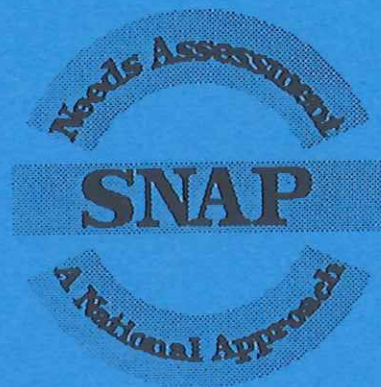


# Scottish Needs Assessment Programme



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## Home Accidents in Scotland

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

**Mrs Julie Truman**

**Department of Health Promotion  
Fife Health Board**

**January 1995**

**Scottish Forum for Public Health Medicine**

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## **Introductory Note**

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

- Leisure and Water 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

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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.

# CONTENTS

|  |            |
|--|------------|
| <b>Accidents in Scotland</b>                 | <b>i</b>   |
| <b>Executive Summary</b>                     | <b>iii</b> |
| <b>Recommendations</b>                       | <b>iv</b>  |
| <b>1 Statement of the problem</b>            | <b>1</b>   |
| <b>1.1 Definitions and data sources used</b> |            |
| <b>1.2 Data sources</b>                      |            |
| <b>1.3 Quality of data</b>                   |            |
| <b>1.4 Importance of Home accidents</b>      |            |
| <b>1.5 Epidemiology of home accidents</b>    |            |
| 1.5.1 Age                                    |            |
| 1.5.2 Gender                                 |            |
| 1.5.3 Trends                                 |            |
| 1.5.4 Geography                              |            |
| 1.5.5 Type of accident                       |            |
| <b>1.6 Pointers to prevention</b>            |            |
| 1.6.1 Gender                                 |            |
| 1.6.2 Socio-economic group                   |            |
| 1.6.3 Risk factors for older people          |            |
| 1.6.4 Health problems                        |            |
| 1.6.5 Social and Psychological factors       |            |
| 1.6.6 Multiple risk factors                  |            |
| <b>2 Scope for Prevention</b>                | <b>11</b>  |
| <b>2.1 Education</b>                         |            |
| <b>2.2 Enforcement</b>                       |            |
| <b>2.3 Environmental prevention</b>          |            |
| 2.3.1 Smoke Detectors                        |            |
| 2.3.2 Poisoning                              |            |
| 2.3.3 Falls                                  |            |
| 2.3.4 Clinical surveillance                  |            |
| <b>2.4 Home Safety check schemes</b>         |            |
| <b>3 The cost of home accidents</b>          | <b>16</b>  |
| <b>4 Costs and priorities</b>                | <b>17</b>  |
| <b>5 References</b>                          | <b>18</b>  |



# **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<br>(NHS as a workplace) | Medical care costs<br>(Total costs) | £5-22 million per year<br>(£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.

# HOME ACCIDENTS - EXECUTIVE SUMMARY

## **The Size of the Problem**

The General Household Survey (1989) estimate that a total of 9.4 million accidents received medical treatment from GPs and hospitals in the United Kingdom. Most accidents occur in the home.

## **Epidemiology**

**Age** Children and those aged over 75 years of age are more likely to experience a home accident than other groups

**Gender** In the under 74 age group, males are more likely to experience a home accident than females. However, over the age of 74, females more commonly have home accidents.

**Trends** Between 1980 and 1991 the number of accidental deaths have fallen while the number of hospital discharges have risen.

**Geography** Scotland's death rate from home accidents is consistently higher than that of England and Wales. Within Scotland, Fife Health Board appears below the Scottish rate and Shetland, Orkney and Dumfries and Galloway appear to be above the Scottish rate.

**Socio-economic group** Those in lower socio-economic groups appear to be at greater risk of home accidents than those in higher groups.

## **Risk factors**

**Trips** Environmental hazards contribute to most falls. The frailer the person the more susceptible they are to minor hazards - for example, ill fitting shoes may become a major hazard to a particularly frail person. Experience of the hazard is an important modifier, people who use stairs regularly are at lower risk than those who use them more frequently.

**Turns** Decline in sensory acuity and medical conditions such as postural hypotension or neurological deficits such as Alzheimer's disease increase the risk of an accident.

**Medication** Older people have an impaired ability to metabolise drugs which effectively increase the potency of medication. Increased potency can be problematic with for example drugs which treat hypertension as this can lead to hypotension.

**Psychological factors** Research suggests that some falls may be linked to a psychological response to loneliness, depression or changes in family relationships

**Multiple risk factors** The risk of a fall increases linearly with multiple risk factors from 8% with no risk factors to 78% with four or more risk factors.

## **Scope for Prevention**

Environmental protection (such as the installation of fire guards, cooker guards and ensuring adequate lighting) and legislation (such as regulating buildings design and products) are generally more effective in reducing accidents in the home than educational measures.



## **The Cost**

Few attempts have been made to identify the cost of home accidents either to the health service or to society. There will be considerable variation in the cost of home accidents depending on the nature of the injury and the long-term follow-up required by the health service and the long-term morbidity associated with the injury.

## **Targets and Priorities**

Targets have been set for reduction in accidents in general but no specific targets have been set for home accidents. It may be appropriate to set such targets as a national level to ensure home accident prevention is given priority at a local level.

## **RECOMMENDATIONS (ISSUES FOR THE PURCHASER)**

There are a number of areas which require further development:

### **a) Information**

The information systems currently available do not accurately capture all the accidents which present to the health service. Thus target setting is invalidated due to the inaccuracies of the data sets on which they are based. Health service purchasers, therefore, have a role in encouraging the adoption of more accurate data collection systems.

The Departments of Public Health within the Boards have a role in digesting the available information to ensure informed decisions are made regarding priorities and targets. The Director of Public Health Annual Reports may be one forum in which information relating to accidents may be presented.

### **b) Liaison**

Health Boards, as "gatekeepers" to information on accidents, have a role in ensuring effective co-ordination between the different agencies involved in accident prevention. Purchasers have a clear role in encouraging healthy alliances and sharing of information.

### **c) Programmes and evaluation**

Health promotion departments should examine the effectiveness of novel methods of accident prevention. Programmes should focus on practical measures rather than educational measures.

The published literature reflects an absence of home accident prevention programmes that have been subject to rigorous evaluation in terms of health gain, or health economic appraisal. There is clearly a role for the purchaser in encouraging health promotion departments to become more critical regarding the development and evaluation of home accident prevention programmes.



# 1 STATEMENT OF THE PROBLEM

## 1.1 Definitions and data sources used

Organisations vary in their definition of home accidents. Most definitions include accidents which occur in the garden, or communal stairs in addition to those which occur inside the home. Some include those which occur in residential institutions (for example, Office of Population Censuses and Surveys, 1982) whilst others do not (for example WHO, 1977). This distinction is important as mortality data reveals that approximately 17% of all home accidents take place in residential institutions.

## 1.2 Data Sources

This report draws on data sets from a number of sources. Mortality data has been compiled from the Registrar General and hospital morbidity data from the Scottish Morbidity Record series (SMR1). These data sets use the International Classification of Diseases (ninth revision, ICD9) to code accidents. The ISD guidance suggests home accident codes are assigned to accidents that occur in "the person's own home or ground or gardens of that home provided that there was no intention (determined by medical staff) by the patient to kill or injure himself" (ISD, 1985).

ICD9 groups home accidents into the following rubrics:

***Accidental Poisoning*** - code E850-869.

***Accidental Falls*** - code E880-888.

***Accidents caused by fire and flames*** - code E890-899.

***Accidents due to suffocation*** - code E910-915.

***All other causes*** - code E916-928.

The Home Accident Surveillance System (HASS) was used to estimate the number of outpatient attendances. Appreciation and thanks are due to staff at ISD who compiled the statistics on behalf of the author.

## 1.3 Quality of data

The quality of the data varies between sources. Data from the Registrar General tends to be of a high quality with the majority of details recorded accurately. The quality of SMR1 data has been criticised (Patel, 1976; Kholi and Knill-Jones, 1992; Park et al, 1992; Pears et al, 1992) with approximately 13% of the principal diagnoses found to be clinically unacceptable (Christie, 1993). Furthermore, an SMR1 record is only completed when an individual has spent one or more nights in hospital. Admission policies vary between hospitals. In addition, where the local population is geographically dispersed, more patients are likely to be admitted due to the impracticalities of sending patients home at certain times of the day.

The Home Accident Surveillance System (HASS) has operated since 1977 under the Department of Trade and Industry. Data are currently collected from ten hospitals, one of which is in Scotland. The main constraints of the database are its product orientation, its lack of 24 hour coverage and its inability to generate local analyses. Thus, the estimation of outpatients used in this report has been extrapolated from the database with some limitations.

## 1.4 The importance of home accidents

Estimates from the General Household Survey (1989) indicate that a total of 9.4m accidents received medical treatment (from GPs and hospitals) in the UK, 35% of which took place in the home (see Table 1 below). Indeed, the home is the most common place for accidents requiring medical treatment to occur.

**Table 1**  
**All medically treated accidents (1989)**

| Place of accident | Estimated number<br>(Millions) | Percentage of all<br>accidents |
|-------------------|--------------------------------|--------------------------------|
| Home              | 3.3                            | 35                             |
| Work              | 2.0                            | 21                             |
| Other             | 1.8                            | 19                             |
| Sports            | 1.6                            | 17                             |
| Road              | 0.7                            | 7                              |

[Source: General Household Survey, 1989]

While the home is one of the most common places in which accidents may occur, relatively few are fatal (Pless, 1993). Home accidents have not been examined in the same detail as, for example, road accidents. Indeed, Backett (1965) stated:

*"Domestic accidents have not, as yet ... attracted much attention as a health problem .. the total deaths and suffering they exact is probably large and much of it could be prevented."*

More recently, speakers at a Health of the Nation Conference on Accidents (1993) urged delegates to raise the profile of home accidents by allocating funding specifically to this area of health promotion.

## 1.5 Epidemiology of Home Accidents

### 1.5.1 Age

Home accidents do not occur randomly throughout the population. Rather they appear to be focused on the very young (0-4 years) and the very old (75+ years) (Table 2). Children and older people are more likely to spend a greater proportion of their day in the home, and may, therefore, be exposed to a greater degree of risk. In addition, children may be at increased risk because of their rapidly progressing physical and mental development.

**Table 2**

Number and rate (per 100 000) of fatalities, hospital admissions and estimated new outpatients due to a home accident, Scotland, 1991

|                 | Fatal  |      | Hospital Admissions |        | Estimated New Outpatient |          |
|-----------------|--------|------|---------------------|--------|--------------------------|----------|
|                 | Number | Rate | Number              | Rate   | Number                   | Rate     |
| <b>0-4</b>      | 28     | 8.6  | 3577                | 1098.8 | 56 084                   | 17 228.1 |
| <b>5-14</b>     | 3      | 2.0  | 1298                | 204.6  | 37 058                   | 5841.1   |
| <b>15-44</b>    | 64     | 2.8  | 4068                | 180.5  | 80 827                   | 3585.8   |
| <b>45-64</b>    | 80     | 7.2  | 2053                | 183.8  | 28 495                   | 2550.9   |
| <b>65-74</b>    | 61     | 13.8 | 1715                | 388.8  | 11 759                   | 2665.9   |
| <b>75+</b>      | 218    | 66.5 | 5283                | 1611.7 | 18 224                   | 5559.7   |
| <b>All ages</b> | 464    | 9.1  | 17 994              | 352.8  | 232 447                  | 4557.8   |

(Source: ISD)

Home accident rates by age for England, Wales and Scotland are shown in Table 3 below. It is noteworthy that Scotland has a higher rate than England and Wales in each age band, but the relative disadvantage is most marked in the 75 and over age group. However, there has been some debate recently regarding differences in the method by which figures are compiled between England & Wales and Scotland. Apparently deaths from falls in the over 75s in England and Wales are underestimated by some 30% owing to the tendency to attribute them to osteoporosis to avoid the necessity for an inquest (Coid 1994).

**Table 3**

Home Accident Deaths, rates per 100 000 population England and Wales and Scotland, by age, 1980-1991

|                 |                         | 1980  | 1985  | 1990  | 1991  |
|-----------------|-------------------------|-------|-------|-------|-------|
| <b>0-4</b>      | <b>Scotland</b>         | 18.7  | 13.8  | 4.6   | 11.7  |
|                 | <b>Engl &amp; Wales</b> | 10.5  | 8.1   | 5.4   | 4.5   |
| <b>5-14</b>     | <b>Scotland</b>         | 4.4   | 4.7   | 2.2   | 4.7   |
|                 | <b>Engl &amp; Wls</b>   | 2.7   | 2.3   | 1.7   | 1.7   |
| <b>15-44</b>    | <b>Scotland</b>         | 8.8   | 8.2   | 7.8   | 6.5   |
|                 | <b>Engl &amp; Wls</b>   | 6.1   | 5.1   | 5.8   | 5.5   |
| <b>45-64</b>    | <b>Scotland</b>         | 22.4  | 15.9  | 15.6  | 12.8  |
|                 | <b>Engl &amp; Wls</b>   | 10.7  | 8.8   | 8.8   | 8.0   |
| <b>65-74</b>    | <b>Scotland</b>         | 48.1  | 37.7  | 31.6  | 28.3  |
|                 | <b>Engl &amp; Wls</b>   | 23.7  | 20.0  | 15.8  | 15.2  |
| <b>75+</b>      | <b>Scotland</b>         | 265.0 | 222.1 | 174.4 | 186.1 |
|                 | <b>Engl &amp; Wls</b>   | 127.0 | 111.7 | 80.5  | 83.5  |
| <b>All ages</b> | <b>Scotland</b>         | 28.4  | 25.0  | 21.3  | 21.4  |
|                 | <b>Engl &amp; Wls</b>   | 15.4  | 14.0  | 12.0  | 11.9  |

(Source: Scottish Office, 1994)

As observed in Table 2, the younger members of the population have the highest rate of home accidents while the elderly run the greatest risk of a fatal accident. Tinetti and Speechley (1988) found that 30% of the elderly living in the community



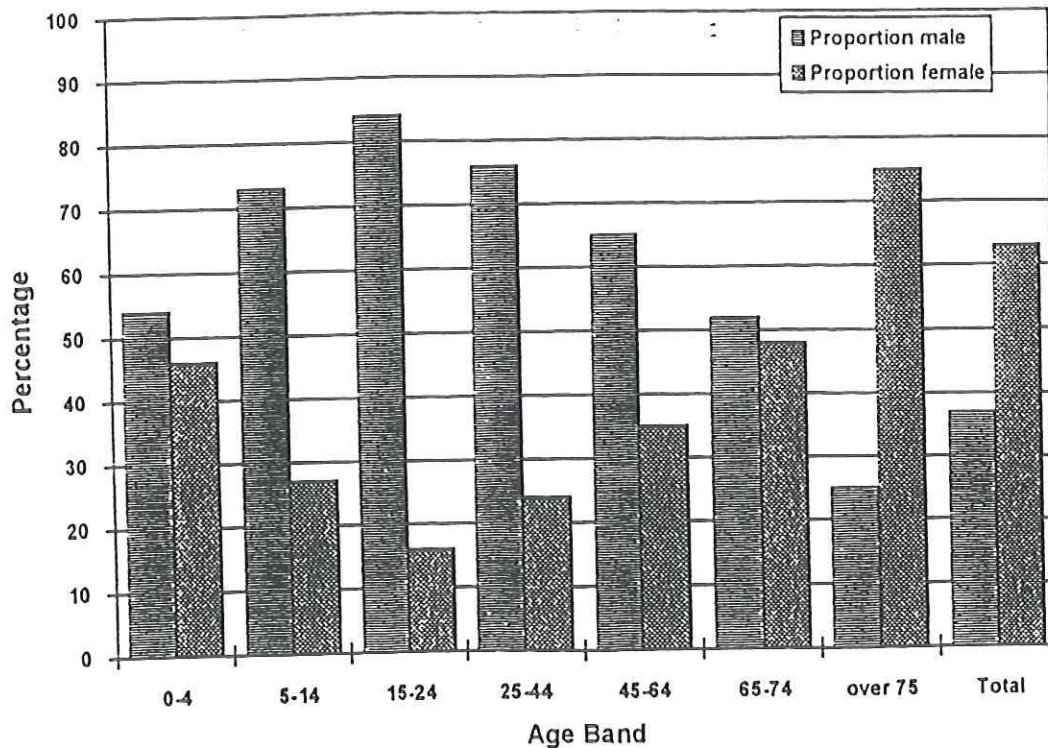
and 50% of those living in institutions fall each year. These falls may cause death, serious injury and psychological distress. Effects of falls can be far reaching, leading to self imposed restriction of activity. Indeed, falls and instability are mentioned as contributing factors in 40% of nursing home admissions (Kellogg, 1987; Smallegan, 1983).

Nationally, the Home Accident Surveillance System estimates that home accidents account for 40% of all fatal accidents and a third of all accidents treated in UK hospitals. The overall rate of home accidents based on the above data is 49 per 1000. This estimate is for those who seek hospital attention for their injuries. However, studies reveal that the majority of reported accidents are dealt with by the GP. In a recent study which examined accidents in the over 65 age group, 77% of accidents were reported, but only 24% were reported to accident and emergency (Graham and Firth, 1992).

### 1.5.2 Gender

The distribution of accidents also shows a distinct pattern in terms of gender (Figure 1). Males are more likely to experience a home accident in the under 74 age group, particularly in the 15-24 age band. Females are more likely to experience a home accident in the 75 and over age group. Because of the comparatively large numbers of females experiencing home accidents in the 75 and over age group, viewed as a whole, home accidents occur more commonly in women than men.

**Figure 1**  
**Distribution of home accidents in Scotland by gender 1988-1992**  
 (Source: ISD)





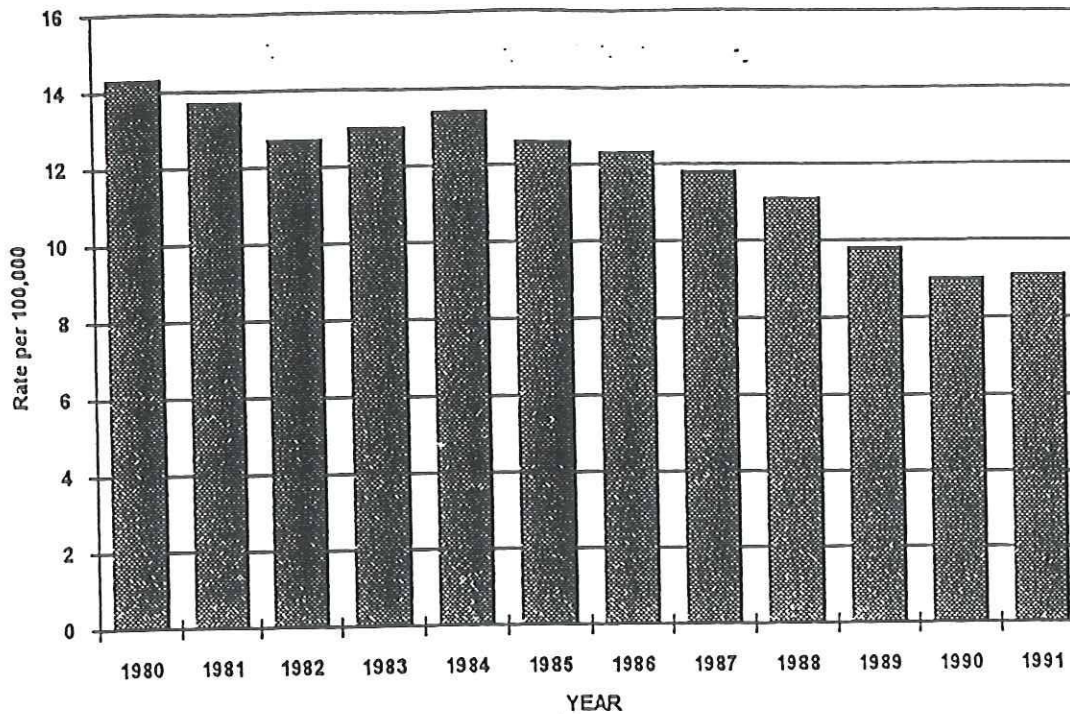
### 1.5.3 Trends

Interestingly, between 1980 and 1991 the rate of accidental deaths has fallen (Figure 2) while the rate of hospital discharges has risen (Figure 3). It is unclear why this is the case, although there are a number of possible explanations. For instance, improved clinical practice may reduce the number of deaths, or accidents that have occurred over this time period may be less severe, or there may be an increased tendency to retain individuals overnight.

**Figure 2**

**Death rate due to accidents (in the home) Scotland, 1980-1991**

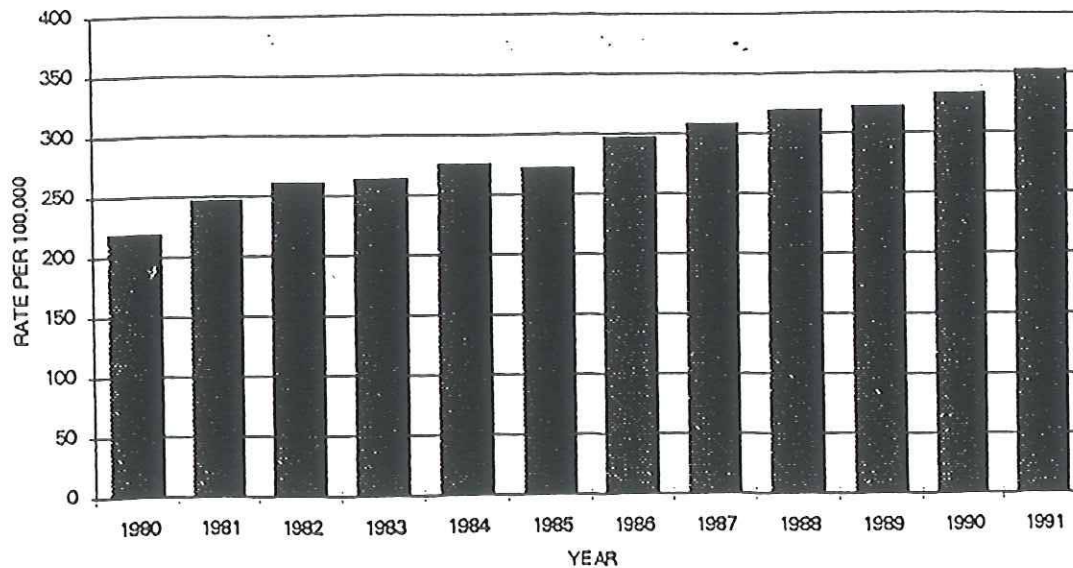
(Source: ISD)



**Figure 3**

**Discharge Rate for Accidents from Scottish Hospitals 1980-1991**

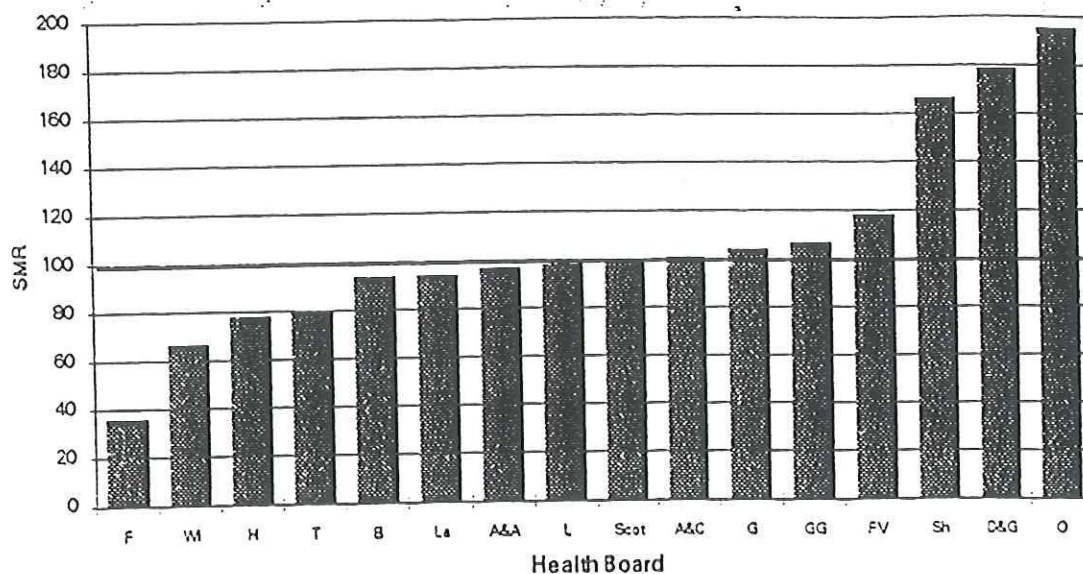
(Source: ISD)



### 1.5.4 Geography

Figure 4 reveals substantial differences between Health Boards in the death rate due to home accidents. Fife Health Board appears to be substantially below the Scottish rate, while Shetland, Orkney and Dumfries and Galloway appear to be above the Scottish rate. The Dumfries and Galloway figure is likely to have been affected by the Lockerbie disaster which took place in December 1988. Figures in Shetland and Orkney are affected substantially by a small number of events, due to the small resident population.

**Figure 4**  
**Standardised Mortality Rate for Home Accidents in Scotland by Health Board, 1988-1992**  
 (Source: ISD)

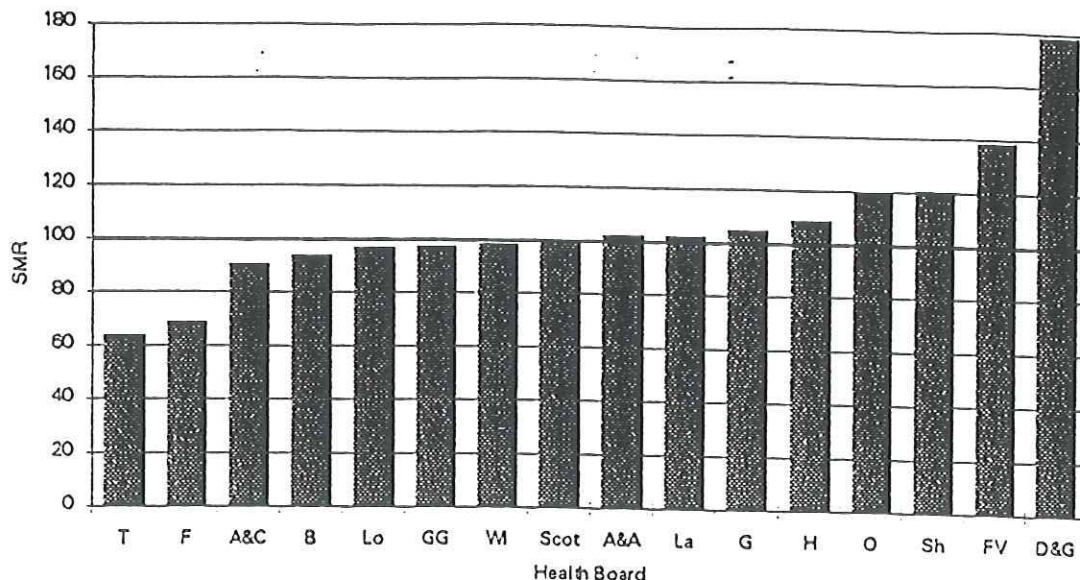


F=Fife WI=Western Isles H=Highland T=Tayside B=Borders La=Lanarkshire  
 A&A=Ayrshire & Arran L=Lothian Scot=Scotland A&C=Argyll & Clyde  
 G=Grampian GG=Greater Glasgow FV=Forth Valley Sh=Shetland  
 D&G=Dumfries & Galloway O=Orkney



There are also variations between health boards in terms of discharges (Figure 5). Fife and Borders Health Boards are below the Scottish rate, while Forth Valley and Western Isles Health Boards are above the Scottish rate.

**Figure 5**  
**Hospital Inpatient Discharges by Health Board, 1991**  
 (Source: ISD)

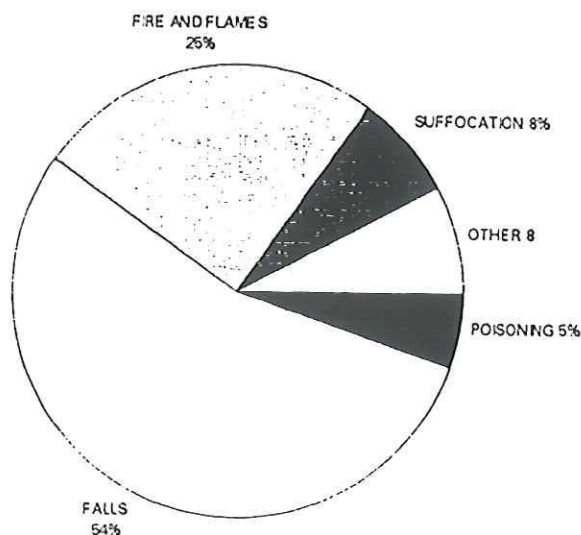


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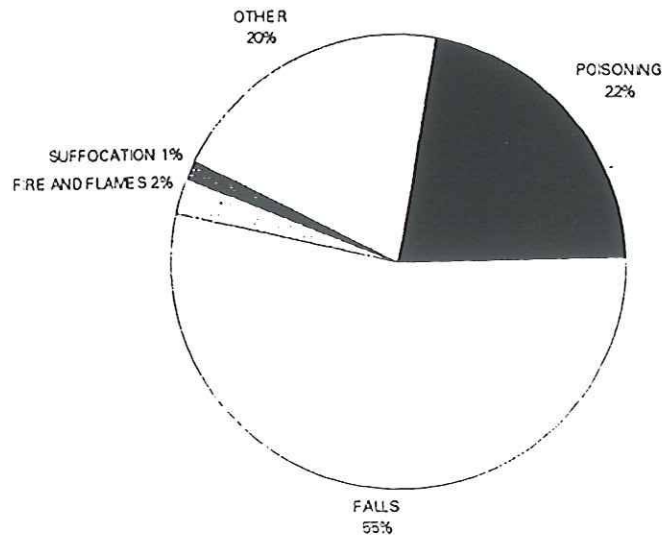
### 1.5.5 Type of Accident

Falls represent the largest cause of accidental death and injury (Figures 6 and 7). Fire and flames contribute significantly to accidental death, while poisoning and other injuries (e.g. cuts) contribute to accidental injury. Examination of the type of accident has influenced the type of prevention strategies that have been applied.

**Figure 6**  
**Accidental death by type of injury due to home accident Scotland, 1991**  
 (Source: ISD)



**Figure 7**  
**Discharges from hospital due to home accident, by type of injury Scotland, 1991**  
(Source: ISD)



### 1.6 Pointers to prevention

A number of risk factors for childhood accidents have emerged from detailed examination of the epidemiology. These include:

#### 1.6.1 Gender

As noted from Figure 1 and from published research (e.g. Jackson, 1977) boys appear to be at greater risk than girls. One explanation for this could be found in theories relating to socialisation. On examination of care-giver behaviour, boys are less likely to be reprimanded for climbing, jumping and physically active play. As a result their exposure to risk may be greater than for girls.

#### 1.6.2 Socio-economic group

Those in low socio-economic groups were at greater risk than those in higher groups, suggested Learmouth (1979). Some studies have highlighted ethnic minority groups as a risk factor for accidents (e.g. Learmouth, 1979), while others argue that social disadvantage is more important than ethnic group in determining accidents in the home (Alwash and McCarthy, 1988).

Poor housing and lack of safe play areas are associated with low socio-economic groups. Thus, exposure to risk of accidents may be greater in these groups.

#### 1.6.3 Risk factors for older people

Roberts (1989) examined the antecedent factors to falls in older people. He argued that falls may be categorised in terms of trips and turns. Trips refer to falls resulting from outside influences, whilst turns refer to falls resulting from factors within the individual. In a study of 339 attendances by elderly patients in Wolverhampton, Morfitt (1983) suggests that environmental causes are more important in males than females, and that for the latter group environmental causes predominate up to



the age of 75 years, but beyond that age-intrinsic or health-related factors become progressively more important.

### **Trips**

Tinetti and Speechley (1988) argue that environmental factors contribute to most falls. Objects that may be tripped over, poor lighting, slippery surfaces and inappropriate furniture are the most frequent environmental hazards (Rubenstein et al, 1988; Kellogg, 1987; Tinetti et al, 1988). The frailer the person the more susceptible they are to minor hazards - for example, ill fitting shoes may become a major hazard to a particularly frail person. Similarly, throw rugs are a particular problem for elderly persons with decreased step height. Experience of the hazard is an important modifier as older people who use stairs regularly are at lower risk than those who use them infrequently.

Environmental factors may be compounded by changes in gait and hand grip strength (Consumer Safety Unit, 1990), the latter being an obvious risk factor when using handrails of any sort. Older women are more prone to falls than older men, possibly because of changes in gait (Tidieksaar and Kay, 1987). Women tend to have a waddling gait with narrower walking and standing base.

### **Turns**

In the case of turns, Tinetti et al (1988) found that the majority of falls by elderly persons occur during their usual activities, such as walking or changing position. A minority of falls (around 5%) occur during hazardous activities, such as climbing on chairs or ladders or participating in sports. About 10% of falls occur on stairs; descent is more hazardous than ascent.

### **Sight**

There are a variety of intrinsic factors that contribute to an increased risk of falls. The decline in visual functioning is one of the most significant physiological changes (Tidieksaar and Kay, 1987). Changes which may increase the risk of an accident include:

- the reaction time to changes in light intensity is increased, thus heightening the risk of an accident when entering a dark environment.
- changes in the lens can lead to glare intolerance and a decline in depth perception.
- lens opacity reduces the ability to discriminate between colours of similar intensity

These visual changes highlight the need for a well-lit environment with minimum glare, especially in risk areas such as stairs. Placing a rug on a carpet of similar colour is one example of an avoidable hazard. Visual changes are exacerbated by age-related diseases such as cataract.

### **Hearing**

Hearing loss can also be a major contributory factor. The effect of hearing loss combined with diminishing sight has been well documented (Gerson, 1989).

### **Reaction Time**

Age also leads to a poorer reaction time, thus the ability to take evasive or remedial action is compromised (Tidieksaar and Kay, 1987).

#### **1.6.4 Health problems**

Older people with additional medical problems are at a significantly greater risk and certain medical conditions are particularly associated with falls (Lubel, 1989; Campbell et al, 1981). These include postural hypotension, heart block, neurological deficits such as Alzheimer's disease and Parkinsonism, and musculoskeletal conditions contributing to leg weakness or joint instability.

Prescribed medication also plays a part. Older people tend to have an impaired ability to metabolise drugs which effectively increases the potency of medication (Ray et al, 1987).

#### **1.6.5 Social and Psychological Factors**

Probably one of the least studied areas related to social and psychological factors relates to accidents (Consumer Safety Unit, 1990). Some falls may be linked to a psychological response to loneliness, depression or changes in family relationships (Tidieksaar and Kay, 1987).

#### **1.6.6 Multiple Risk Factors**

Tinetti et al (1988) found that the risk of falling increased linearly with the number of risk factors from 8% with no risk factor to 78% with four or more risk factors.

## 2 SCOPE FOR PREVENTION

Health promotion can be discussed by examining the overlapping spheres of:

- education
- enforcement of legislation
- environmental protection

### 2.1 Education

Health education campaigns aimed at parents and children have had mixed results (Towner et al, 1993). Minchholm et al (1984) found no improvements in home injury rates following an educational campaign. Bryce et al (1993) found that most parents were aware of hazards to their children's safety, but had limited resources to reduce the hazards in their home. Some educational programmes, however, have reported increased knowledge, changed attitudes and safety enhancing behaviour (e.g., Gallagher et al, 1985; Colver et al, 1982). Miller et al (1982) found that a short health education session at well child clinics conducted by a paediatrician resulted in a significant increase in smoke detector installation in the intervention groups' homes as opposed to a control group. The study population, however, was predominantly white and middle class who do not represent a high risk group.

Katcher (1987) described a community wide health education campaign co-ordinated by the electricity distributing companies aimed at reducing domestic hot water temperatures in order to reduce the incidence of scalds. Free thermometers were provided on request and there were significant reductions in water temperatures by those motivated enough to request thermometers but not by the rest of the population. Webne (1989) reported no significant results from a small scale education campaign by a paediatrician aimed specifically at high risk families. In a later study Katcher (1990) reported some changes in water temperature following physicians' counselling; water temperatures were more likely to be checked and reduced if free thermometers were provided. Thomas et al (1984) claim a reduction in home water temperature resulting from a short burn prevention education session at a well child clinic.

There is no evidence that general education campaigns aimed at fire prevention have resulted in injury reduction. A large state wide campaign in the USA, Project Burn Prevention conducted by McLoughlin et al (1982), reported knowledge gain among school children but no reduction in burn injury incidence or severity in the longer term. Similarly, campaigns aimed at general hazard reduction (Eckelt, 1985; Varas, 1988) reported small increases in knowledge but no changes in behaviour. An evaluation in Britain of National Fire Safety Week by McCabe and Moore (1990) reported that among those attending Accident and Emergency departments only 15% were aware of the campaigns. Furthermore there was little change in attitude after the campaign.

These mixed results have led some to argue that the most important function of education is to create sufficient awareness of a problem to ensure that definitive design, environmental and legislative measures become acceptable (Cudmore, 1992; McLoughlin et al, 1982; Towner et al, 1993).

The BBC Television "Play it Safe" series focused attention on home safety, and Health Boards were encouraged to become involved. During a previous campaign in 1981 Colver examined the value of health visitors encouraging families to watch the

series and of making specific suggestions about action to make homes safer. The result was that 60% of families given specific advice took action to make their home safer. However, Williams and Sibert (1983) found that admissions to accident and emergency departments did not change during the 1981 Play It Safe Campaign, despite the fact that 59% of adults watched the programme and some 10% sent away for the accompanying booklet (HEC, 1983).

A more productive means of improving home safety may be by creating a safer environment (Child Accident Prevention Trust, 1985; Avery and Jackson, 1993). Roberts et al (1989) found that parents are aware of the hazards in their environment and take measures to minimise risk. However, care givers are not always able to supervise children, due to competing priorities of every day life, for example, putting the washing out or going shopping. Roberts et al go on to argue "...risks are not so much a product of parental neglect as a problem of coping with other household priorities in essentially dangerous places, effective accident prevention might depend on building a collective responsibility for safety into the rights and entitlements associated with the welfare state" (p.199).

## **2.2 Enforcement**

Since the 1960s domestic architecture has been regulated to enhance home safety (Sinnot 1977, Gloag 1988). Regulations have included:

- HASS data led to the redesign of pen tops to prevent child asphyxiation after swallowing the tops (Mathias and Colling, 1988).
- interior glazing in new buildings is now regulated (Department of Environment, 1991). However, correlation between this and reduction in injury rates has yet to be reported (Towner et al, 1993).
- the opening distances of windows on high rise buildings have been controlled. The installation of window guards in New York resulted in a 96% decrease in accidental falls from windows (Speigal and Lindamen, 1987).
- regulations to kitchen design reduced access by children to the sides of cookers (Sinnott, 1977).
- Sorensen (1976) documents changes in burn injuries occurring as a result of product redesign in the case of washing machines, coffee filters and vacuum cleaner plugs.

Thus, the role of the Home Accident Surveillance System in identifying products associated with injury has been found to be an effective method of collecting information to support the regulation of a number of products. However, some dangerous products still remain unregulated. Ferguson et al (1992) noted that 56% of poisonings were due to ingestion of unregulated products such as bleach, detergents and paint removers.

Child resistant packaging has been found to be effective in some studies. From January 1976 in the UK, all child aspirin and paracetamol preparations were required to have child resistant closures or dark tinted unit packaging. In the year following the 1976 Act, Sibert et al (1977) recorded a significant fall in admissions for accidental aspirin poisoning. Nevertheless, Walton (1982) notes safe storage is still an important method of prevention as twice as many poisonings continue to occur in the USA with regulated compared to unregulated products.



## **2.3 Environmental protection**

There is a growing range of safety devices which aim to prevent home accidents. Positive outcome has been observed in relation to smoke detectors, child resistant containers, fireguards, stair gates, safety catches for cupboards, coiled kettle flexes, safety harnesses and thermostat control of water temperature, but not to others such as cooker guards and bath thermostats (Towner et al, 1993). In a review of the literature, overall environmental measures tend to be more effective than educational ones (Stone, 1993).

### **2.3.1 Smoke detectors**

There have been a series of evaluations of campaigns aimed at increasing the use of smoke detectors. Gorman (1985) describes a campaign aiming to increase installation of fire detectors in those homes most at risk and reports that a smoke detector give-away programme involving local fire fighters resulted in the distribution of 3729 free detectors and sales exceeding 100 000 detectors at cost price. Of those detectors distributed free of charge, 81% were operational 8-10 months after the campaign. A give-away campaign reported by Shaw et al (1988) also demonstrated a high uptake of devices but did not record whether the detectors were installed.

McLoughlin et al (1985) in the USA compared areas where smoke detectors were required by law in all homes with areas where their installation was voluntary. However, the reduction in mortality was not large and the authors commented, using an analogy from seat belt use, that:

*"unless compliance is virtually universal, the higher rates of deaths and injuries among high risk populations are likely to mask the effectiveness of the devices for the majority of people"*

Cheadle (1992) found approximately 50% of all homes in the UK had smoke detectors. An earlier survey identified only 21% of all house fires attended had some kind of detector fitted, and of those who had smoke detectors, 50% of the detectors did not work. Of the detectors that did not work the main problem was lack of or flat batteries.

### **2.3.2 Poisoning**

Labelling harmful substances with poison warnings (for example, Mr Yuk Stickers) in order to deter young children from tampering with dangerous products has been demonstrated to be ineffective; young children were still attracted to the containers (Vernberg, 1984). Fortunately, this did not affect poisoning rates; there were no differences between groups supplied and those not supplied with stickers (Ferguson, 1982). Children under the age of 3 do not seem to be amenable to this approach.

### **2.3.3 Falls**

The goal of prevention strategies (Tinetti and Speechley, 1988) should be to minimise the risk of falling without compromising the mobility and functional independence of the individual. The multifactorial nature of falls suggests the need for a multifaceted approach to prevention. The components of a strategy to prevent falls should include the assessment and modification, in so far as possible, of intrinsic and extrinsic risk factors. The Royal Society for the Prevention of Accidents (RoSPA, 1989) advocated community nurses as playing a vital role in the prevention of accidents in the home. They have an intimate knowledge of home circumstances and medical and nursing needs, and have access to more

comprehensive information than any other community worker. A mechanism to focus observations in salient areas is required.

Tidieksaar and Kay (1987) produced a useful checklist incorporating both intrinsic and extrinsic factors. Berryman et al (1989) produced a risk calculator incorporating a scoring system for use in an institutional environment on the basis of a study of over 1000 falls occurring during an 18 month period. This may be easily adapted to suit a patient's home circumstances. It may also be used alongside the checklist devised by Tidieksaar and Kay (1987), since each has a unique contribution to make. Data such as that provided by HASS (Consumer Safety Unit, 1990) should be used in a creative fashion by community nurses, e.g. to draw attention to certain areas of the home. (Williams and Nolan, 1993). However, there has been no evaluation of such a proposal to examine its effectiveness.

#### **2.3.4 Clinical surveillance**

Given the role of underlying medical conditions and medication as risk factors for accidents (particularly in the elderly), regular clinical surveillance should be explored. The role of osteoporosis prevention in the secondary prevention of fractures in the elderly remains controversial

#### **2.4 Home safety check schemes - an integrated approach to home safety?**

HASS data clearly indicates those areas of the home environment which merit the most attention (Consumer Safety Unit, 1990) in terms of enhancement of safety. There is, however a change in the location and frequency of accidents for people of advancing years. In the 65-74 age group, accidents occur most often in the kitchen (18%), garden (16%) and living/dining room (13%), while in the over 75's, the living/dining room (19%), bedroom (18%) and kitchen (14%) are the most common locations for accidents. A scheme was established by Gloucestershire Health Education Service to check the home for hazards and make recommendations regarding safety enhancing features. Similarly, this scheme noted the highest distribution of risk factors to be in the kitchen.

| <b>Location</b>      | <b>Risks</b>               |
|----------------------|----------------------------|
| Porch/Hallway/Stairs | 9.0% (0.73 per household)  |
| Living/Dining Room   | 26.5% (2.15 per household) |
| Kitchen              | 28.2% (2.29 per household) |
| Bedroom              | 22.1% (1.80 per household) |
| Bathroom             | 11.8% (0.96 per household) |
| Garage/Shed          | 2.4% (0.19 per household)  |

A total of 2087 rectifications were carried out at a rate of 3.02 per check made. Of these, 1130 were concerned with plugs, some 54% of the total, and 47% (980) were in the kitchen, with most of the remainder being in the living room (26%) and bedroom (19%). However, there was no reported evidence that the accident rate of those undertaking the check was reduced (Pennington, 1986).

The Child Accident Prevention Trust reported on a case study regarding the practicality of establishing a Home Safety Equipment Loan Scheme. Loans were made on the basis of referrals from health visitors. Between 15-20% of all equipment loans required fitting. Costs for the programme were initially underestimated as those requiring a substantial number failed to meet the appointment. Further during the first months of the scheme only 30 of the 300 items lent had been returned, and over a third of these were returned in very poor condition. The Trading Standards Department agreed to check all equipment before being reused. The scheme has not been evaluated in terms of a reduction in accidents to the homes receiving equipment or whether equipment was still in place and in working order after a period of time.

### 3 THE COST OF HOME ACCIDENTS

It has been difficult to identify the cost of home accidents to the health service. Vipulendran et al (1988) estimated the cost of child home accidents to hospitals in the West Midlands as £3 059 100 in 1984, with an average cost per episode of £51.

It should be noted that this is an estimate in its crudest sense. Inpatient episodes are considerably more expensive than outpatient attendances, therefore it is difficult to apply the average cost in a meaningful way to other areas. There will also be considerable variation in the cost of each individual to the health service which may significantly alter the true costs to the NHS of home accidents. It should be noted that home accidents in the elderly are generally more costly than accidents to children as they tend to be associated with longer lengths of stay.

In addition to the costs incurred in acute units, there are also costs to primary care for those who either sustain a minor injury, or alternatively, require longer term support and follow up.

There are intangible costs to family and friends in terms of personal loss or stress. Where the injured person contributes to the household income, there are additional financial consequences of home accidents in terms of time off work and, consequently, loss of family income.

#### 4 COSTS AND PRIORITIES

Home accidents contribute significantly in terms of morbidity and mortality and should therefore represent a major priority for all Health Boards throughout Scotland.

The Health of the Nation, the strategy document on health promotion for England and Wales, identified the following targets for accidents:

To reduce the death rate for accidents among children aged under 15 by at least 33% by the year 2005

To reduce the death rate for accidents among young people aged 15-24 by at least 25% by 2005

To reduce the death rate for accidents among people aged 65 and over by at least 33% by 2005

*Base Line: 1990*

The World Health Organisation proposed a target for Europe:

"To reduce deaths from accidents by 25% by the year 2000"

*Base Line: 1980*

If current trends persist, and the death rate continues to decrease, it is likely that these targets will be met. It may be appropriate for national and local targets to be developed for home accidents specifically in order to re-emphasise safety in the home.



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# Scottish Needs Assessment Programme



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## Home Accidents in Scotland

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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<br>(NHS as a workplace) | Medical care costs<br>(Total costs) | £5-22 million per year<br>(£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.

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

**Mrs Julie Truman**

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**January 1995**

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## HOME ACCIDENTS - EXECUTIVE SUMMARY

### The Size of the Problem

The General Household Survey (1989) estimate that a total of 9.4 million accidents received medical treatment from GPs and hospitals in the United Kingdom. Most accidents occur in the home.

### Epidemiology

**Age** Children and those aged over 75 years of age are more likely to experience a home accident than other groups

**Gender** In the under 74 age group, males are more likely to experience a home accident than females. However, over the age of 74, females more commonly have home accidents.

**Trends** Between 1980 and 1991 the number of accidental deaths have fallen while the number of hospital discharges have risen.

**Geography** Scotland's death rate from home accidents is consistently higher than that of England and Wales. Within Scotland, Fife Health Board appears below the Scottish rate and Shetland, Orkney and Dumfries and Galloway appear to be above the Scottish rate.

**Socio-economic group** Those in lower socio-economic groups appear to be at greater risk of home accidents than those in higher groups.

### Risk factors

**Trips** Environmental hazards contribute to most falls. The frailer the person the more susceptible they are to minor hazards - for example, ill fitting shoes may become a major hazard to a particularly frail person. Experience of the hazard is an important modifier, people who use stairs regularly are at lower risk than those who use them more frequently.

**Turns** Decline in sensory acuity and medical conditions such as postural hypotension or neurological deficits such as Alzheimer's disease increase the risk of an accident.

**Medication** Older people have an impaired ability to metabolise drugs which effectively increase the potency of medication. Increased potency can be problematic with for example drugs which treat hypertension as this can lead to hypotension.

**Psychological factors** Research suggests that some falls may be linked to a psychological response to loneliness, depression or changes in family relationships

**Multiple risk factors** The risk of a fall increases linearly with multiple risk factors from 8% with no risk factors to 78% with four or more risk factors.

### Scope for Prevention

Environmental protection (such as the installation of fire guards, cooker guards and ensuring adequate lighting) and legislation (such as regulating buildings design and products) are generally more effective in reducing accidents in the home than educational measures.

## **The Cost**

Few attempts have been made to identify the cost of home accidents either to the health service or to society. There will be considerable variation in the cost of home accidents depending on the nature of the injury and the long-term follow-up required by the health service and the long-term morbidity associated with the injury.

## **Targets and Priorities**

Targets have been set for reduction in accidents in general but no specific targets have been set for home accidents. It may be appropriate to set such targets as a national level to ensure home accident prevention is given priority at a local level.

## **RECOMMENDATIONS (ISSUES FOR THE PURCHASER)**

There are a number of areas which require further development:

### **a) Information**

The information systems currently available do not accurately capture all the accidents which present to the health service. Thus target setting is invalidated due to the inaccuracies of the data sets on which they are based. Health service purchasers, therefore, have a role in encouraging the adoption of more accurate data collection systems.

The Departments of Public Health within the Boards have a role in digesting the available information to ensure informed decisions are made regarding priorities and targets. The Director of Public Health Annual Reports may be one forum in which information relating to accidents may be presented.

### **b) Liaison**

Health Boards, as "gatekeepers" to information on accidents, have a role in ensuring effective co-ordination between the different agencies involved in accident prevention. Purchasers have a clear role in encouraging healthy alliances and sharing of information.

### **c) Programmes and evaluation**

Health promotion departments should examine the effectiveness of novel methods of accident prevention. Programmes should focus on practical measures rather than educational measures.

The published literature reflects an absence of home accident prevention programmes that have been subject to rigorous evaluation in terms of health gain, or health economic appraisal. There is clearly a role for the purchaser in encouraging health promotion departments to become more critical regarding the development and evaluation of home accident prevention programmes.