20.2)	141250 (16.5)

taught to protect himself. Although psychological and other aspects of childhood accidents and their prevention have been extensively studied,^{5,6} Britain still has a higher rate of increase in fatal traffic accidents than Sweden, Iceland, or Cyprus,⁷ and although the number of fireworks sold in Britain has fallen the number of injuries per million fireworks sold is unchanged.⁸

The best way to prevent accidents is to avoid or remove the causes and modify the predisposing circumstances. Much more attention needs to be paid to safety in the design of our environment, inside and outside the home, and in the design of objects used in everyday life. The Health Education Council's study of home accidents in Bristol gives detailed figures of the incidence of different types of accidents in the home and the various causative agents implicated. Attention has been drawn repeatedly to faulty design or manufacture which results in an increased liability to accidents. A child riding a bicycle with wheels of unequal size is at greater risk of fractures, head injuries, and admission to hospital than one riding a conventional bicycle with wheels of equal size.⁹ Some other examples of faulty design and careless planning that have caused accidents are given below.

Roof gardens—A block of maisonettes has partitions that separate the roof "gardens" from one another (fig 2a). These provide a perfect set of stairs for the toddler to climb up on to the parapet, and fig 2b shows the four-storey fall that awaits him. A child climbed to the left instead of to the right on to the roof of the stairway shown in fig 3 but fell only about 10 feet.



FIG 4—(A) Third-storey balcony from which a boy fell, injuring his spine on low railings below, which caused (B) paraplegia.

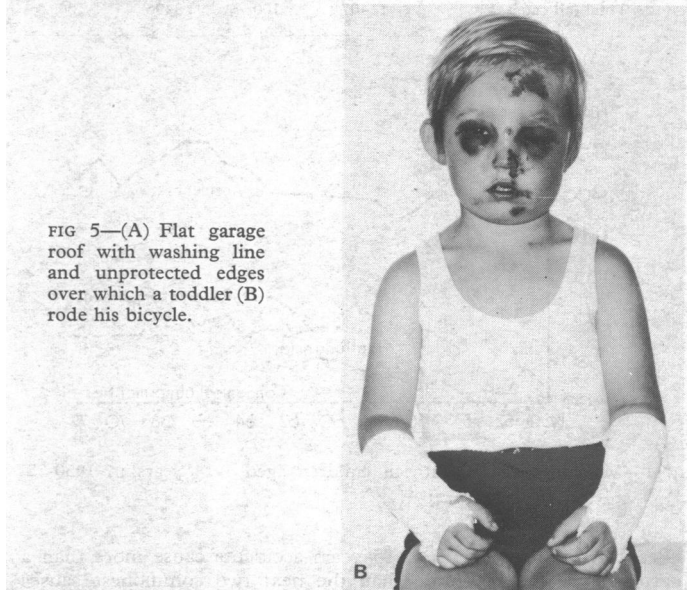
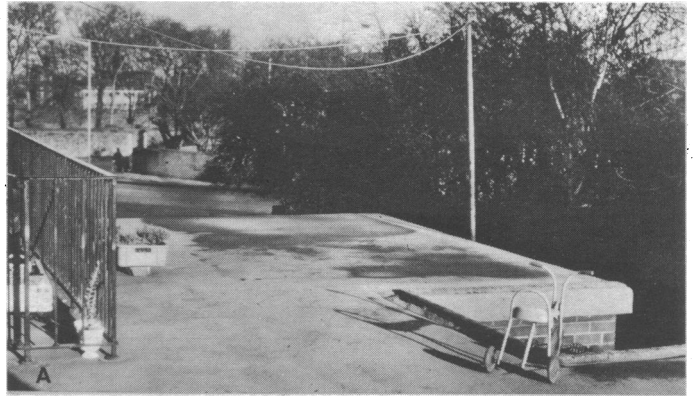


FIG 5—(A) Flat garage roof with washing line and unprotected edges over which a toddler (B) rode his bicycle.

Balconies—A child was riding his "Mobo" horse along the balcony shown in fig 4a when he fell, landing with his back across the railings surrounding the grass below. He is now paraplegic (fig 4b). This accident occurred eight years ago, but in July 1975 a child of 3 was killed by falling over the same balcony.

Washing on a flat roof—It seems extraordinary that a washing line on a flat garage roof should be placed where there is no protection from falling over the edge (fig 5a). In this instance a toddler rode his tricycle over the edge (fig 5b).

Windows—The injuries of the child shown in fig 6a resulted from her falling out of a window. The "safety catch" designed to prevent the window being fully opened had been removed, and the sliding mechanism had gummed up with paint (fig 6b).

ADMINISTRATIVE FAILURES

At an administrative level, there has been a delay of over seven years between the first official comment about the prevention of childhood poisoning¹⁰ and the first use of child-resistant containers for a limited number of pharmaceutical products.¹¹ It will be a long time before all such products are dispensed in safety packaging, and perhaps even longer before poisonous household fluids are more safely packed. It seems reasonable that harmful substances should be clearly labelled as such, but a BMA recommendation on this subject¹² in 1968 was turned down by the Home Office. Fig 7a shows an example of a failure of labelling; a boy nearly lost his sight (fig 7b) after the inadequately labelled bottle was brought into the house by his father.

Accident prevention

Children of all ages live in an adult world designed by adults for adults. To reduce the severity and the number of accidents in childhood three things must be done: (a) information must be obtained on the

national and local incidence of different types of accidents and the factors causing them; (b) factors that can be modified to reduce the incidence or severity of accidents must be identified and appropriate measures taken; and (c) these measures must then be applied. Some will necessitate changes in design or manufacture, others will involve changing attitudes and behaviour through education. Constant emphasis will be necessary, using television, radio, cinema, the press, and public advertising.



FIG 6—(A) Injuries sustained by child who fell from window (B) from which safety catch had been removed.

Four main groups of people are involved.

The medical profession is in the best position to find out the facts about the incidence of different types of accidents and their long- and short-term effects, but it has done too little in the past. The Medical Commission on Accident Prevention (MCAP) has produced reports on some specific aspects of accidents.^{13 14}

Official government bodies—The Department of Health and Social Security, the Home Office, the Department of Prices and Consumer Protection (DPCP), the Department of the Environment, and the Departments of Trade and Industry have done much to improve safety, both generally and that of appliances and clothing. The Health and Safety Commission is concerned primarily with industrial safety.

Industrial and trade organisations such as the British Standards Institution, the Building Trades Research Association, the Electrical Trade Research Association, etc, are concerned with establishing safety standards as well as implementing them.

Voluntary Organisations, such as the Royal Society for the Prevention of Accidents (ROSPA), the Consumer's Association, and the National Society for the Prevention of Cruelty to Children (NSPCC), are more concerned with education and dissemination of information, though the Consumer's Association is also concerned with the independent testing of appliances. The BBC, independent television, the press, and women's magazines have enormous and insufficiently used influence in the widespread education of the public in accident prevention.

The role of some of these organisations often overlaps and their efforts are not co-ordinated. The DPCP is sponsoring research into home accidents at all ages, while the DHSS is proposing to inquire into accidents to children. The DPCP study will examine poisoning in childhood from domestic products but not from medicinal products, which will be considered by the DHSS. The collection and analysis of data on home accidents will suffer from the withdrawal of the grant to the Medical Research Division of the Health Education Council.

The MCAP, with its subcommittees on road safety, home safety, etc, is the main medical body interested in accident prevention, but much of its attention is now focused on rescue and resuscitation rather than on the patterns of accidents.

Future planning: our main proposal

The best way to rationalise the conflicting roles and interests of overlapping independent committees is to follow the example of Sweden and establish a joint committee on childhood accident prevention. This would unite the existing interested bodies, plan a rational programme for collecting facts on which to base safety measures, and then spread throughout the community the information and promote the safety measures. Government, industry, insurance companies, voluntary bodies, and the medical profession must all be represented.

The need for such an organisation has been emphasised by a team of workers from the European Public Health Committee of the Council of Europe, in association with the European Office of the World Health Organisation.⁷ This team studied accident prevention in childhood throughout Europe, and commented:

"Efficient accident control requires sound epidemiological information, but in this respect the findings of the study were not reassuring. There was initially no information available on accident morbidity and no attempt had apparently been made to measure the load of invalidism resulting from childhood accidents which, if done, could well provide convincing humanitarian and economic arguments to stimulate more action by governments. There was no clear indication in most countries of a central institution or department responsible for the development and co-ordination of programmes directed at child safety. On the basis of these conclusions, the following recommendations are offered: a central institution (governmental or non-governmental) should be designated to concern itself with all aspects of child safety. Public health authorities at all levels should play an active role in child accident prevention. Closer co-operation and better channels of co-ordination should be established between the statutory and voluntary organisations concerned with child safety."

Such an organisation has already been established in Sweden, where a paediatrician and now professor of social medicine, Professor Berfenstam, and a paediatric surgeon, Professor Ehrenpreis, set up the joint committee for the prevention of

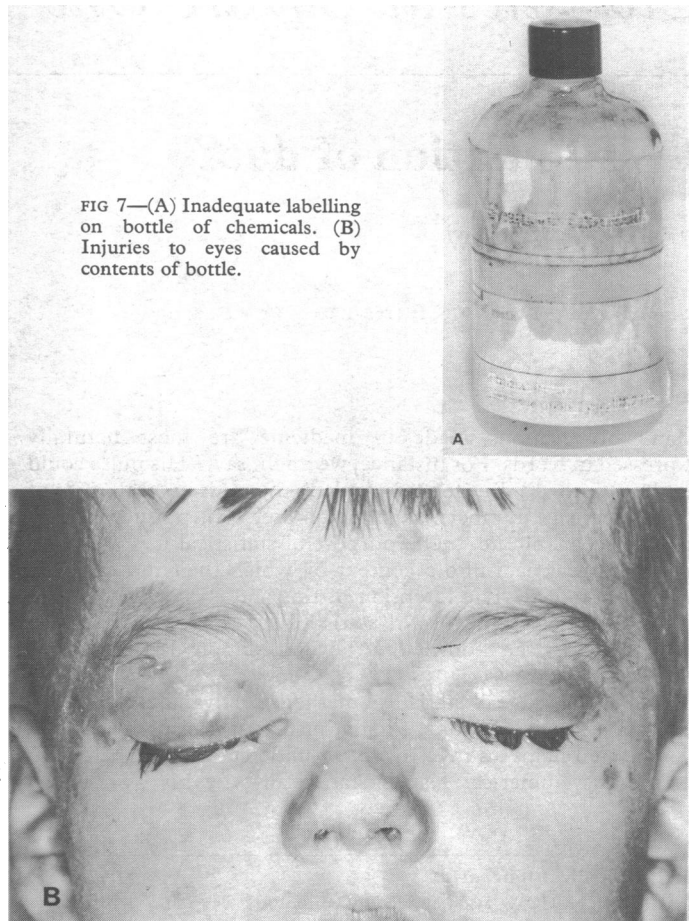


FIG 7—(A) Inadequate labelling on bottle of chemicals. (B) Injuries to eyes caused by contents of bottle.

childhood accidents. West Germany too has a similar organisation and has found it equally effective.

A committee related to accidents in childhood is needed because (a) the kinds of accidents and where they happen are different in children and adults; (b) more of these accidents affect young children, and the circumstances need different modes of prevention; (c) no organisation exists to prevent accidents in children; and (d) the economic cost and loss to the nation is much greater when permanent damage occurs in childhood. The committees that already exist to co-ordinate the efforts of government departments and other public and voluntary bodies in this field are concerned almost exclusively with adults. The problem of childhood accidents cannot be tackled by applying to a younger age group the means of prevention that are successful in adults.

Although we believe that such an organisation would be valuable, we are, nevertheless, realistic about what can be done in the long run. In discussing the work of the Swedish committee, a recent booklet¹⁵ concludes with the following statement:

"It may sound paradoxical, but we do not expect, and do not even aim at, a national reduction in the total number of accidents. The vast majority of childhood accidents result in minor injuries. They are to a large extent unavoidable and even desirable from the educational point of view. We do not want to restrict the child's normal and free development and behaviour by trying to shield him from many types of accidents. What we are striving for is to prevent serious types of accidents and potential causes of disability or death. Even a very good result within this limited scope would only slightly reduce the total number of accidents, but it would bring about a further reduction of childhood mortality and disability, and this is what we are hoping for." This seems to be a practical and sensible approach and one which we support. We believe that the formation of a joint

committee on childhood accident prevention would be an important step in this direction.

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Statistics at Square One

I—Tabulation of data

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Introduction

Many observations made in medicine are most naturally expressed in words. For instance, we might say, "His pulse could not be recorded." But for many others the most natural mode of expression is in numbers, as in the phrase, "His pulse was beating at 80 per minute." The purpose of statistical methods is to put numerical data into a context by which their meaning can be better judged. The intention of this and succeeding articles is to show how some useful statistical methods can be used. No mathematical knowledge beyond simple arithmetic is required.

Some knowledge of statistical methods is advantageous—even essential—for two reasons. Firstly, just as discussing his data in words often helps an investigator to understand them better, so testing the numerical results statistically, by his own effort,

gives him a clearer view of their significance. Secondly, statisticians themselves are busy if helpful people, and are not always available to solve the sort of simple problems that will be discussed in these articles.

The small, moderately priced electronic calculators now generally available have made the computation of elementary statistics a simple matter. The methods to be described here will therefore be adapted to their use. Suitable instruments have keys for squares, square roots, change of sign, and a memory in addition to the usual arithmetical keys. Though simpler calculators can be of help, keys of squares and square roots save much labour, while a memory obviates the need to record intermediate stages of some calculations on paper. More complex desk calculators with special statistical functions exist, but they are unnecessary for the calculations to be discussed here. One of the great advantages of the electronic over the older mechanical calculators is that they provide instant squares, square roots, and reciprocals at the push of a button.

Tabulation

Before any statistical calculation, even of the simplest kind, is performed on data they are tabulated. If they are relatively