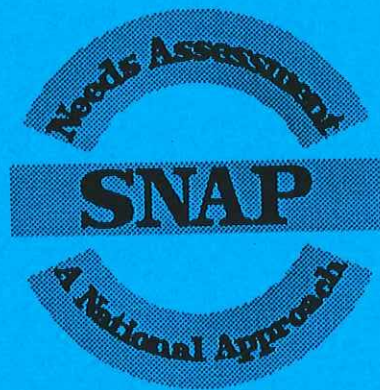


Scottish Needs Assessment Programme



School Accidents in Scotland

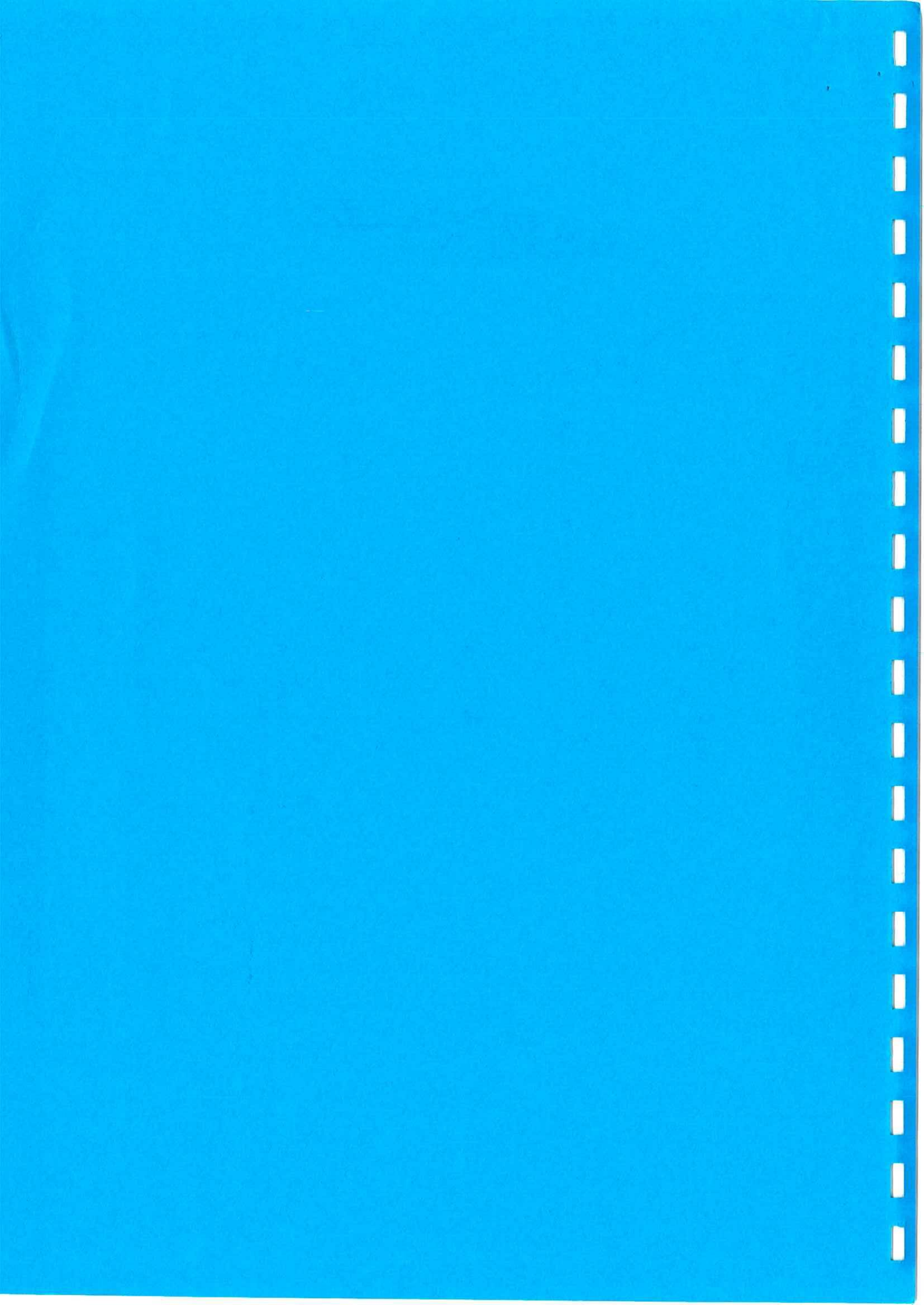
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Scottish Needs Assessment Programme
Health Promotion Review: Accident Prevention
School Accidents in Scotland

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January 1995

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Introductory Note

This Health Promotion Review is one of a series of five being published simultaneously. The others are:

- Home Accidents in Scotland
- Leisure and Water Accidents in Scotland
- Road Traffic Accidents in Scotland
- Workplace Accidents in Scotland

SNAP Reports currently available

Total Elective Hip and Knee Replacement - a comparative assessment
Cataract Surgery
Congenital Dislocation of the Hip
Global Needs Assessment - a screening tool for determining priorities
Increasing Choice in Maternity Care in Scotland - Issues for Purchasers and Providers
Breastfeeding in Scotland
Improving Gynaecological Services Within Existing Resources - A Programme
Budgeting and Marginal Analysis Approach
Cancer Care in Glasgow - A Model for Regional Cancer Care in Scotland
Inpatient Resources for Communicable Disease in Scotland
Dental Caries in Children
Oral Cancer
Addictions - Overview and Summary

- Alcohol Misuse
- Tobacco
- Problem Drug Use

Acute Stroke
Teenage Pregnancy in Scotland
Mental Health - Overview and Programme

SNAP Reports due to be published shortly

Cardiac Disease
Hernia Repair

Copies of all SNAP Reports are available from Ms Jackie Gregan, Scottish Needs Assessment Programme, 69 Oakfield Avenue, Glasgow G12 8QQ.

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ACCIDENTS IN SCOTLAND - GENERAL

STATEMENT OF THE PROBLEM

Mortality

Deaths resulting from accidents account for a substantial proportion of all deaths and are the fourth largest single cause of death in Scotland. In the 1980s deaths from accidents showed a downward trend but this has now levelled off.

Although death rates due to accidents increase with age, much of the impact on years of life lost is due to deaths among children and young adults, especially young men. Accidents are the third largest single cause of years of life lost, calculated as years of life lost before the age of 75 years.

Morbidity

Figures on the morbidity caused by accidents is limited. Information on community morbidity is not collected nationally. There may be information collected by individual practices or health visitors but this is not yet in a systematised form. Accident and emergency department information is limited by the proportion of attendances not coded completely. Information collected in the hospital service concentrates on the injury rather than on the place of injury or how it was caused and is, therefore, not complete.

Need for a common data set

Information on the number of accidents and types of accidents are collected by many agencies but as yet there is no common data set of information agreed by the various agencies and limited use can, therefore, be made of these data.

RISK FACTORS

The risk factors and their amenability to intervention depends very much on the setting in which the potential accident takes place. However, it is widely recognised now that in order to reduce injury and death from accidents it is necessary to reduce the number of accidents as well as to reduce the adverse effects of the accident.

EFFECTIVENESS AND COST-EFFECTIVENESS OF INTERVENTION

There is limited published information about the effectiveness and cost-effectiveness of interventions to both reduce the number of accidents and also to reduce the adverse effects of an accident. Much more research is required in this area. However, in summary, the value of health education initiatives alone is questionable. When coupled with structural or environmental changes, there can be an improvement in the outcome.

COSTS TO THE NHS OF ACCIDENTS

The cost of accidents is very difficult to estimate and therefore these estimates, in most cases, have been limited to the costs of the Health Service. These are meant to indicate the likely scale of the problem in Scotland.

School accidents	Hospital costs	£1 million per year
Workplace	Medical care costs	£5-22 million per year
(NHS as a workplace)	(Total costs)	(£85 million per year)
Road accidents	Total costs	£608 million per year
Leisure and water accidents	Hospital costs	£15-27 million per year
Home accidents	Hospital costs	£8-13 million per year

OVERALL RECOMMENDATIONS

At national level

- Information systems between the various organisations should agree on a minimum data set of information to allow for better analyses of the statistics to inform an action plan
- A joint strategy for accident prevention by setting should be drawn up in conjunction with all agencies involved.

At local level

- Purchasers should encourage Healthy Alliances to examine accidents locally and produce an action plan.
- Purchasers should require improved completeness and accuracy of statistics.
- A pilot scheme to evaluate the costs and effectiveness of community health service staff and domiciliary social work staff (such as home helps) undertaking a safety audit with advice within the homes of young people and the elderly should be undertaken.
- Various initiatives to reduce injuries from road accidents should be promoted including encouragement of the use of public transport, separation of pedestrians and cyclists from traffic, automatic speed cameras, especially in dangerous areas, the use of cycle helmets, infant car seats and rear seat belts, advanced driver training, especially by employers for their staff who drive, and sensible alcohol consumption
- The NHS should implement the SCOTMEG recommendations and monitor these through the contracting mechanism.
- Health Promotion initiatives with employers should include accident prevention.
- Schools should be encouraged to review regularly their information on accidents to identify risks and design an action plan incorporating the findings.
- All leisure and sports centres and clubs should collect and analyse data on accidents to identify risks and design an action plan to reduce these risks.

SCHOOL ACCIDENTS - EXECUTIVE SUMMARY

- School accidents account for approximately 20-30% of all accidents to school age children which result in medical treatment.
- There is a wide variation in the rate of reporting school accidents, largely explained by different reporting methods. Routine methods yield the lowest rate, while time-limited methods produce the highest accident rate.
- The school accident rate peaks at the 10 to 13 year old age group. In general, boys tend to have more accidents than girls.
- Playgrounds are the most common site for the occurrence of accidents in primary schools; classrooms, gymnasiums and stairs also feature significantly. In secondary schools, sports accidents are more common than those in the classroom, while workshops, laboratories and home economic departments also feature as common sites for accidents.
- The risk of being injured in an "uncontrolled" area in a Primary school is 6.3 times greater than that in a "controlled" area, a controlled area being one in which there is a reasonable opportunity for intervention and control of student behaviour. Playgrounds, corridors, stairs and washrooms are examples of uncontrolled areas, while classroom activities and organised sports events are considered as controlled activities.
- Two mechanisms of injury dominate school accidents - "struck by object / person" and "fall on same level". Head and facial injuries are more common in younger children, while older children tend to suffer from upper limb injuries. The types of injuries most commonly incurred are cuts and lacerations, contusions, sprains/strains and fractures.
- School sports accidents are important due to their frequency and severity. Football injuries are common in Scotland, but this may simply reflect its popularity. Accidents in gymnasiums are also common. Evidence from the US indicates that contact sports have the highest injury rates, while competitive gymnastics and basketball dominate injuries from those sports with less physical contact.
- It is been estimated that school accidents account for 5-10% of the total medical care consumption of school age children. The cost of these accidents is unknown, but figures from a pilot study in Paisley suggest a minimum cost to NHS hospitals in Scotland of £1 million a year.
- Prevention strategies to reduce school accidents include measures to increase both staff and pupils' knowledge of the importance of school accidents; improvement of the supervision of pupils; staff development programmes to provide the skills required to reduce accidents; and the implementation of structural changes, such as replacing potentially dangerous equipment.
- Education Departments should establish an effective school-based reporting system for accidents to allow the identification and monitoring of school accidents, and to provide feedback to schools enabling them undertake their own accident prevention initiatives.

RECOMMENDATIONS

1.1 School Information

There is no central source of information on school accidents. The recent Scottish Office Interdepartmental Working Party on Accidents made no mention of school accidents. Routine school-based reporting systems are the easiest way of gathering information on school accidents. The main role of Health Boards is to provide epidemiological support to Education Departments on the interpretation of the results.

1.2 Health Service Information

Few Accident and Emergency Departments appear to have adequate coding of school accidents. Purchasers should seek to encourage coding of Accident and Emergency records.

1.3 Action Within Health Alliances

Most Health Boards have formed healthy alliances with Education Departments. It is important to maintain these links, as any health service involvement would be impossible without good relations with schools, teachers and Regional Councils.

Health Boards and individual health care staff have a key role in acting as advocates for accident prevention. Many education staff will not have been exposed to recent views of injury prevention, and may view school accidents as uncommon or unpreventable. Boards should raise school accidents as a topic for discussion in multi-agency groups, and emphasise their view that there is considerable scope for prevention.

Health Boards should be aware that there are many existing accident prevention activities within schools. These projects, including the Healthy Schools Initiative and the work of Health and Safety advisers, are of great value but often focus on individual accidents. Boards may be able to help Education Departments to take a global view of school accidents by collaborating on epidemiological reviews, and by encouraging discussion of risk factors.

All Education Departments do collect some information on school accidents. Health Boards should ascertain whether this information is collated, and, if not, should encourage Education Departments to do so. Departments of Public Health can advise on data analysis where appropriate.

First aid is given in around half of reported school accidents. The Health Service has a role in liaising with Education Departments on appropriate training of staff to deal with accident victims. Education Departments should be encouraged to obtain training from an appropriate source.

Community Health staff have considerable contact with schools. These health care workers could advise school staff on the provision of first aid on site, as discussed above. In addition, there is an opportunity to extend their role into accident prevention activities and this should be encouraged and evaluated where possible.

1.4 Education Departments

Education Departments should make clear policy statements on the importance of school accidents, and on the actions schools should take to minimise risk. This can be based on local review of accidents, for example by School Boards. This requires information from which to plan preventive activities.

Reporting of school accidents is poor, and this limits the value of routine data. Teachers should be provided with clear guidelines on accident reporting. Education Departments should give regular reminders both of the need to report accidents, and also of the criteria for reporting under the RIDDOR Regulations.

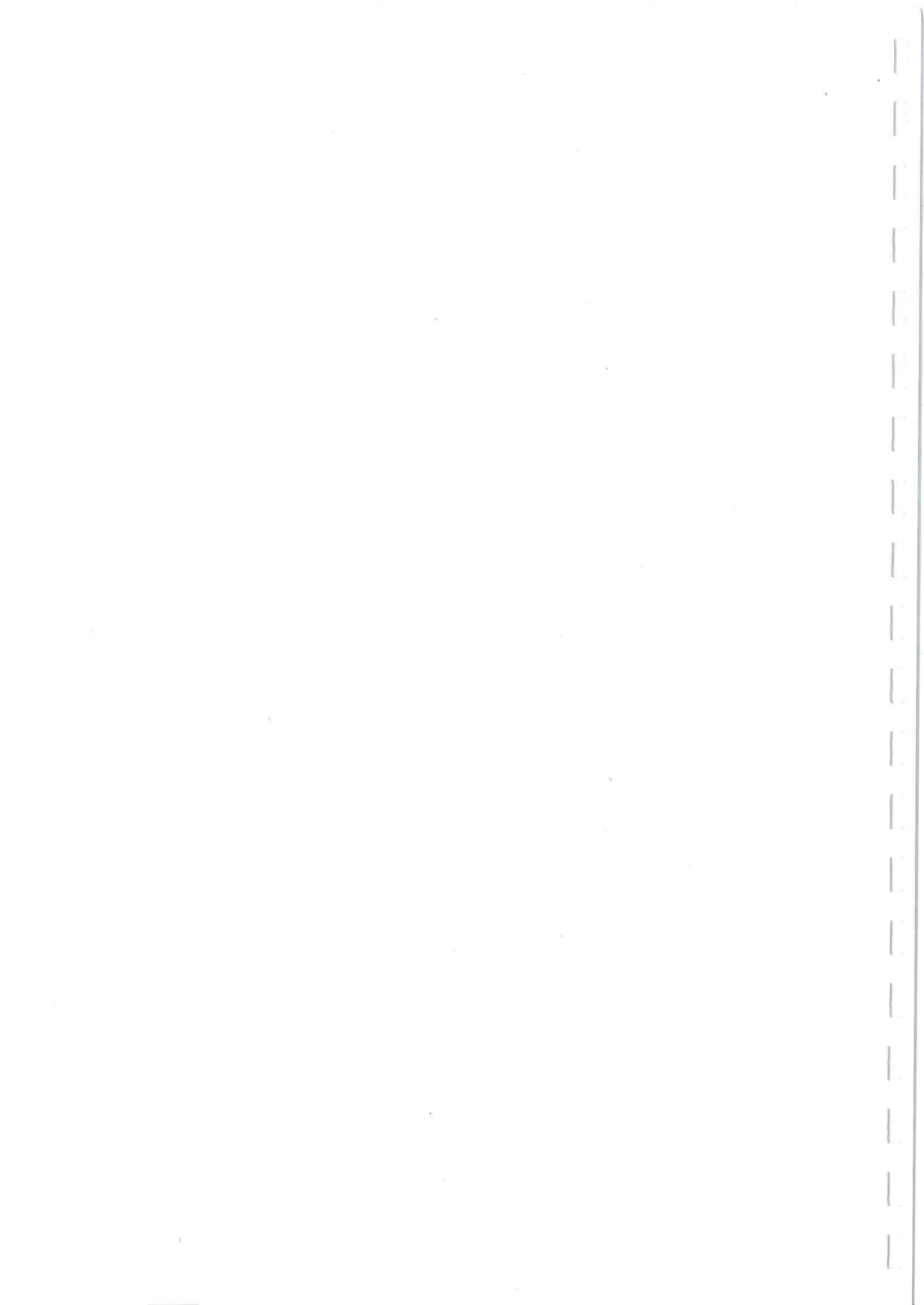
Where information is already collected and analysed, Education Departments should be encouraged to feed it back to the schools and nurseries which collect it. This should have the dual effects of acting as a reminder on collection, and providing information for schools to make use of in their own accident prevention initiatives.

Where there is already evidence of effective interventions, such as the wearing of eye protectors during particular experiments, teachers should be encouraged to implement them. When monitoring suggests a high accident frequency in particular activities (e.g. a specific sport), Education Departments should consider active investigation of the reasons, with the intention of developing prevention strategies.

1.5 Within the NHS

It is not possible to identify school accidents as a separate category in routine NHS data. Where accident and emergency systems are in place, Health Boards should specify data quality standards in contracts with providers of acute services, and require the identification of site of childhood accidents. The new accident and emergency information systems in development may offer improvements on previous methods of NHS data collection when new systems are being considered.

There are few intervention studies examining the effects of accident prevention strategies in schools. Health Boards and Health Promotion departments can offer advice and support to the evaluation of accident prevention activities. Research funding should be sought for trials of both structural and educational interventions.



1 INTRODUCTION

The Department of Trade and Industry (DTI) define an accident as:

"any unplanned event which resulted in injury or ill-health of people, no matter how caused, except for

(i) deliberately self-inflicted injuries or suspected suicides and

(ii) injuries resulting from physical attacks by other persons"

(Department of Trade and Industry 1993).

As discussed in section 2.2, this definition requires redefinition for school accidents.

2 STATEMENT OF THE PROBLEM

2.1 Proportion of Childhood Accidents Occurring in Educational Establishments

There is little information from which to judge the importance of school accidents as a proportion of all childhood accidents. Researchers in Wales recorded information on all children admitted to a hospital or treated at the only Accident and Emergency Department in the area over a four week period. From a school age population of 69 000 children, 1072 accident victims were treated. Of this group, 254 (23.7%) had been injured in "school accidents". No definition of school accidents was given (Maddocks et al 1976).

Jacobsson et al (1986) collected information on all injuries treated at a Primary Care Centre, Casualty Department or "General Casualty Centre" in Sweden over a one-year period. There were 187 individuals treated because of school accidents, which constituted 5% of all accidents, or 30% of accidents in those of school age (compulsory education was ages 7-19 in Sweden at the time of the study). Again, no definition of school accidents was given.

In a cohort study of 1139 children born in New Zealand in 1972-3 reported on their injury experience at 9 and 10 years of age (Langley et al 1987). A total of 413 accidents requiring medical treatment were identified, of which 116 (28%) occurred at school. Based on these figures, it seems likely that in school age children school accidents account for 20-30% of all accidents which result in medical treatment.

2.2 Definitions of School Accidents

The studies quoted above, while helpful, reveal that there is often no definition of school accidents. Where definitions are given, they often vary between studies. Differences in definition relate to whether only accidents resulting in injury are included; whether accidents outwith school grounds are included (e.g. accidents while travelling to or from school), and whether accidents during activities outwith the school day are included (e.g. weekend or holiday outings). The most comprehensive definition, and the definition which sits best with the DTI definition given above, is that of Dale et al (1969), *"any sudden and unexpected event which may, and usually does, cause injury... (they) may occur either on the school premises while school is in session or during a school-sponsored activity such as an athletic contest or while riding on a school bus"*. This report excludes school-related road traffic accidents as these are best considered under the rubric of all road traffic accidents.

This definition includes non-injury accidents. In many other studies it is unclear whether non-injury accidents are included. Woodward et al (1984) for example, mention collecting information "on all accidents" (their emphasis), but later state that their purpose was "(to examine) the extent of under-reporting that occurred in routine reporting of injuries". Similarly, Jacobsson et al (1986) defined a school accident as "an accident that takes place in school during school hours, on the way to or from school, or in any activity organised by the school outside its premises", but continue, "only accidents treated at the Health Centre, the Emergency Department or the General Casualty Centre were registered". Both these groups appear to use "accidents" as being synonymous with "accidents resulting in injury".

Previous reports using routine statistics have not always distinguished deliberate acts - for example, deliberate self-poisonings or injuries resulting from assault -

from other incidents reported on accident forms. These incidents may not be separated out from accidental injuries. In addition, accidents not resulting in injuries are reported occasionally, usually because of a potential for injury (R Balendra, personal communication). There are, therefore, three main categories of incidents occurring in schools:

- non-injury accidents
- injury accidents
- non-accidental injuries

The methods used by researchers to identify school accidents implicitly divide them into those resulting in treatment in health care settings, and those which do not.

2.3 Reporting of School Accidents

Several authors have attempted to estimate the proportion of all school accidents reported routinely by schools. Bremberg (1989) compared studies using different methods of reporting school accidents. Reviewing studies using the criteria of injury accident occurring at school and treated by a physician, Bremberg found that, on average, routine school-based reporting systems recorded an injury rate of 17 injuries per 1000 student years; hospital/health centre based studies a rate of 38 injuries per 1000 student years and time-limited school based studies a rate of 71 injuries per 1000 student years.

Bremberg also reported on the injury rates in three years of routine school reporting in Linköping in Sweden, followed by one year in which staff were repeatedly encouraged to report injuries. The injury rate increased from 9.8 injuries per 1,000 student years in the first three year period to 17. per 1,000 in the second period. There were no significant differences in either the type or severity of injury reported in the two time periods.

Woodward et al (1984) recorded school injury accidents reported by schools over a one-year period in a Canadian town. Their definition of school accidents included accidents occurring going to or from school, and had no treatment threshold (i.e. injuries requiring no medical treatment were included). Within the routine reporting system, fifty schools were chosen randomly and asked to report all accidents occurring during a two month period, including those they would not normally report. The annual injury rate was 5.4 per 100 children in the routinely reporting group, and 23.8 in those asked to report all injuries. They used their own categorisation of serious and non-serious injuries, with "serious" including fractures, loss of consciousness, dislocations, sprains, torn ligaments or cartilage, chipped or broken teeth, and internal injuries, and found that in the two month period, schools reported twice as many serious injuries and five times as many non-serious injuries.

There has been no direct comparison of injury accidents requiring medical treatment and reported by schools, and those not reported but still receiving medical treatment.

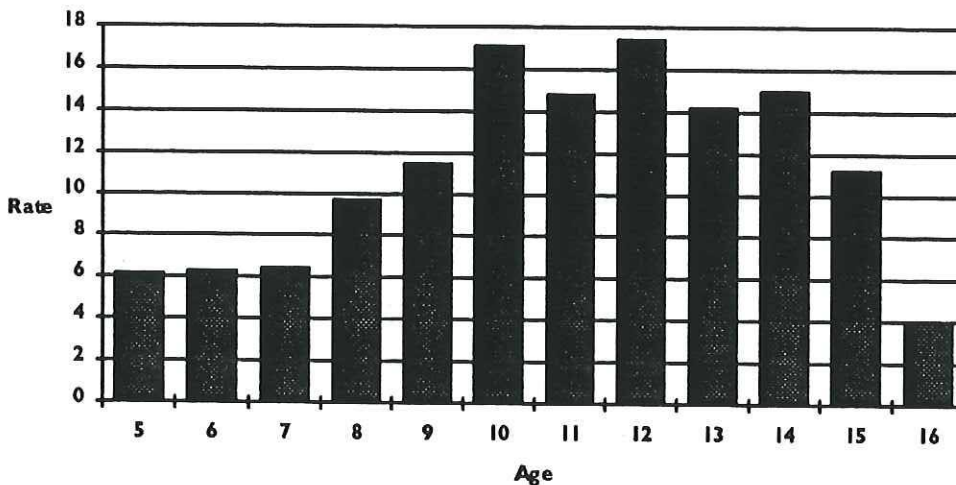
2.4 Accident Rate by Age

From the work discussed above, it is likely that reported prevalence of injury accidents in schools is unreliable when calculated from routine data. Biases within any one study, however, are likely to be systematic. The best indication of difference between age groups should come from differences between ages in the same study. Most published work reports accidents for either primary and secondary schools (or elementary and senior schools), rather than by age. The only study identified in the literature review as providing injury rates by year of age indicated a peak rate at 10-13 years of age (Sheps et al 1987).

Where other workers have provided enough information to give an indication of accident rates by age, their evidence is largely supportive of a peak in this age group (Langley 1981, Jacobsson 1986, Schelp 1991). Balendra (1992) also found the highest number of accidents in this age group, although rates were not calculated.

Figure 1 shows accident rate by age for school accidents reported to the Education Department in Renfrew Sub-Region in 1991-93.

Figure 1
School Accidents Accident Rate Per 1000 Pupil Years By Year of Age

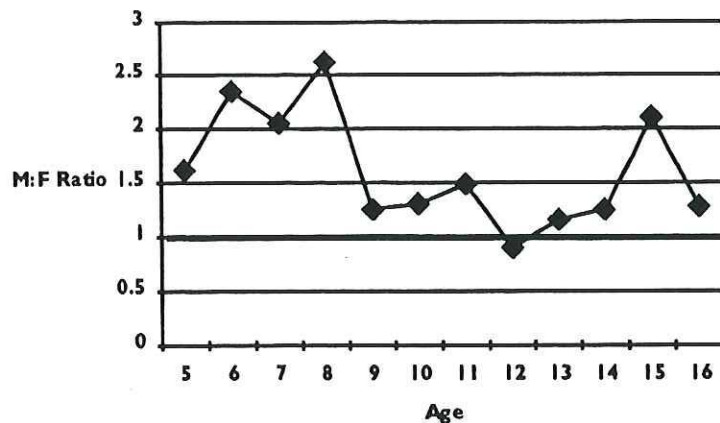


Source: Department of Public Health ACHB
SRC Education Department

2.5 Accident Rate by Gender

There is a persistent gender bias, with boys having more accidents than girls at almost all ages. The overall male:female gender ratio in the Renfrew study was 1.37:1. Figure 2 shows the ratio by year of age.

Figure 2
Male:Female Gender Ratio School Accidents Renfrew Sub-Region 1992-1993



Source: Department of Public Health
 Strathclyde Regional Council Education Department

2.6 Site of Occurrence of Injuries

The most common sites for primary school injury accidents are playgrounds, followed by classrooms and gymnasiums (Langley et al, Sheps et al 1987, Johnson et al 1972, Pagano et al 1987, Balendra 1992). The proportions vary between series, and gymnasiums are a more common site of injuries than classrooms in some series. Stairs and steps also tend to be important sites.

Secondary school injuries have a different profile. Sports injuries, in gymnasiums and on playing fields, are more common than classroom injuries (Johnson 1972, Pagano 1987, Balendra 1992). Other areas, such as workshops, laboratories, and home economic departments, are also common sites in secondary schools.

Sheps et al (1987), in their work in British Columbia, examined accident rates and relative risk of accidents in controlled and uncontrolled areas. Controlled areas were defined as areas where there was both direct observation by teachers and a reasonable opportunity for intervention and control of student behaviour. Classroom activities and organised sports events were regarded as controlled. Uncontrolled areas were those in which there might or might not be supervision but where the ability of the teacher or janitor to effectively intervene was limited due to factors such as the large number of students, or their physical distribution. Playgrounds, corridors, stairs, washrooms and so on were deemed to be uncontrolled areas. In elementary school accidents, the risk of being injured was 6.3 times greater in uncontrolled than controlled areas. This effect was present for all types of injury.

2.7 Mechanism of Injury

The mechanism of injury has been recorded in various ways. Classifications, generally based on the DTI injury classifications, tend to provide little information. Two categories, "struck by object/person" and "fall on same level" usually dominates the findings. The "struck by object/person" category is used to describe accidents as varied as running into a wall, being hit by a ball, or being struck by a falling object. In Balendra's study, for example, 36% of 759 school accidents were

categorised as "struck by object/person", and a further 28% as "fall on the same level". These mechanisms tend, therefore, to be uninformative unless examined for a particular injury and site (e.g. basketball injuries in a school gymnasium).

2.8 Part of Body Injured

In general, head and facial injuries are more common in younger children (Dale 1969), and upper limb injuries in older children (Sheps and Evans 1987, Balendra 1992). It is difficult to know how best to interpret this; while young children may be less able to protect their head and face, for example in a fall, it is also possible that schools may be particularly likely to report head and facial injuries in younger children. Alternatively, the activities in secondary schools, such as laboratory, workshop and sports, may result in more upper limb injuries.

2.9 Nature of Injuries

Findings on types of injury are conflicting. In general, cuts and laceration, contusions, sprains/strains and fractures are the four most common categories of injury. The relative order, and their prevalence, varies markedly from study to study.

Bell, in a small Scottish study, found that cuts and lacerations constituted 39% of all reported injuries while Schelp (1991) found fractures to be the most frequent injuries. The differences between studies may be partially due to international differences in school environment. Reporting criteria and definitions used in different studies may also help to explain variations. In the example given above, Bell recorded all routinely reported injuries, while Schelp reviewed only injuries requiring medical treatment. This is unlikely to be the whole explanation for the differences between studies: Maddocks et al (1978) and Fothergill and Hashemi (1991), reviewing child accidents presenting to Accident and Emergency Departments, found lacerations, bruises and sprains to be more common than fractures.

Bremberg (1989) has suggested that the frequency of fractures reported in different studies of school accidents might be a better comparator, as these may be less likely to be under-reported. Comparisons of the rate of fractures do show less variation than do the frequency of all school accidents.

2.10 Sports Accidents

Sports accidents are important because of the frequency of school sports injuries discussed above. They have been examined both as part of wider studies of school accidents, and as specific topics. In general studies of school accidents, they are of greatest importance in secondary schools. Accidents in gymnasiums are common (Pagano 1987, Balendra 1992). Schelp (1991) suggests that vaulting horses were commonly involved in gymnastic accidents. The chief difficulty with interpreting figures quoted in various studies is the lack of a denominator. Finding that most sporting injuries were associated with soccer may indicate that the game is more popular, is played more, and so results in more injuries, rather than meaning that it is particularly dangerous. The lack of information on exposure limits interpretation of the data.

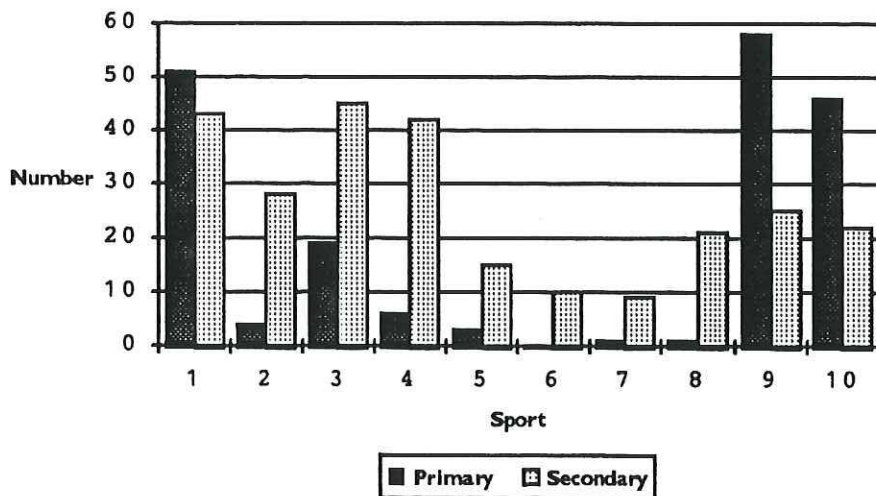
The two most comprehensive prospective studies are both from the United States and refer to competitive high school sports (Garrick and Requa 1978, Shively et al 1981). These studies take a broader definition of accidents, and recorded any injury

resulting in withdrawal from a practice session, or missing a further practice session or competitive event. The situation in the USA may not be typical of sporting arrangements in British schools, but comparisons of accident rates within the studies may provide some information on the relative risk of injury in different sports. Contact sports such as American football and wrestling, had the highest injury rates. Among sports with less physical contact, competitive gymnastics and basketball predominated as causes of injury. Garrick and Requa also noted higher rates of injury in competitive events than in practices. Shively et al noted that, although males had similar rates of injury to females, females tended to have longer lasting injuries. They hypothesised that this could be due to lack of access to conditioning facilities, and less of an emphasis on year-round fitness than with males.

School Sports Accidents by Location

Figure 3 shows the distribution of sports accidents in primary and secondary schools in the Renfrew study. Although rates are not available, the figures suggest that basketball and gymnastics are associated with surprisingly high numbers of injury reports.

Figure 3
Sports Accidents Renfrew Sub-Region 1992-1993



Source: Department of Public Health
Strathclyde Regional Council Education Department

Key to Sports

1	Football
2	Hockey
3	Gymnastics
4	Basketball
5	Netball
6	Warm Up
7	Trampoline
8	Athletics
9	Other
10	Not Stated

2.11 Risk Factors

The finding of an excess of injuries in 10-12 year old children has been discussed above. The other consistent finding is a greater number of reported injuries in males (Dale 1969, Langley 1981, Schelp 1991). There is a suggestion that part of the male excess may be artefactual. Woodward et al (1984) reviewed the gender ratio under two reporting conditions - routine school-based reporting and time limited school-based reporting. They found that, with routine reporting, the male:female ratio was 1.4:1, decreasing to 1.14:1 during the time-limited period of higher reporting. The reason for this finding is unknown, and the finding does not appear to have been re-examined by other workers.

Primary school children are at greatest risk in uncontrolled areas of the school - playgrounds, stairs, corridors and the like (Sheps and Evans 1987). Sports accidents, as discussed above, are important in secondary schools. High risk sports are those associated with high velocity, physical contact or indoor activities (Garrick and Requa 1978, Kelly et al 1991). Basketball is an obvious example of a high velocity indoor sport. Using it as an example, in the USA the type of shoes worn and the fitness of the participant have also been shown to influence injury rates (Petrov et al 1988, Gross and Nelson 1988).

The characteristics of the child are also important, although the area of the school and type of activity are of greater absolute importance. There is some evidence that children are more likely to have an accident at school if they have poor relationships with their peers (Bremberg and Gerber 1988). This may be related to injuries resulting from bullying being disguised as accidental injuries. Other child characteristics which increase risk are aggressive behaviour, and a history of accidental injury before school age (Bijur et al 1988a, 1988b).

3 ECONOMIC COSTS

3.1 Proportion of Health Care Consumption

There are few estimates of the economic cost of school accidents to health services. No estimates of costs to families was found. Jacobsson et al (1986) estimated that school accidents accounted for between 5-10% of the total medical care consumption of school age children.

3.2 Estimate of NHS Hospital Costs

No previous estimate has been made of the cost of school accidents to the Health Service in Scotland. A pilot study is under way in the Argyll and Clyde Health Board area, which attempts to identify the hospital costs associated with school accidents. The work is incomplete, but is discussed here because of the lack of other information.

Of the first 69 school accident attendances included in the study at the Royal Alexandra Hospital, Paisley, there were 61 x-rays, four general anaesthetics, four overnight stays and 13 return out-patient appointments. Other local work has been used to estimate the frequency of school accidents treated at Accident and Emergency Departments. Applying the local estimates to Scotland, and using the average cost of a Casualty Department attendance in Scotland, would suggest that the minimum hospital costs of school accidents to the NHS in Scotland are around £1 million a year. Given the frequency of x-rays and other interventions in the first group to be reviewed, this may prove to be an underestimate.

4 PREVENTION

4.1 Lack of Evaluated Initiatives

Much of the work on school accidents has focused on descriptive epidemiology. There has been very little work on prevention of accidents. This section reviews the little work which is available, and identifies general themes within it. Few of the interventions discussed have been formally evaluated.

4.2 Prevention Strategies

Much of the work on prevention is from North America. This is unsurprising, as for many years there has been interest in schools' legal liabilities in the event of a school accident (Thomas 1976). Much of the American literature has been produced by educationalists, and concentrates on the components of preventive systems.

In 1968 the American Association for Health, Physical Education, Athletics and Recreation recommended school safety policies, emergency care training for staff and procedures for reporting and investigating hazards in schools. Haering (1979) suggests that regional education departments should take the initiative by issuing a clear policy statement on accident prevention. This should be supported by an accident reporting system to allow hazards to be identified and monitored, and school safety committees to carry out work at local level.

Wayne (1982) stresses the importance of increasing the knowledge of both staff and pupils about the importance of school accidents, supervision of pupil behaviour and the introduction of staff development programmes to help provide them with the skills to reduce accidents.

4.3 Specific Initiatives

Dunklee and Thomson (1990) introduced student orientation rules and a staff development programme, and demonstrated a decrease of 78% in accidents reported from the elementary school used as a pilot site. While some of the reduction could have been due to chance or altered reporting procedures, this is an encouraging result. Most of the reduction was in playground accidents.

In high schools, programmes have been introduced to help reduce specific types of accidents, such as laboratory accidents. Gerlovich and Downs (1981) and Krajkovich (1983) emphasise the value of adequate eye protection in laboratories, and provide examples of structural change, such as altering the type of pipette used to reduce glass injuries.

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