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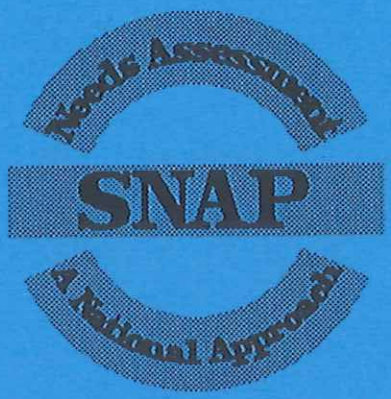

Leisure and Water Accidents in Scotland

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Scottish Needs Assessment Programme

Health Promotion Review: Accident Prevention

Leisure and Water Accidents in Scotland

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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
- Road Traffic Accidents in Scotland
- School 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

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

CONTENTS

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.

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.

1 INTRODUCTION

1.1 Background

We are constantly being urged nowadays to take more physical exercise. In addition, increasing leisure time has opened up wider opportunities for new adventures in sport and leisure. There appears to be little dispute that regular physical activity is beneficial to health. Repeated exercise appears to produce improvements in the body structure, functioning, fitness and health status. Examples of health benefits include prevention of obesity, positive effects on psychological health, prevention of osteoporosis, maintenance of functional capacity particularly in the elderly and disabled and the primary and secondary prevention of coronary heart disease.[1,2] However the levels of physical activity which are necessary to achieve the above health benefits are not clearly understood. Neither are the relative importance of intensity, duration, frequency and mode of activity well documented. Nevertheless the well documented benefits of regular exercise must be weighed against the complications of vigorous exercise, the injury risks of taking part in certain sports and the likelihood of accidents in certain active recreational pursuits.

The policy statement "Scotland's Health: A Challenge to Us All"[3] noted that Scottish accident rates were higher than those in England and Wales and confirmed accidents as one of the priority areas for action to improve Scotland's health. It set out a number of initiatives aimed at promoting accident prevention and noted that the Scottish Office Inter-Departmental Group on Health Strategy had commissioned an urgent study of accidents in Scotland with particular reference to home and leisure accidents. The review was to seek to establish what further information is required and to advise on preventive strategies at a national level. An analysis of available data "Scottish Accident Statistics" together with a guide to available data sources "Scottish Accident Data Sources" have recently been published.[4,5]

There currently is no publication which attempts to draw together data on leisure accidents in Scotland. "Scottish Accident Statistics" concentrates on road traffic and home (mainly fire) accidents and hospital admissions data. In England and Wales an Office of Population Censuses and Surveys (OPCS) Monitor reports on leisure accidents but only those which are fatal and can be identified within the ICD coding system. ICD-9 contains no distinct codes for leisure accidents although these will be contained in the ICD-10 revision. The leisure accident surveillance system (LASS) of the Department of Trade and Industry publishes data on leisure accidents but is restricted to non-fatal accidents presenting to casualty departments in 13 hospitals throughout the UK.

This report attempts to present data from a wide variety of sources on both fatal and non-fatal leisure accidents, to comment on these findings, and to suggest priority areas for action in accident prevention within the NHS in Scotland. It focuses on primary and secondary accident prevention and does not consider the impact of emergency treatment and rehabilitation on tertiary prevention. The review contains a separate consideration of water accidents. Where possible this is confined to leisure related water accidents. It also attempts to identify areas for future research and to highlight areas in which further information is required. The review is one of a series on accidents in Scotland prepared by the Scottish Forum for Public Health Medicine.

1.2 Definition of leisure accident

The Department of Trade and Industry define a leisure accident as one in which occurs in "any environment where accidents occur, other than the home, during paid work or involving motorised vehicles on the public highway. This includes children at school and activities such as shopping, cycling, travelling on public transport and sport."[6] We have adopted this definition throughout the report. Data on accidents associated with leisure activities in which that activity is the occupation of the victim, or where a death was due to natural causes are dealt with separately in the International Classification of Diseases (ICD) but may be included in data from other sources.

1.3 Sources of data

Annex 1 contains a review of the available sources of data on leisure and water accidents. Notes are given on the method of collection, relationships and differences between sources and relevant publications.

2 EPIDEMIOLOGY

2.1 Leisure accidents

2.1.1 Background

While sport and other leisure activities form only one per cent of fatal accidents they represent 17 per cent of accidents treated in hospital.[7,8] The increasing attention given to injuries associated with sports and other leisure activities in recent years represents both a growing trend in these injuries or an increased appreciation of the extent to which they are preventable. Some new leisure activities such as motocross have brought with them new injuries, while established sporting activities, like horseback riding, are now viewed in a new light. It is no longer assumed that accidents in such sports are inevitable. This also applies to many athletic activities involving major body contact.

Deaths from sport and leisure activities have been published by the OPCS for England and Wales only since 1982. Analysis of these figures shows that in England and Wales during 1982-88 there were 98 deaths from horse riding accidents, 92 from air sports, 86 from motor sports and 74 from mountaineering. The commonest activities resulting in drowning in adults were swimming (128 deaths) and fishing (82 deaths).

When level of participation was taken into account, mountaineering, motor sports and horse riding were found to be associated with the highest incidence of fatal accident. Mountaineering had an associated death rate during 1982-84 of 2.3 per one million participants per annum; motor sports had a death rate of 1.0, and horse riding 0.6. Air sports would almost certainly have been associated with the highest mortality rate but no information was available on levels of participation.[9] These crude rates do not however take into account frequency of participation on a person days at risk basis.

2.1.2 Participation in leisure activities in Scotland

According to the General Household Survey one in three adults now takes some kind of regular exercise.[10] The Scottish Sports Council carry out a programme of community based surveys which aim to estimate the level of participation among Scottish residents aged 16 years and over. Data are collected through the Scottish Opinion Survey, a monthly omnibus survey of the Scottish population conducted by the market research company System Three Scotland.

Approximately 1000 adults (aged 16 years and over) are interviewed each month in 40 sampling points throughout mainland Scotland. The sample is weighted in an attempt to obtain an accurate presentation of the total adult population in Scotland. Every other month the interviewees are questioned on their participation in sport and physical recreation in Scotland in the four weeks before the interview. On behalf of the Scottish Sports Council these questions have been included in the survey every other month since May 1987.

It should be noted that because of the modest numbers involved in the sample the reliability of the figures for many of the minority sports cannot be ensured. In addition, the survey methodology does not allow for the seasonal nature of many of the sports, and because figures are averaged over the year such sports are as a consequence adversely affected. These survey data are subject to an unknown sampling error which is however estimated at around plus or minus 3%. The estimated level of participation in a selected number of leisure activities is given in table 1 where seasonal percentages have been added by combining the figures for the peak survey months over seven years.

Table 1
Individual sports and physical recreations - participation among Scottish adults, 1987-1993

Sport	Proportion of adult population who participate									
	1987	1988	1989	1990	1991	1992	1993	1993	Peak survey month	
	%	%	%	%	%	%	%	No (000s)**	1987-93	%
Angling	1.7	2.0	2.1	2.0	2.1	2.0	2.4	96.0	July	3.4
Athletics	0.8	0.7	0.9	0.6	0.5	0.4	0.3	12.0	May	0.8
Badminton	3.4	4.3	3.9	2.7	2.6	2.8	2.8	111.9	March	3.5
Bowls	4.1	4.1	4.4	4.3	4.4	4.2	3.9	155.9	July	4.3
Cricket	0.2	0.4	0.3	0.2	0.3	0.1	0.3	12.0	July	0.5
Curling	*	*	0.4	0.3	0.2	0.3	0.8	32.0	November	0.8
Cycling	4.1	4.6	4.8	4.1	4.4	4.6	5.2	207.9	July	6.2
Dancing	8.8	7.8	8.3	6.3	6.5	6.0	4.3	171.9	March	7.6
Football	7.6	6.9	6.7	6.6	5.9	6.7	7.7	307.8	May	7.9
Golf	5.7	6.3	7.0	6.3	6.1	5.8	6.6	263.9	July	8.5
Gymnastics	0.4	0.5	0.6	0.4	0.2	0.3	0.3	12.0	March	0.8
Hill walking/climbing etc	2.9	3.4	3.4	2.7	3.2	2.9	3.7	147.9	July	4.1
Hockey	0.5	0.6	0.4	0.3	0.4	0.3	0.3	12.0	March	0.5
Horse riding	0.7	0.7	0.8	0.6	0.8	0.6	0.8	32.0	July	1.0
Ice skating/ice hockey	0.8	1.0	1.0	0.7	1.2	1.0	0.9	36.0	March	1.1
Keep fit/aerobics	7.2	6.4	6.6	6.3	8.0	8.1	9.4	375.8	May	8.4
Martial arts	1.1	0.9	0.7	0.7	0.5	0.7	0.7	28.0	March	1.3
Multigym/weight training	2.5	3.4	2.5	3.1	3.6	4.2	3.8	151.9	March	3.7
Rugby	0.8	0.7	0.8	0.6	0.4	0.5	0.7	28.0	November	0.8
Running/jogging	4.4	4.7	4.6	3.4	4.3	4.3	4.3	171.9	July	4.6
Sailing and other watersports	0.5	0.9	0.8	0.6	1.0	0.9	0.5	20.0	July	1.5
Skiing	1.0	1.0	0.7	0.6	0.7	0.3	0.5	20.0	March	2.4
Snooker/billiards/pool	11.1	11.2	9.3	8.2	8.2	7.1	6.4	255.9	January	9.8
Squash	2.1	2.6	2.1	1.6	1.9	1.2	1.4	56.0	November	2.0
Swimming	14.4	15.4	17.1	16.5	17.3	17.6	18.9	755.6	July	18.9
Table tennis	1.3	1.3	1.4	1.1	0.8	0.7	0.7	28.0	January	1.3
Tennis	1.4	1.0	1.6	0.8	0.9	1.1	0.9	36.0	July	2.9
Walking (2+ miles)	22.2	21.7	22.7	15.3	16.9	18.0	19.5	779.6	March	22.6
Yoga	*	0.5	0.7	0.6	0.5	0.5	0.5	20.0	March	0.7

* Insufficient data
** Figures based on population aged 16+ from 1991 Census Report for Scotland (Part 1) published by HMSO, Edinburgh, 1993

2.1.3 Fatal accidents

There is no comprehensive record of fatal leisure accidents in Scotland. Data on deaths from drowning accidents are collected by RoSPA (see section 2.3) and data on deaths in Scottish mountains by the Mountain Rescue Committee of Scotland (see section 2.2). The Registrar General's office in Scotland collects and codes data on causes of death under the International Classification of Diseases 9th revision (ICD9) classification which include codes on "external causes" of death. Deaths occurring in the 5 year period 1988-1993 for selected E codes which identify deaths occurring during some leisure activities are given in table 2. Unfortunately, E codes only specifically identify deaths from a limited number of leisure activities. These include motor sports, air sports, horse riding, subaqua and certain other water sports. Comparison of drowning deaths with RoSPA data show that the Register General data are incomplete.

Analysis and interpretation of these data are difficult. They are only generated when a sporting or leisure activity is mentioned on the death registration. In addition, the ICD classification which is used to code causes of death does not provide specific rubrics for sporting and leisure fatalities. It is thus the responsibility of those who code the cause of death to note these events (using the above codes) when underlying causes of death are assigned. These deaths do not include those in which the activity was part of the occupation of the deceased nor when the underlying cause of death was natural but does include deaths of officials at sporting events.

The 1992 OPCS Monitor DH4 93/3 records all deaths associated with leisure and water accidents in England and Wales in 1992. There were 125 deaths during leisure activities (58 were drownings) and 354 other drowning deaths. This represented 5% of all accidental deaths in England and Wales in 1992, the other major categories being road traffic accidents 4239 (39%), accidental falls 3268 (30%), accidental poisonings 732 (7%), accidental submersions/suffocations 718 (7%), fires 499 (5%) and deaths associated with natural events or environmental causes 162 (2%).

Table 2
Numbers of deaths in Scotland over the 5 year period 1988-1993 caused by selected leisure accidents

Leisure activity	E code	Number of deaths		
		0-15 years	over 16 years	Total
Water sports				
Boating: unpowered	E830-8 (.0 only)	-	14	14
Boating: powered	E830-8 (.4 only)	-	-	-
Water skier	E830-8 (.4 only) and E910.0	-	-	-
Swimmer	E830-8 (.5 only) and E910.2	2	16	18
Scuba diver	E910.1	-	6	6
Diving (pressure changes)	E902.2	-	3	3
Horse accidents				
Horse rider	E828.2	1	2	3
Pedestrian (in collision)	E828.0	-	-	-
Animal drawn vehicle accidents	E827, E828.3 and E821/2/3/5 (.5 only)	-	-	-
Motor sports				
Only driver	E821/2/3/5 (.0 only)	-	3	3
Only passenger	E821/2/3/5 (.1 only)	-	1	1
Only motor cyclist	E821/2/3/5 (.2 only)	1	2	3
Only motorcycle passenger	E821/2/3/5 (.3 only)	-	-	-
Air sports				
Unpowered glider	E843.6	-	-	-
Parachutist	E842.7	-	-	-
Powered, non commercial aircraft or glider	E840.5	-	3	3
Mountain accidents				
Fall from cliff	E884.1	1	98	99
Exposure	E904.3	-	5	5

Source: ISD, Edinburgh

When the estimates of sports participation in the adult Scottish population given in table 1 is considered together with the mortality data in tables 2, 9 and 14 an estimate of the incidence rate of fatal accident associated with specific leisure activities can be calculated (see table 3). It should be stressed that these are imprecise estimates. Nevertheless they can be used to give a very rough indication of the absolute risks involved.

Table 3
Estimates of the risk of fatal accident associated with selected leisure activities among adults in Scotland

Activity	Estimated number of adult participants in Scotland	Mean annual number of deaths associated with leisure activity	Number of annual deaths per 100,000 participants
Swimming	755,000	5.6	0.7
Horse riding	32,000	0.6	1.9
Angling	96,000	7.4	7.7
Hill walking/Climbing	148,000	25.6	17.3
Air sports (powered aircraft or glider)	2,500[2]	0.6	24.0
Boating	20,000	5.6	28.0
Subaqua[1]	2,000	2.6	130.0

[1] Scottish Subaqua Club membership (source Sports Council)
[2] Based on number of private pilots licences in the UK in pilots with valid medical certificates at 31/3/94 adjusted pro rata for Scottish population (source Civil Aviation Authority)

2.1.4 Non fatal accidents

The consumer safety unit of the Department of Trade and Industry collates data from 13 hospitals throughout the UK through the Leisure Accident Surveillance System (LASS). Monklands General Hospital is the only participating hospital in Scotland and data from this source are presented in this report. It is important to recognise that local factors are likely to determine the specific pattern for activity in the Monklands area and there are severe limitations in generalising this data to Scotland. Nevertheless LASS data is collected in standard format and data management staff are employed to facilitate the collection of good quality data. Completed forms are checked and coded by clerks, then sent for data entry to the DTI computer centre. Data are subsequently checked for validity and consistency of coding. It therefore represents the best available data on leisure accidents resulting in attendance at a casualty department.[6]

Table 4 presents an estimate of the total number of leisure accidents in Scotland which result in new outpatient attendances. These are calculated based on the LASS national estimates (utilising data from all 13 participating hospitals) adjusted by a factor reflecting the relative level of casualty attendances in Scotland compared to the UK. This estimate assumes that the casualties associated with leisure activities in the 13 hospitals participating in LASS give a valid picture of casualties associated with leisure activities throughout Scotland. It can be seen that the rate of leisure accidents resulting in an outpatient attendance is maximum in the 5-14 year old age group with approximately one new outpatient attendance each year due to a leisure accident for every 6 children aged 5-14 years.

Table 4
Estimated annual numbers of Scottish new outpatient A&E attendances for leisure accidents, 1991

	Age					
	0-4	**5-14**	**15-64**	**65-74**	**75+**	**Total**
Male	9,838	61,409	101,629	3,226	2,213	178,617
Female	7,219	35,955	50,159	6,695	6,459	106,699
Total	17,057	97,364	151,788	9,921	8,672	285,316
Rate per 1,000*	52.4	153.5	45.0	22.5	26.5	55.9

* Rate per 1,000 population in that age group
The Scottish figure is arrived at by multiplying the DTI 1991 LASS 'national estimates' (for the UK) by the number of new Scottish A & E attendances divided by the UK new A & E attendances

The number of attendances for males in the 15-64 year old age group is almost double that for females. However, above the age of 65 years this picture is reversed with the number of attendances in females some 2-3 times higher than that for males. This latter finding may be explained in part by the ratio of women to men in this age group which is approximately 1.5:1. The total number of new outpatient A&E attendances for leisure accidents represents approximately 24% of all new outpatient A&E attendances in Scotland.

Table 5 presents information on sporting activities which resulted in casualties from the UK-wide LASS data and table 6 presents the estimated number of casualty attendances associated with sporting accidents in Scotland based on national estimates from the UK LASS data. Table 6 also presents rates of casualty department attendances per 100,000 population and per 1,000 participants. The accuracy of this latter figure is limited by the errors and biases in the participation data and the UK LASS data, nevertheless it gives a rough indication of the absolute risk of injury resulting in casualty department treatment for a number of individual sports.

There are many factors which are recognised to be associated with accidents in selected sports. These can be considered to be those which are host-related (eg physical condition, level of instruction, use of proper protective equipment and clothing), agent-related (eg condition of the horse in horse riding or skates in ice-skating or related to known danger situations such as scrums in rugby or "dangerous" tackles in rugby or football) and environment-related (eg poor playing conditions, over-crowded conditions, and dangerous outdoor water conditions in swimming and other watersports).

Table 5
Number of casualty attendances by sporting activity and by age and sex, UK LASS data, 1991

Sport	Age (years)										Total	%
	0-4		5-14		15-64		65-74		75 and over			
	M	F	M	F	M	F	M	F	M	F		
Football	15	4	3201	186	9953	231	6	0	0	0	13612	41.7
Rugby	1	0	605	13	2393	48	0	0	1	0	3063	9.4
Ice/roller skating	12	9	534	491	401	351	1	1	0	0	1803	5.5
Cricket	0	1	217	26	904	28	1	1	0	0	1180	3.6
Riding	0	1	32	269	153	556	2	1	1	0	1015	3.1
Swimming/diving	44	33	255	188	260	150	4	3	1	2	941	2.9
Netball	0	1	23	469	16	298	0	0	0	0	807	2.5
Gymnastics	6	5	278	395	45	45	0	0	0	0	774	2.4
Martial arts	0	0	142	44	445	104	1	0	0	0	737	2.3
Indoor/outdoor hockey	0	0	85	149	285	213	0	0	0	0	733	2.2
Basketball	1	0	231	106	264	83	0	0	0	0	686	2.1
Ski-ing	0	1	71	50	274	190	1	0	1	0	588	1.8
Running/jogging	1	1	64	61	275	100	1	0	1	0	507	1.6
Other (specified)	13	11	797	620	3043	1128	44	24	15	5	5705	17.5
Other (unspecified)	3	2	84	79	252	65	1	0	0	0	486	1.5
Total	96	67	6619	3146	18963	3590	62	30	20	7	32637	100

* This represents the estimated number of leisure accidents resulting in casualty attendances in Scotland based on a projection from LASS data

Table 6
Estimated annual number of casualty attendances in Scotland associated with sporting activities

Sport	Estimated annual number of casualty attendances in Scotland[1]	Rate of casualty attendances per 100,000 population	Annual rate of casualty attendances in adults per 1,000 participants in that sport[2]
Football	34300	686	109
Rugby	7700	154	385
Ice/roller skating	4500	90	39
Cricket	3000	60	197
Riding	2600	52	57
Swimming/diving	2400	48	2
Netball	2000	40	-
Gymnastics	1900	38	29
Martial arts	1900	38	71
Indoor/outdoor hockey	1800	36	76
Basketball	1700	34	-
Skiing	1500	30	42
Running/jogging	1300	26	6
Other (specified)	14400	288	-
Other (unspecified)	1200	24	-
Total	82200	1644	

[1] This represents the estimated number of leisure accidents resulting in casualty attendances in Scotland based on projection from LASS data
[2] Participant data from table 1

Table 7 outlines the further management of patients with leisure accident injuries seen at Monklands Hospital in 1991. The great majority were discharged to the care of their general practitioner or were followed up in outpatients. Six per cent were admitted for inpatient care. The mean duration of inpatient days varied with age from 2.7 days in 0-4 year olds to 12.7 days in those 75 years or above with a mean of 4.7 days across all age groups.

Table 7
Further management of leisure accident casualties, LASS data, Monklands, 1991

	Age						Total	
Disposal	0-4	5-14	15-64	65-74	75 and over	Age not known		
GP/OPD	523	2536	4495	233	147	16	69%	7950
Home	219	831	1393	51	31	7	22%	2532
Inpatient	19	189	345	63	53	1	6%	670

Further details from the LASS data from Monklands Hospital are given in annex 2. These include data on type of injury (table A1), activity at time of injury (table A2), location of injury (table A3), nature of injury (table A4) and part of body injured (table A5).

2.2 Mountaineering accidents

There were about two deaths per month in the Scottish mountains in 1993. One report has highlighted that people participating in this activity accounted the for the largest single group of deaths related to sport and leisure in Scotland. The costs of mountaineering accidents in terms of lives lost, pain and suffering and conducting rescue operations is very high considering that many of the rescues involve large numbers of people and expensive equipment such as helicopters.

The Mountain Rescue Committee of Scotland published a 5 year review covering the period 1987 to 1992 giving estimates of the participation of Scottish residents in mountaineering (including both hill walking and climbing) together with details of the total casualties and fatalities among both residents and non-residents in Scotland (table 1).[11] Additional details of these accidents are published in the regional police mountain rescue co-ordinators reports, the Scottish Mountain Rescue Team reports, and the Royal Air Force and Royal Navy helicopter flight reports.

The ratio of male to female hill walkers/climbers is approximately 2:1 and 39% of the hill walking population are in the 16 - 34 year age group. The most popular month for this activity is July. Many of those who died were experienced climbers and at least half of the fatalities were amongst non natives. Specific details of the circumstances surrounding these accidents are published by the mountain rescue teams and give clues to the reasons for the accidents.[12]

The estimated participation in mountaineering among the Scottish adult population together with total casualties and fatalities is given in table 8. This incorporates a further analysis of these deaths by age and country of residence (Anderson CM, personal communication) which identifies the number of deaths among Scottish residents. Table 9 estimates rates of fatal mountaineering accidents among Scottish adults over the period 1989-93. The substantial year to year variation may in part reflect annual variation in weather conditions.

Table 8
Estimated participation in mountaineering among Scottish adults and Scottish mountain fatality and casualty data, 1989-1993

Year	Estimated participation[1]	Total casualties		Fatalities	
		Number[2]		Number[2]	
	Percentage of adult population who hill walk	Under 16 years	16 years and over	Under 16 years	16 years and over
1989	3.4%	5	57	0	6
1990	2.7%	4	47	1	12
1991	3.2%	4	82	0	16
1992	2.9%	1	68	0	9
1993	3.7%	1	75	1	23

Footnote:
Data based on Scottish Sports Council annual surveys of 6,000 adults aged 16 years and over who noted involvement in hill walking/climbing/mountaineering; and on analysis of casualties by C M Anderson, Glenmore Lodge, 1994 (personal communication)

[1] In survey 93% noted participation in hill walking and scrambling and 7% in technical climbing
[2] Only includes accidents involving adults and children resident in Scotland

Table 9
Estimated rate of mountaineering accidents resulting in death among Scottish adults who participate in hill walking or climbing

	Scottish adult casualties[1]		Scottish adult fatalities	
Year	Number	Rate per 100,000 participants[2]	Number[1]	Rate per 100,000 participants[2]
1989	57	41	6	4
1990	47	43	12	11
1991	82	63	16	12
1992	68	58	9	8
1993	75	50	23	15

Footnote:
1 Casualties only consist of those identified by mountain rescue teams
2 Denominator for rate based on participation data from table 1

It has been frequently suggested that increases in participation have outstripped the increase in mountaineering accidents over recent years. This would not appear to be the case based on these data. There is considerable year to year variation in both participation and accidents and no clear relationship emerges. However, there is a suggestion that the increase in accidents has been greater than the rise in numbers of people participating in mountaineering.

The accident statistics available from the Mountain Rescue Committee of Scotland suggest that over the last ten years rather fewer accidents have taken place in October to December compared with the rest of the year. The explanation that this is due to a lower number of people in the hills seems not to be supported by the information available on participation. The difference in number of accidents may relate partly to the type of activities undertaken, with little snow and ice climbing in November.[11]

An analysis of 190 mountaineering accidents in Scotland showed that ice and rock climbing accounted for 46 accidents while walking, glissading and scrambling accounted for 130.[24] The Scottish participation data shows that of those who were hill walking or climbing in the last few weeks, 7% were climbing and 93% were walking. This confirms, that as would be expected, climbing is substantially more dangerous than walking.[12] The reasons for mountain rescue callouts in 1993 were classified as walking falls/slips (36%), overdue (23%), climbing falls (10%), stuck (9%), avalanche (8%), search (5%), hypothermia (3%), heart attack or collapse (3%) and other (3%).

The Mountain Rescue Committee for Scotland statistics on fatalities over the period 1983-92 show that the following mountains were associated with the highest number of fatalities Ben Nevis (11% of all fatalities), Bidean nam Bian (5%), Cairngorm (5%), Aonach Eagach (3%) and Buchaille Etive Mor (2%).

2.3 Water accidents

2.3.1 Background

Drowning has been the largest category of fatal accident in sport and recreation for many years although in 1993 for the first time there were more fatal mountain accidents than drownings. During the last 25 years there has been a great increase in swimming, boating and sailing, other water sports, and informal recreation near water. Drownings, however, have fallen in number.

2.3.2 Participation in water sports

There are no comprehensive statistics indicating the numbers who participate in water sports, but they probably involve around 8 million regular participants in the UK and many more who participate periodically. The most popular activities are angling and swimming, both of which claim up to 4 million regular participants throughout the UK. Other major activities include sailing, windsurfing, canoeing, water skiing and motor boating. Depending on the activity, participation rates for these vary from 100,000 and 1.5 million people in the UK.[14]

The number of participants is likely to rise in the future as disposable income, available leisure time and personal mobility increase. It has been estimated that by the year 2000 there will be an additional one million participants in water sports. Some sports will experience a more rapid growth than others as the age structure of the population changes, as new sports become established and as the costs of individual sports and the ease with which people can participate fluctuates.

2.3.3 Fatal Water Accidents

It is not easily possible to distinguish leisure-related drownings from among all deaths from drowning. The data presented below are therefore based on all drowning deaths although the data in table 14 show most of these deaths are related to leisure accidents.

Drowning is the third most important cause of accidental death among children in the UK. It varies according to the extent to which there is ready access to pools or other bodies of water, and the relative importance of each is age-related.

The outcome of a submersion event is clear cut in that victims tend to recover completely, regaining consciousness quickly or they suffer serious neurological sequelae or death. The mortality to morbidity ratio is very high. A 48% mortality rate for children admitted to hospital after a drowning accident has been recorded. Drowning is an unusual accident in that unlike most other accidents it is an infrequent cause of presentation to the accident and emergency department. Many near-drowning cases who are admitted to hospital are seriously ill and have to be admitted to the intensive care unit.[15]

The numbers of deaths from drowning in Scotland has been significantly falling over the period 1983-93 (table 10). This is part of a declining trend over a longer period with rates of drowning some 10-15% of those found at the turn of the century. This may be due in part to a reduction in and greater safety in commercial fishing. There is substantial seasonal variation in drowning incidents with a peak in warm weather. The drop in the numbers of drownings in Scotland in 1993 has been attributed to the poor summer (ROSPA personal communication).

Table 10
Deaths attributable to drowning in Scotland over the past 10 years

Year	Number of deaths
1983	96
1984	76
1985	91
1986	92
1987	49
1988	62
1989	67
1990	55
1991	44
1992	45
1993	29

Source: ROSPA drowning statistics

A study carried out in 1988/9 in conjunction with the British Paediatric Surveillance Unit showed that of 306 children who had confirmed submersion incidents 149 died and 157 survived after near-drowning, 10 of whom sustained severe brain damage. This suggests that there are likely to be at least one near-drowning episode for each recorded death from drowning.[15,16]

Table 11 shows the numbers of deaths from drowning and the average annual incidence rates over a 5 year period by age group. The annual incidence in England and Wales of submersion accidents for children under 15 years is 1.5 per 100,000, with a mortality rate of 0.7 per 100,000. The male to female ratio of drowning deaths in Scotland in recent years is approximately 4.6 to 1.[16]

Table 11
Deaths from drowning by age in Scotland: 5 year period 1987-92[1]

Age (years)	Number of deaths from drowning	Rate of drowning deaths per 100,000 population in that age group per year[2]
0-4	8	0.5
5-14	15	0.5
15-29	82	1.6
30-44	55	1.2
45-64	54	1.1
65 and over	22	0.7
Adult age not specified	37	-
All ages	273	1.1

[1] Data based on an analysis of ROSPA data from 1987-90 and 1992
[2] Denominator from 1991 census of Scotland; rates in adults adjusted to incorporate adult deaths (age unspecified)

Table 12 shows the variation in incidence rates of drowning by region in Scotland and table 13 shows the location of the drowning incident.

Table 12
Deaths from drowning by region in Scotland: 5 year period 1987-92[1]

Region	Number of drowning deaths	Proportion of deaths in the sea (%)	Rate of drowning deaths per 100,000 population[2] per year
Borders	7	43%	1.4
Fife	15	67%	0.9
Central	11	0%	0.8
Dumfries & Galloway	21	21%	2.8
Grampian	26	54%	1.1
Highland	53	43%	5.1
Lothian	8	38%	0.2
Strathclyde	91	38%	0.8
Tayside	20	20%	1.0
Western Isles/ Orkney/ Shetland	21	100%	6.0
Scotland	273	44%	1.1

[1] Data based on analysis of ROSPA data from 1987-90 and 1992
[2] Denominator from 1991 census of Scotland

It is likely that the high level of supervision insisted on by the Code of Practice on Safety in Swimming Pools, introduced under the Health and Safety at Work Act 1974, is responsible for the low mortality in public pools.[17]

It can be seen that there is a 30 fold difference in the rate of drowning deaths across Scottish regions. This should be interpreted with caution, however, since the numbers of drownings reported relate to location of the accident rather than region of residence of the victim. It is therefore possible that some of the sea drowning deaths in Orkney/Shetland/Western Isles, for example, are of tourists. This does not alter the fact that attention to this issue should perhaps receive priority in this area but it may give a false impression of the risk of drowning among residents of that area.

Table 13
Deaths from drowning by location in Scotland: 5 year period 1987-92[1]

Location	Number (proportion) of deaths from drowning	
Sea	121	(44%)
River	86	(32%)
Loch	51	(19%)
Canal	4	(1%)
Home - pond Home - bath	3) 3)	(2%)
Pool - public Pool - private	3) 2)	(2%)

[1] Data based on analysis of ROSPA data from 1987-90 and 1992

The location varies with the age of the drowning victim. Young children drown most often in or close to the home (babies in the bath and toddlers in garden ponds and

swimming pools). Older children are more likely to drown in open water away from the home and in public and private swimming pools.[18]

Table 14 shows drowning deaths in Scotland by recorded activity at the time of drowning. The substantial numbers of deaths associated with angling, boating and subaqua are noteworthy (accounting for about 40% of all deaths).

Table 14
Deaths from drowning by activity in Scotland: 5 year period 1987-92[1]

Activity at time of drowning	Number (proportion)[2] of deaths from drowning	
Angling[3]	37	(19%)
Swimming	28	(15%)
Fell in water	28	(15%)
Boating[4]	28	(15%)
Fishing (commercial)[2]	26	(14%)
In vehicle[2]	20	(11%)
Subaqua	13	(7%)
Canoeing	3	
Playing in water or on ice	3	
Diving	2	
On a ferry	1	
Unspecified[2]	83	
Total	273	

[1] Data based on analysis of ROSPA data from 1987-90 and 1992
[2] Includes some non-leisure related drownings
[3] 10 in sea water and 27 in rivers and lochs
[4] 3 deaths among fishermen

ROSPA has identified six risk factors associated with drowning based on research findings over the past ten years.[19] These are:

1 ignorance, disregard or misjudgement of danger;

2 unrealistic view of open water swimming ability;

3 unfamiliar surroundings;

4 unrestricted access to danger, ie unqualified or unprotected access to hazardous water;

5 lack of competent supervision;

6 inability to save oneself or to be rescued.

Recognised environmental factors include the absence of, or inadequate fencing around water hazards; non functional/absent self locking gates around pools; and hazards such as strong currents in deep water. In childhood, drowning accidents a number of parental factors have been identified. The quality of the supervisor and his or her proximity to the victim are all important factors in preventing childhood drownings. Marital disharmony, parental exhaustion and inability to perform resuscitation have also been cited as contributory factors. Factors related to the victim include disobedience of warning notices; ill health; alcohol consumption; and inability to swim.

Illness was the primary factor in approximately 25% of accidental drownings in a study of 500 drownings in open stretches of water carried out by the DTI in 1974. People with a history of seizures have a higher incidence of submersion accidents. It has been estimated that children with epilepsy were up to 7.5 times more likely to experience a submersion incident than a child without epilepsy. Specific water safety recommendations are available for people with epilepsy. Depression, heart disease, and chronic conditions for example Parkinson's Disease and osteoarthritis are also associated with a proportion of drownings.[20]

Alcohol has been shown to be a contributory factor in a proportion of accidental drownings. In the 1974-1975 DTI review of drownings alcohol was found to be a contributory factor in up to 15% of all accidental drownings. Other studies have noted that alcohol was a contributory factor in 25% of drownings.[21]

2.3.4 Non Fatal Incidents

Although very few people are killed in water sports accidents, a much larger number of incidents occur where individuals are injured or require assistance. These numbers are supplemented by an unknown number of unreported incidents and near misses. HM Coastguard returns for Scotland in 1992 show that 339 recreational craft were assisted in 1992, accounting for about one third of all incidents (table 15). The majority of these are powered pleasure or sailing craft. However, in terms of the total number of participants involved in these activities, the risk is still small. The assistance rendered to 329 sailboards in 1989 represents about 0.1% of the total number of sailboards estimated to be in use in the United Kingdom.[22]

Table 15
Scottish Coastguard statistics 1992: rescue incidents

1 Rescues involving vessel	
Vessel	**Number of rescue incidents**
Merchant fishing	238
Powered pleasure	128
Sailing craft	131
Small craft	37
Inflated craft	25
Merchant vessels	33
Sailboards	18
Other	27
Total	**637**
2 Rescues not involving vessels	
Medical evacuations	245
Cut off by tide	29
Divers	31
Missing persons	19
Swimmers	7
Persons overboard	14
Cliff	25
Other	48
Total	**418**

Accidents in and close to water involving children under the age of fifteen years as recorded by the Department of Trade and Industry's Leisure and Home Accident Surveillance Systems (LASS and HASS) were analysed in detail for the year 1 November 1987 to 31 October 1988 inclusive. The analysis covered 771 leisure accidents which happened in and close to swimming pools, in open water, at the waterside, on quays and docks and on vessels and 29 home accidents which occurred in and close to water in gardens.

Of the 771 leisure accidents 62% of the victims were boys and 53% of the children were between 10 and 14 years old. Almost half of the accidents occurred during June, July and August. Most accidents happened on Saturdays and Sundays (42% of the known cases), particularly between 12.00 hrs and 16.00 hrs (45% of the known cases). One per cent of the accidents resulted in a drowning or near-drowning. The main activity and sport involved were children playing and swimming. The victims were most often struck by an object or a person (37%), or they fell due to slipping, tripping or stumbling (20%) or were cut by a sharp object (13%). In 50% of the cases the victims required further treatment from their general practitioner or the out-patient clinic after their initial visit to the casualty department. Four per cent required admission to hospital.[23]

In all water sports involving the use of craft, a number of causal factors for accidents can be identified. These include adverse weather conditions; swamping, capsize or foundering; falling overboard; collision; equipment failure; and natural hazards such as exceptionally strong currents or tidal streams. Many of these hazards also apply to those sports in which the participant is in particularly close proximity with the water or which involve total immersion such as swimming or sub-aqua. In these sports there may also be a risk of illness contracted as a result of water pollution and effects of cold-cramp and hypothermia.

The main safety issues in water sports concern individual competence (primary safety); the safety of groups of participants, particularly where different sports take place at the same time in a confined area (secondary safety); and measures taken for the general safety of participants such as standards for the craft and equipment involved (tertiary safety). Individual governing bodies of sport bear responsibility for promoting many of these elements.

3 EVIDENCE FOR EFFECTIVENESS OF INTERVENTIONS

3.1 Background

There are very few controlled trials which have sought to evaluate the impact of interventions seeking to reduce leisure accidents. By inference from studies in other areas of accident prevention it is likely that legislation and environmental improvement have had a greater impact than education on leisure accidents. This section lists the few relevant studies which have considered interventions to reduce leisure accidents.[24]

3.2 Play and sports accidents

3.2.1 Legislation and public policy on play and leisure

Health and safety regulations relating to swimming pools and leisure facilities are widely considered to have had a significant impact on leisure and drowning accidents. These include the surveillance of public swimming pools. Safety standards in equipment, accreditation schemes for training and accepted codes of good practice adopted by sporting governing bodies are also very likely to have had an impact on accidents although this has not been formally studied.

Changes in public policy have been advocated to make the area around the homes of children safer for play. Area-wide traffic calming schemes may make Home Zones safer play environments for children[25]. Greater nursery provision, more access to sports facilities and after school clubs could potentially result in fewer casualties.

3.2.2 Environmental improvement

There has been little evaluation of changes in playground layout, equipment and surfacing in terms of achieving injury reduction, although all of these factors have been associated with injuries.[26]

3.2.3 Protective equipment

The promotion of protective equipment for sporting activities such as rugby and horse riding is encouraged. The introduction of protective equipment and improved rules governing sports seem certain to minimise injuries, but neither of these measures have yet been evaluated. There is also a clear need for adequate injury surveillance in this area.[27]

3.2.4 Education

The Rockwood County Study in the USA attempted to evaluate education in an intervention and a reasonably close well-matched control area. A rise in the incidence rate in both study and control areas was found. It was concluded that education was not effective.[28]

The "Play it Safe" programmes were initially broadcast on BBC in 1980, and a subsequent version screened in 1992. Despite the enormous amount of time, thought and money that was put into the production of these programmes, the evaluation results were disappointing. Accident rates were not affected by the nationwide programmes, and at a more local level parents of small children took no action to improve the safety of their own homes even when encouraged by their health visitor specifically to watch the programmes.[29] However, if a programme was followed by a visit to the home by the health visitor to discuss child safety in the

home, one study showed that parents did take positive steps to make the home safer.[30] An education campaign in Cardiff using posters and literature sensitised parents to trivial accidents for which they sought help, but it did not prevent accidents.[31]

In Australia, a study assessed whether education could alter the attitudes of 12-14 year olds regarding safety. Factual knowledge was improved but attitudes, and presumably therefore actions, did not alter.[32]

3.3 Water accidents

3.3.1 Introduction

Much of the research on drowning and near-drowning has been performed in the USA and Australia where water activities are relatively more common. In Britain, little research which could be used to guide accident prevention policy has been carried out.

3.3.2 Education

An extensive Australian review of fatal and near-fatal cases[33] suggests that vigorous education campaigns over a 15 year study period may have contributed to a reduction in drowning rates. A massive community educational programme mounted in Arizona in 1989 reduced life threatening immersion episodes and drownings by almost 50% in 1990. After four to five months of the campaign the rate of drownings had decreased dramatically. This campaign suggested that the community campaign to reduce drowning through education and legislation (including a pool barrier code) was effective in the short term.[34]

For the youngest children, a factor associated with most deaths was the lack of adult supervision at the time of the incident. Campaigns aimed at reducing hazards and increasing parental awareness of the risks in the home, including bathroom supervision, have met some, although limited, success.[35] Teaching children to swim seems to offer protection from drowning injury in older children.[36]

There does not appear to have been any formal evaluations of Red Cross learn-to-swim programmes or Royal Life Saving Society efforts aimed at teaching life saving skills. Nor does there appear to have been much consideration given to identifying children at greatest risk. One study noted that nearly 30% of children were unable to swim at age 9, and that disproportionate numbers of these came from lower social class families.[37]

3.3.3 Guarding public pools and beaches

An in-depth examination of accidental drownings in Auckland[38] drew attention to unfenced domestic swimming pools and called for legislation to protect children in these situations. It has been estimated that the introduction of pool fencing would reduce these drownings by 40% to 67%.[39]

There is evidence from Australia and the USA that beach guards are effective in reducing drowning deaths on certain beaches.[40,41] The small number of drowning deaths in public swimming pools in England and Wales (two in 1988-89) also points to the value of trained guards. The ratio of near-drowning deaths to deaths in public pools also suggests that prompt rescue and resuscitation by pool guards saves lives.[16]

3.3.4 Pool design and protections

In Australia, New Zealand, Canada and the USA domestic pool ownership and drowning deaths are more common. The provision of adequate fences around garden ponds and domestic swimming pools have been associated with reduced risk, particularly for the under fives. Fences with self-locking gates restrict access to pools for wandering toddlers. Above ground rather than in-ground pools are also associated with decreased risk.[42-46]

4 COSTS ASSOCIATED WITH LEISURE ACCIDENTS

A rough estimate of the direct patient costs in the NHS associated with leisure accidents can be derived by applying costs to the data presented in tables 4 and 5. Thus 285,316 new outpatient attendances at £25-£45 per attendance (source: Child Accident Prevention Trust) would cost approximately £7.1-£12.8 million nationally. Similarly if 6% of attendances result in inpatient admission (table 6) and if the mean duration of admission is 4.7 days then leisure accidents can be estimated to result in 285,316 x 0.06 x 4.7 = 80,457 inpatient days. If the median direct patient cost of £160 quoted for an orthopaedic inpatient stay in Scottish Health Service Costs, 1992 is applied to this estimate the total cost is £7.2-£12.9 million. Finally if 20% of those referred to their general practitioner or to outpatient follow-up attend for one outpatient follow-up visit then in a similar fashion it can be estimated that this will cost £1-£1.8 million. Thus the total direct patient costs associated with outpatient and inpatient attendances due to leisure accidents can be estimated at £15.3-£27.7 million annually throughout Scotland or approximately £305,000-£550,000 per 100,000 population.

5 NHS ACTION TO PREVENT LEISURE ACCIDENTS

5.1 General

Three levels of prevention measures are recognised:

- prevention in the pre-event phase (primary prevention) are measures aimed at preventing the accident happening at all;
- prevention in the event phase (secondary prevention) are measures aimed at reducing or minimising the effect and severity of accidents;
- prevention in the post-event phase (tertiary prevention) are measures taken after the accident has happened. The measures are aimed at minimising the severity of the final outcome of the injury.

This review focuses on primary prevention and certain aspects of secondary prevention. Issues relating to treatment and rehabilitation services for accident victims are outwith the scope of this review. There are clearly many important areas relating for example to the need for adequate expertise in the specific management of leisure accidents such as near drowning which will additionally have to be addressed by health services.

The NHS can develop its contribution to leisure accident prevention, usually through existing resources, by:

- making leisure accident prevention a key element of health promotion
- participating in local multi-agency schemes (healthy alliances)
- collecting and sharing information on the incidence, causes, severity and cost of leisure accidents
- providing high quality treatment and rehabilitation services.

5.2 Making accident prevention a key element of health promotion and give separate attention to leisure and water accidents within accident prevention strategies

It is important that all Health Boards commit time and resources to the preparation of a strategic framework for accident prevention which includes separate consideration of leisure and water accidents. The level of morbidity, mortality and costs associated with accidents dictate that this issue should be given priority.

This framework can often be supplemented effectively by opportunistic interventions. Opportunistic initiatives, by their nature, can be too easily overlooked but there is a strong case for encouraging health professionals to include opportunistic health education, particularly about accidents, that is consistent with the on-going strategic approach, as a routine aspect of their work. Examples include:

- physiotherapists discussing risks during consultations for injuries associated with leisure activities;
- general practitioners giving safety advice in consultations and home visits;

- casualty department staff making available relevant health promotional material in waiting areas;

- ambulance staff advising community groups and schools about local accident risks, first aid and resuscitation; and

- school doctors and nurses advising on safety at play in school and in sports and leisure activities.

Locally, health service staff such as health visitors and occupational therapists are often in a position to help identify hazardous environments or leisure activities. Remedial action will need to be co-ordinated with local authority departments, which have regulatory responsibilities for environmental health and safety. These departments will usually have information and promotional material available which will be of use to health service staff and experience of safety initiatives. Materials may also be available from professional bodies representing NHS staff and voluntary organisations. It is particularly important to ensure that these materials are accessible to all members of the community, including black and ethnic minority groups.

5.3 Participating in local multi-agency schemes (healthy alliances)

Successful accident prevention involves a range of different agencies, and alliances are essential to address the spread of interests and responsibilities. Healthy alliances have been described as:

- a partnership of organisations and/or individuals to enable people to increase control over and to improve their health and well-being

- any arrangements for joint working, collaboration and co-operation between the purchasing authority and other agencies.

This will often involve the NHS in areas of work where other agencies already have experience and responsibilities in accident prevention and may have initiatives in progress. Consequently, local targets will not be just for health authorities, but will need to be developed jointly with local alliance partners.

An example of an area in which work might be done to develop local targets is given in table 16 overleaf.

Table 16
Example of local target development

Target age group	Outcome targets: reduction in deaths	Outcome targets: reduction in injuries	Process targets	Aim of process targets
Young adults aged 15-24	reduce drownings	reduce admissions for near drownings	assess environment by rivers and canals, ensure safety	meet needs identified by local residents
			establish joint working with other agencies	facilitate other agencies in accident prevention

The formation of sub-groups focusing on sports and leisure safety with representatives of specialised areas of accident prevention work, led in each case by the agency with the greatest involvement, could also be considered.

Examples of how the NHS can contribute through those groups to local authority planning and policies are given below in table 17.

Table 17
Opportunities for NHS liaison with local authorities

Local authority departments	Examples of areas of work	Possible NHS involvement through co-ordinating group
Education	provision of safety education and safe use of equipment	back up and encourage safety education, also give safety advice to children and parents
Environmental health	responsibility for health and safety regulations	help identify risks in leisure facilities or areas
Leisure amenities	parks, playgrounds, sports grounds and stadia: safety of equipment and safe maintenance	help identify high risk areas and activities

5.4 Collecting and sharing information on the incidence, causes and severity and costs of accidents

The accident information provided by the data sources listed in this report gives sufficient detail to provide some indication of suitable countermeasures. However, further detailed research on specific locations and specific types of accidents is

needed to provide more insight into the dangers of specific locations and the preventive measures especially appropriate for each location.

Effective collection and use of information about accidents have proved to be central features of successful national and local accident prevention schemes. Information needs to be disseminated to staff in the relevant agencies so that it can be used for:

- targeting the most important types of accident or risk groups
- motivating key players
- measuring the effectiveness of preventive activity.

Within healthy alliances there are a number of agencies with information that will be relevant to accident prevention. Alliance members will be able to build up jointly a picture of the local community that can be used to target important causes of accidents and high risk groups. This might involve identifying:

- numbers and distribution of accidents in different age groups
- the availability of sources of prevention advice
- pointers to opportunities for prevention initiatives
- high risk groups and locations where accidents recur, and their characteristics
- low risk groups or locations and their characteristics.

5.5 Providing high quality treatment and rehabilitation services

As noted in the introduction this is outwith the scope of this review.

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7 GLOSSARY

HASS	Home Accident Surveillance System
LASS	Leisure Accident Surveillance System
DTI	Department of Trade and Industry
OPCS	Office of Population Censuses and Surveys
NHS	National Health Service
ROSPA	Royal Society of the Prevention of Accidents
ICD	International Classification of Diseases

Annex 1

(Source: Scottish Accident Data Sources, Scottish Office, 1993)

1.1 Leisure Accidents

1.1.1 Fatal

1.1.1.1 Mountain Rescue Committee of Scotland

The Mountain Rescue Committee for Scotland records details of all accidents on Scottish mountains, including fatalities. These are published in the annual journal of the Scottish Mountaineering Club, and include details of ages of people involved, the type of accident, the mountain rescue services involved, including helicopters, and the total man hours. These include non-leisure and non-mountain incidents in which the rescue teams are called out.

1.1.2 Non Fatal

1.1.2.1 DTI Consumer Safety Unit

LASS operates in parallel to HASS recording data at 13 hospitals, including Monklands DGH. The term "leisure accidents" covers all accidents except RTAs involving motorised vehicles, accidents at home and accidents at work. There would seem to be an overlap in that both STATS19 and LASS record cycling accidents. LASS records the type of sport involved in sporting injuries. Data are assembled on a UK basis by the DTI's Consumer Safety Unit.

1.1.2.2 Mountain Rescue Committee of Scotland

The Mountain Rescue Committee of Scotland records details of all accidents in Scottish mountains which involve mountain rescue teams. The details recorded for non fatal accidents are the same as for fatal accidents.

1.1.2.3 National Health Service for Scotland

ISD collates data on attendances at accident and emergency departments due to injury by fireworks during the period 14 October to 10 November each year. Statistics are published annually by ISD.

1.1.2.4 Health and Safety Executive

Many leisure accidents occur in situations where a work activity is involved (eg a paid instructor) and are therefore reportable under RIDDOR. Local authorities are responsible for the enforcement of safety legislation in service industries (eg health clubs) and local authority premises (schools, swimming pools etc). Significant skiing accidents are reported to the HSE by ski slope operators.

1.1.2.5 General Household Survey

The General Household Survey from OPCS record accidents that occur within a specified reference period that resulted in a visit to a GP or the hospital or both. They also record the type of accident and whether it occurred during sport.

1.2 Water Accidents

1.2.1 Fatal

1.2.1.1 Royal Society for the Prevention of Accidents

The Royal Society for the Prevention of Accidents (ROSPA) uses a press clippings agency to notify them of drownings. This is collated annually into a UK report, Scottish deaths being separately identifiable. The ROSPA document lists each incident with any relevant details recorded in the press. Water accidents up to 5 miles offshore are recorded. The accuracy is good, probably 97% of drownings are recorded.

1.2.1.2 General Register Office for Scotland

Local registrars record deaths from drownings on death certificates, details being reported in the Registrar General's annual report. Whilst specific details of causation and circumstances may be recorded on death certificates these are not reported in the annual report, nor are they amenable to analysis using the ICD codes with which the data are encoded.

1.2.1.3 British Waterways Board

The British Waterways Board (BWB) collects statistics on accidents causing death and injury to members of the public on its property in Scotland, and other parts of the UK. The number of deaths reported in Scotland has varied between 2 in 1991 and 8 in 1992. The statistics supplied by the BWB give no indication as to the circumstances of the accident, although they were broken down by age.

1.2.1.4 HM Coastguard

The annual HM Coastguard Operational Statistics record the number of fatal incidents in the two Scottish coastguard regions. The type of vessel (eg merchant, military, sailboard, sailing craft) and whether search and rescue was involved is recorded. Onshore accidents, from cliffs and beaches are also recorded.

1.2.2 Non Fatal

1.2.2.1 Department of Transport

Shipping accidents at sea are investigated by the DoT's Marine Accident Investigation Branch but no routine statistics are published.

1.2.2.2 HM Coastguard

HM Inspector of Coastguard's annual report contains details of accidents at sea around the coasts of the UK broken down by area. The annual HM Coastguard Operational Statistics contain statistics by coastguard regions, two of which, Aberdeen and Clyde are Scottish. Numbers of people and incidents involved, including details on type of vessel involved (eg merchant, military, sail board, sailing craft), and whether search and rescue was involved are detailed.

1.2.2.3 British Waterways Board

BWB record details of accidents, which they say "grossly under record" non fatal incidents. Scottish waterways are separately identifiable in the statistics which can be supplied on request. The statistics supplied by the BWB give no indication as to the circumstances of the accident, although they were broken down by age.

Annex 2

Data on leisure accident attendances, LASS, Monklands Hospital, 1991

Table A1
Type of injury by age (LASS data, Monklands, 1991)

Accident type	Age						Total	
	0-4	5-14	15-64	65-74	75-120	age not known		
Falls								
on all levels	-	0						
same level	146	744	1584	148	82	2	23.5%	2706
other fall	149	520	924	79	74	7	15%	1753
fall between 2 levels	165	703	251	11	11	1	10%	142
Striking accidents								
struck by moving object	50	471	714	8	4	2	11%	1249
struck by static object	37	188	256	6	5	1	4%	493
unspecified striking accident	11	66	123	2	3	0	2%	205
Other spec	14	138	875	18	4	2	9%	1056

Table A2
Activity at time of injury by age (LASS data, Monklands, 1991)

Activity	Age						Total	
	0-4	5-14	15-64	65-74	75-120	age not known		
Unknown	363	1505	2667	158	128	17	42%	4838
Children's play/hobby	267	1067	26	0	0	2	16%	1362
Sports unorganised	14	297	626	5	0	2	8%	944
Sports organised	1	131	726	0	0	1	7.5%	859
Unspecified sport	3	148	549	0	0	1	6%	737

Table A3
Location of accident by age (LASS data, Monklands, 1991)

Location	Age						Total	
	0-4	5-14	15-64	65-74	75-120	age not known		
Other unspec	381	1821	3444	157	109	21	52%	5933
Road/bus station	244	1050	1393	133	80	2	25%	2902
Indoor sport facility	18	139	358	1	0	0	5%	516
Outdoor sport field	2	124	635	4	0	1	7%	766
Parkland/ countryside	22	236	167	6	1	0	4%	432

Table A4
Nature of injury by age (LASS data, Monklands, 1991)

Injury	Age						Total	
	0-4	5-14	15-64	65-74	75-120	age not known		
Bruises/ contusions	272	1098	1571	1031	77	10	27% (UK 14%)	3131
Sprain/strain	54	613	2044	62	31	5	24% (UK 8%)	2809
Cuts/ lacerations	317	988	1011	87	54	6	21.5% (UK 15%)	2473
Fracture	71	683	1172	110	80	3	18% (UK 16%)	2119
Tenderness & swelling	4	28	70	5	3	0	1% (UK 31%)	110

Table A5
Part of body injured by age (LASS data, Monklands, 1991)

Injured part	Age						Total	
	0-4	5-14	15-64	65-74	75-120	age not known		
Ankle	20	278	1292	37	9	5	14%	1641
Head	285	586	434	60	30	7	12%	1402
Wrist	22	414	511	50	31	0	9%	1028
Finger/ thumb	59	355	572	16	6	0	8%	1008
Foot	33	274	544	27	10	1	8%	889

Annex 3

List of some national bodies with interest in or responsibility for the promotion of safety in sports and leisure pursuits

Scottish Accident Prevention Council

Scottish Mountain Safety Group

National Water Safety Committee (UK)

Royal Life Saving Society (Scotland)

British Association of Sport and Medicine (Scottish area)

Health Education Board for Scotland

Search and Rescue Dog Association

Mountain Rescue Committee of Scotland

Relevant governing bodies of sport

LEISURE AND WATER ACCIDENTS - EXECUTIVE SUMMARY

- This report attempts to present data from a wide variety of sources on both fatal and non-fatal leisure accidents, to comment on these findings and to suggest priority areas for action in accident prevention within the NHS in Scotland.

- At least one in three adults now take some form of regular exercise and there is little dispute that regular, physical activity is beneficial to health.

- Leisure accidents have received little attention relative to other accident categories at a national level and available sources of data are incomplete, uncoordinated, difficult to interpret and found in many disparate sources.

- The major two causes of death from leisure accidents in Scotland are drownings and death from mountaineering accidents. There have been an average of 69 deaths from water accidents and 13 deaths from mountaineering accidents each year among Scottish residents in recent years.

- While sport and other leisure activities form only 1% of fatal accidents they represent about one quarter of accidents treated in hospital.

- There were an estimated total of 285,000 new out-patient accident and emergency attendances for leisure accidents in Scotland in 1991.

- Direct patient costs in the NHS in Scotland associated with leisure accidents can be estimated between £15 million to £28 million annually or approximately £305,000 to £550,000 per 100,000 population. These estimates do not take into account general practitioner costs or costs to families and are therefore conservative estimates.

- There are very few controlled trials which have sought to evaluate the impact of interventions seeking to reduce leisure accidents. By inference from studies in other areas of accident prevention it is likely that legislation and environmental improvement have had a greater impact than education on leisure accidents.

- NHS action to prevent leisure accidents should include the collection and sharing of information on the incidence, causes, severity and costs of accidents; making accident prevention a key element of health promotion; participating in local multi-agency schemes (healthy alliances); and providing high quality treatment in rehabilitation services.

- The report presents a number of general recommendations for action to be taken within the NHS in Scotland to prevent leisure accidents.

RECOMMENDATIONS

Recommendations for action to be taken within the NHS to prevent leisure accidents are listed below by level at which action is required.

1.1 National level

- Encourage Health Boards to give separate attention to leisure accidents within their local accident prevention strategies.

- Convene a multi-agency accident prevention group to agree:

  - what leisure accident information will be most helpful and to develop a strategy for the collection of this data

  - the possibilities for action by each agency

  - an outline joint strategy for accident prevention

- Maintain a national system of collecting information on drowning deaths and deaths from mountaineering accidents.

- Collate sport and leisure activity specific accident and injury data from LASS and other sources for presentation to the Scottish Sports Council and related individual national sports safety association to facilitate informed review of safety legislation, rules of sport and recommendations concerning training of instructors.

1.2 Health board level (purchaser action)

- Collate currently available local data on leisure accidents; where this is found to be inadequate to guide local accident prevention strategy investigate methods of collecting relevant data by epidemiological studies or audit of contacts with health services related to leisure accidents.

- Call upon the Director of Public Health to include accident data in his/her annual report.

- Ensure that accident prevention strategies include a separate consideration of prevention of leisure accidents.

- Take local action to highlight the problem of leisure accidents to draw attention to this issue and encourage joint initiatives among statutory agencies, local voluntary groups and, where appropriate, national sport and leisure safety organisations to prevent leisure accidents. Investigate avenues for involving the public in highlighting problem areas and in accident prevention activities.

- Ensure that health promotion material relating to leisure accident prevention is made regularly available by the health promotion department.

- Ensure that provider staff (eg accident and emergency and physiotherapy) are adequately trained to respond to injuries which result from leisure accidents including giving emphasis to appropriate health promotion to prevent accident recurrences; consider the need for separate sports injury clinics.

Scottish Needs Assessment Programme

Leisure and Water Accidents in Scotland

SCOTTISH FORUM FOR PUBLIC HEALTH MEDICINE

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Scottish Needs Assessment Programme

Health Promotion Review: Accident Prevention

Leisure and Water Accidents in Scotland

Dr H Campbell — **Department of Public Health Medicine, Fife Health Board**

Dr S O'Driscoll — **Department of Public Health Medicine, Fife Health Board**

January 1995

Scottish Forum for Public Health Medicine
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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.

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