



KAROLINSKA INSTITUTET
DEPARTMENT OF PUBLIC HEALTH SCIENCES
DIVISION OF SOCIAL MEDICINE

2000-02-07

Evidence-based safety promotion and injury prevention - an introduction

by

Leif O Svanström , Bo J A Haglund

Postadress
171 76 STOCKHOLM

Besöksadress
Norrbacka

Telefon
08- 517 779 63
E-mail:bo.haglund@phs.ki.se or
leif.svantrom@phs.ki.se

Telefax
08-33 4693

Preface

The aim of this book is to present a more extensive synopsis on studies of effects and effectiveness of accident, violence and injury prevention.

The Nordic countries have internationally been in the forefront of accident and injury prevention. This has been especially successful for children, where a combination of strategies has been used; epidemiological surveillance systems of injuries have been the basis together with inter-sectoral collaboration and legislative measures. Similar success with reduced rates of accidents and injuries caused by crashes in traffic due to better roads, better cars, and use of safety belts has led to the lowest mortality in the world. Also work-related accidents has decreased remarkably during the last decades due to changes in the physical environment. During the last couple of decades the accident prevention in the Nordic countries have focused on the development of new strategies using community intervention models. Several major projects with promising outcomes have been presented from both Sweden and Norway.

This book discusses firstly the task and how it has been tackled. Secondly a conceptual framework of intervention evaluation and some of its key concepts is presented. In a third section a more evolved description is provided on injury prevention and safety promotion models and theories. As an outcome of this discussion our model "a safety promotion matrix" is presented. This matrix is used as a basis for presenting accident and injury prevention in the rest of the book chapters.

The Safety Promotion Matrix includes intervention areas and intervention levels. The NOMESCO classification of external causes of injuries, similar to ICECI, has been used for the areas of intervention including "Reasons for contacts", "Place of occurrence", "Age groups", "Gender", "Social groups", and "Ethnicity". In addition some more categories have been added including areas of interventions like Products, Economics, Models etc The intervention levels include group, organisation, community and national level. Also the interventions can be mono factorial or multi-factorial concerning the components of the intervention at each level.

Inequity is discussed as an aspect related to different types of interventions. In health promotion using the conceptual model of creating supportive environments for health the equity dimension is included e.g. when discussing building new paths for bicycles. When using health education as the key strategy the equity dimension is more difficult to deal with.

The strategy used for collecting the evidences on effect and effectiveness of injury prevention have been firstly to identify relevant literature by a search of computerised databases of the period of 1994 to 1997, citation in identified papers and previous reviews. Secondly a number of international research centres on safety promotion were identified and contacted by e-mail with a request for on-going or recently published systematic reviews in the field. Through Internet and requests on its discussion lists thus an additional number of international groups currently working with systematic reviews were identified and contacted.

Our hope is that the second stage of this project would include the development of a presentation using the Internet facilities, including reviews on different types of interventions aiming at reduction of accidents and injuries.

We are indebted to the Swedish National Institute of Public Health for their support. A web-site to access the material is under construction.

Stockholm in February 2000

Leif O Svanström

Bo J A Haglund

TABLE OF CONTENTS

Preface

- 1 INTRODUCTION**
- 2 BACKGROUND**
 - 2.1 Evaluation and effectiveness**
 - 2.2 The Development of the Biomedical oriented Cochrane collaboration**
 - 2.3 Beyond the Randomised Control Trial**
 - 2.4 Concepts and definitions of Injury Prevention and Safety Promotion**
 - 2.5 Theories and Models of Injury Prevention and Safety Promotion**
- 3. MATRIX OF AN EVIDENCED-BASED INJURY PREVENTION AND SAFETY PROMOTION MODEL**
- 4. METHODS IN SEARCHING FOR LITERATURE**
- 5. RESULTS**
 - 5.1.1 Classified articles using the matrix**
 - 5.2 Examples of articles with headlines in the database**
- 6 THE SAFETY IMPACT OF EVALUATED INTERVENTIONS**
 - 6.1 Child safety interventions**
 - 6.2 Promoting Safety for adolescents**
 - 6.3 Safety Promotion in the Work environment**
 - 6.4 Preventing Falls and Subsequent Injury in Older People**
 - 6.5 Interventions to prevent violence or self-inflicted injuries**
 - 6.6 Studies describing social interventions on injuries**
 - 6.7 Safety promotion at the local level - safe community interventions**
- 7. SOME CONCLUDING REMARKS ON EVALUATION MATTERS**

APPENDIX 1

Output in Medline format of references used in the Safety Promotion model

1. INTRODUCTION

Injuries are the most common cause of death among young people, a leading cause of disability and years of life lost, and a major contributor to health care costs. In the world about four million people die every year due to injuries, and in Sweden about 3,000 individuals die annually, and one million people visit a doctor every year due to injuries caused by accident.

In Sweden, annual social expenditure for personal injuries was in 1990 estimated at 63 billion SEK, equivalent of 4 percent of GNP (Jansson 1994).

Especially in the western industrialised world there have been dramatic reductions in injury-associated mortality since the turn of the century, largely because of a decrease in the proportion of workers involved in dangerous occupations as well as improvements in the safety of buildings, motor vehicles, roads, and everyday products. Other parts of the world suffer from increasing number of injuries.

The human costs of accidental injuries in the form of suffering, grief and disability are devastating and immeasurable. In particular, children, adolescents and the elderly are at risk. Furthermore, there are social differences in the risk of suffering unintentional injury as children of white-collar workers have much lower mortality rates compared with children whose parents have traditional working class occupations (Östberg 1996). Among adult Swedish men, the socio-economic differences in accidental deaths have increased during the 1980s (Public Health Report 1997)

The involvement of the health care community in injury prevention was limited until recently, when injuries came to be viewed as a public health problem. Over the past decade, since the adoption of the national injury prevention program in 1991, the health care community has assumed a larger role in injury control. Medical and surgical specialists, epidemiologists, statisticians, biomechanical engineers, public health practitioners, and economists have collaborated to develop a sophisticated interdisciplinary science of injury control and safety promotion.

The Nordic countries have internationally been in the forefront of accident and injury prevention. This has been especially successful in the area of injury prevention for children, where a combination of strategies have been used; epidemiological surveillance systems of accidents and injuries has been the basis together with inter-sectoral collaboration, and legislative measures. Similar success with reduced rates of accidents and injuries caused by crashes in traffic due to better roads, better cars, and use of safety belts another important feature. Also work-related accidents has decreased remarkable during the last decades due to changes in the physical environment, and extensive safety promotion work. There is however a need for new efforts aiming at reducing the accidents and injuries in homes and neighbourhood as well as for young people and elderly. During the last couple of decades the accident prevention in the Nordic countries have focused on the development of new strategies using community intervention models. Several major projects with promising outcomes have been presented from Sweden, Denmark and Norway (Maeland and Haglund 1999).

The interventions, which are shown to work, rely on professionals and practitioners working across their disciplines, with parents and children and on a long-term basis. Such alliance working requires a

sustained strategic approach and focused leadership. It invariably requires dedicated support for inter-agency collaboration.

Injury prevention and safety promotion are measures based on our understanding of the relationship between "injury event" and "mechanism of injury" as presented by the Nordic Medico-Statistical Committee of External Causes of Injuries (NOMESCO 1997). NOMESCO has defined an *accident* as an unintentional event characterised by the sudden release of an external force or impact which can manifest itself as body injury. Intentional injuries could be either an event of *violence* which is assault on one or more persons causing harm to at least one of these persons, or intentional self-harm /para-suicide act with or without fatal outcome.

Injury prevention and safety promotion actions demand co-ordinated efforts on all societal levels (international, national, regional, local and in the primary groups of the neighbourhood), and within all social structures, environments and the living conditions of the populations (e.g. the alcohol habits). Focus of actions will differ depending on the determinants of accidents and the knowledge about the effects and effectiveness of preventive measures and their costs.

Even if there is fair evidence-based knowledge on injury prevention and safety promotion in different environments we have less knowledge on the social factors as determinants to injuries and accidents and their social consequences. This is a field of present research at the department of Public Health Sciences of the Karolinska Institutet in Sweden.

The strategy used for collecting the evidences on effect and effectiveness of injury prevention have been firstly to identify relevant literature by a search of computerised databases of the period of 1994 to 1997, and citations in identified papers and previous reviews. The years were set since international reviews tended to be seen in international scientific literature after 1994.

Secondly, a number of international research centres on safety promotion were identified and contacted by e-mail with a request on on-going or recently published systematic reviews in the field. Through Internet and requests on discussion lists thus an additional numbers of international groups currently working with systematic reviews were identified and contacted.

References

Maeland J G, Haglund B J A. Health Promotion Developments in the Nordic and Related Countries. In: Bracht N (Ed.) Health Promotion at the Community Level. New Advances. Thousand Oaks: Sage Publications, 1999 pp 187-198

Jansson B. Community expenditures for injuries. A pilot study. (Samhällets utgifter för personskador. En förstudie.) Stockholm: Folkhälsoinstitutet, 1994.

Public Health Report (Folkhälsorapporten 1997) . Stockholm: Folkhälsoinstitutet, 1997.

Nomesco. NOMESCO Classification of External Causes of Injuries Third revised edition. Copenhagen: Nordic Medico Statistical Committee 48:1997.

Östberg V. Social Class Differences in Child Mortality in Sweden. J Epidemiol & Comm Health. 1992;46:480–4.

2. BACKGROUND

Systematic Inter-sectoral collaboration has been the main reason for successful Nordic injury prevention and safety promotion. Only after a couple of years of intervention injury rates has decreased. In times with limited resources it has been even more important to assess what actions has been effective when proper evaluation designs have been used. This information is crucial for decision-makers both for priority of future research and for proper choice of intervention. Systematic reviews of evidenced-based knowledge increase rapidly at present world-wide. The Cochrane methodology is most spread and will be presented here more in depth. Within the field of injury prevention and safety promotion systematic reviews have been presented both from Europe, within the framework of International Union for Health Promotion/Health Education (IUHPE), and the USA, e.g. ex Harborview Injury Prevention and Research Centre (HIPRC). In the discussion of evaluation it is important to assess not only the outcome effects but also to increase the knowledge of how the programme was implemented and why some elements was successful and others did not work. The international discussions are intensive on these issues at present and therefor we first provide a theoretical framework on the concepts of health and safety promotion and the implications for evaluation.

2.1 Evaluation and effectiveness

Is health/safety promotion a good investment? How can the short and long-term returns of such an investment be assessed? To what degree can social and economic benefits stemming from health/safety promotion initiatives be measured alongside health ones? Answering these sorts of questions is not a simple task. Health /Safety promotion policies and programmes, if properly planned and implemented, involve complex and sophisticated activities. Very often, health/ safety promotion action requires multiple approaches, relies on interdisciplinary inputs and operates at several levels over long period of time. Despite this complexity, health /safety promotion programmes are often forced to be evaluated with methods and approaches which, although quite acceptable within medical care and prevention, are totally unsuitable for this field.

Fortunately, over the last two decades there has been a significant increase in knowledge and understanding about how best to evaluate complex programmes and policies (Hawe at al. 1990, Christenson & Dandoy 1995, Jackson et al. 1996, Macdonald 1996, Macdonald et al. 1996, Nutbeam 1996, Chelinski & Shadish 1997, Pawson & Tilley 1997, Robson 1997, Sidell et al. 1997, Zwerling et al. 1997, Nutbeam 1998). However, the decision-makers and practitioners are not fully aware of these developments or their implications for evaluation of health and safety promotion interventions.

For these reasons the European Office of WHO (WHO/EURO) has established an International Working Group (IWG) on Evaluating Health Promotion Approaches, This is implemented in co-operation with Health Canada and Centres for Disease Control in the USA. (Rootman et al. 1997). The project was initiated in July 1995 at a meeting in Atlanta Georgia, where it was agreed that the

purpose of the IWG should be: *To stimulate and support innovative approaches to the evaluation and practice of health promotion, by reviewing the theory and best practice of evaluation and by producing guidelines and recommendations for health promotion policy makers and practitioners concerning evaluation of health promotion approaches (Springett 1998)*. In a background paper an evaluation framework to assist in the achievement of this purpose is presented. It first considers the question of what is health promotion followed by a discussion of what is evaluation in general. This section in turn is followed by a discussion of evaluation in health promotion. The final section presents an evaluation framework considered to be appropriate for health promotion (Rootman 1997). We will come back to this report later. But first some comments on the terminology.

During the last decades the relative merits of different preventive strategies in injury prevention has been discussed and e.g. environmental changes, and legislation are often regarded as superior and more effective approaches to those involving health education. Towner (1995) argues that health education has a wider role than one solely directed at individualised behaviour change. Health education underpins both legislative and environmental measures and is one component of the overall process of health promotion which encompasses actions to protect and enhance health, including legal, fiscal, educational and social measures (Towner 1995). In the "Framework for Assessing the Effectiveness of Disease and Injury Prevention" made by Centers for Disease Control (CDC) (1992) in the USA it becomes clear that there are several approaches to prevention evaluation, and as a result to the interpretation of effectiveness. One of the frameworks for conceptualisation of prevention programmes includes three components;

1. Clinical prevention strategies using the traditional biomedical model for preventive services that rely on the one-to-one, provider-to-patient interactions.
2. Behavioural prevention strategies using an array of strategies to encourage lifestyle changes in a complex, sequential process; and
3. Environmental prevention strategies often related to as health protection, such as safe water, seat-belt laws, and safer highways which generally require societal commitment for the implementation of the extensive intervention needed.

From this follows also a requirement of range of process and outcome measures that should be assessed when effectiveness is considered.

It is said that the scientific approach to evaluating effectiveness of prevention strategies include:

- Identification of efficacious and effective strategies to reduce morbidity and mortality and improve quality of life.
- Determination of the potential and practical consequences of those strategies, including social, legal, ethical and economic factors.
- Determination of the economic impact of a prevention strategy.
- Determination of optional methods for implementing those strategies.
- Evaluation of the impact of prevention programmes.

The first question that should be addressed about any prevention technique is "does it work?" What is the scientific basis for using the technique? How good is that information? "Efficacy" is defined as the effect obtained with a specific technique in expert hands under ideal circumstances.

Determination of the efficacy of a prevention strategy requiring doing a critical review of the studies that have been done, with the aim of assessing the quality of the science and the magnitude of problem. In the medical milieu, "the golden standard" for efficacy studies has been a randomised clinical trial of health outcomes (Rosén & Örtendal 1998).

Once a technique, such as a seat-belt programme, is known to be efficacious, it is necessary to answer "how well does it work in the real world?" Thus *effectiveness* is the impact of the prevention activity in practical application. Although efficacy is usually determined under carefully controlled conditions, by their very nature, effectiveness studies must be done in the setting in which the intervention will be conducted, i.e. in communities. Therefore, determination of the impact of prevention strategies most often comes from community demonstration projects and prevention programs (CDC 1992).

Health promotion as a concept began with the commitment of the World Health Organization (WHO 1988) to the goals of Health for All in 1977. It was followed by the Declaration of Alma Ata on Primary Health Care in 1978. During this conference the commitment to community participation and inter-sectoral action were also incorporated. At the First International Conference on Health Promotion in Ottawa (1986) five principal areas for health promotion action were outlined: building healthy public policy, creating supportive environments (SE), strengthening community action, developing personal skills, and reorienting health services. These five action areas provide useful framework for the delivery of health promotion programmes. These concepts have been developed in further world health conferences in Adelaide (WHO 1998), Sundsvall 1991 (Haglund et al. 1996), Jakarta 1997, and is planned for a fifth conference in Mexico 2000.

In the report by Rootman et al. (1997) they claim that the *instrumental* objective elements of the definitions of health promotion fall into two clusters that are not mutually exclusive. The first cluster focuses on the *environment*-for example, "to improve social and environmental living conditions..." the second focuses on the *individual*, for example to "choose new lifestyles...". Most however, recognise the need to focus on *both* the individual and the environment. This was also the case in the earlier quoted CDC report.

With regard to the processes, few definitions identify them. The exceptions are the WHO definition ("increase control..."), an elaboration of this definition ("control over the determinants of health") and the definition put forward by Marc Lalonde ("accept more responsibility and be more active"). Thus, although there are differences between recent conceptualisations of health promotion, there are substantial commonalities as well. Specifically, *health promotion is generally seen by those who have defined it as involving a diverse set of actions focused on the individual or environment which through increasing control ultimately leads to improved health or well being.*

One of the most used definitions of health promotion by Stachenko and Jenicek (1990) with the adding of safety reads as follows: "*the process of enabling [individuals and communities] to increase control over [the determinants of health and safety] and [thereby] improve their health.*"

The latter definition has the merit of making explicit a concern with both individuals and communities, what is being controlled, and a possible "causal" mechanism. In particular, it embodies the key underlying concept or "cardinal principle" of health promotion, namely "empowerment." That is, it suggests that health promotion is fundamentally about ensuring that individuals and communities are able to assume the power that they are entitled to. Rootman et al. (1997) suggest that the primary criterion for determining whether or not a particular initiative should be considered to be health promoting ought to be the extent to which health promotion activities involve *the process of enabling or empowering* individuals or communities. Therefore, the absence of empowering activities should be a signal that an intervention *does not fall* within the rubric of health promotion. Attempts to encourage *public participation* are critical to the process of empowerment. Other criteria that help to distinguish between a health promotion approach and some other approach include taking a broad view of health, an emphasis on equity or social justice and intersectorial collaboration. Given these criteria, it can be argued that a health promotion approach can be applied in a number of domains including prevention, treatment, rehabilitation and even long-term care.

WHO (1998) has suggested some principles of health promotion and suggest that health promotion initiatives are programmes, policies and other organised activities planned and implemented in accordance with the following principles.

Empowering: Health promotion initiatives should enable individuals and communities to assume more power over the personal, socio-economic and environmental factors that affect their health.

Participatory: Health promotion initiatives should involve those concerned in all stages of planning, implementing and evaluation.

Holistic: Health promotion initiatives should foster physical, mental, social and spiritual health.

Intersectoral: Health promotion initiatives should involve the collaboration of agencies from relevant sectors

Equitable: Health promotion initiatives should be guided by a concern for equity and social justice.

Sustainability: Health promotion initiatives should bring about changes that individuals and communities can maintain one initial funding has ended.

Multi-strategy: Health promotion initiatives should use a variety of approaches, including policy development, organisational change, community development, legislation, advocacy, education and communication, in combination with one another.

The field of evaluation has been enriched by contributions from many disciplines and professional activities, each leaving profound imprint. These imprints come from the field of education, the social sciences, and the health sciences, but evaluation has also been an important issue outside the academic world. The Planning-Programming-Budgeting –System is an attempt to rationalise government decision-making about social programme issues. This is also a key-issue for the European Commission (Nagarajan and Vanheukeien 1997), and their production of instructional manuals on evaluation. They have made models of intervention logic's and key evaluation issues relating them to each other at different levels.

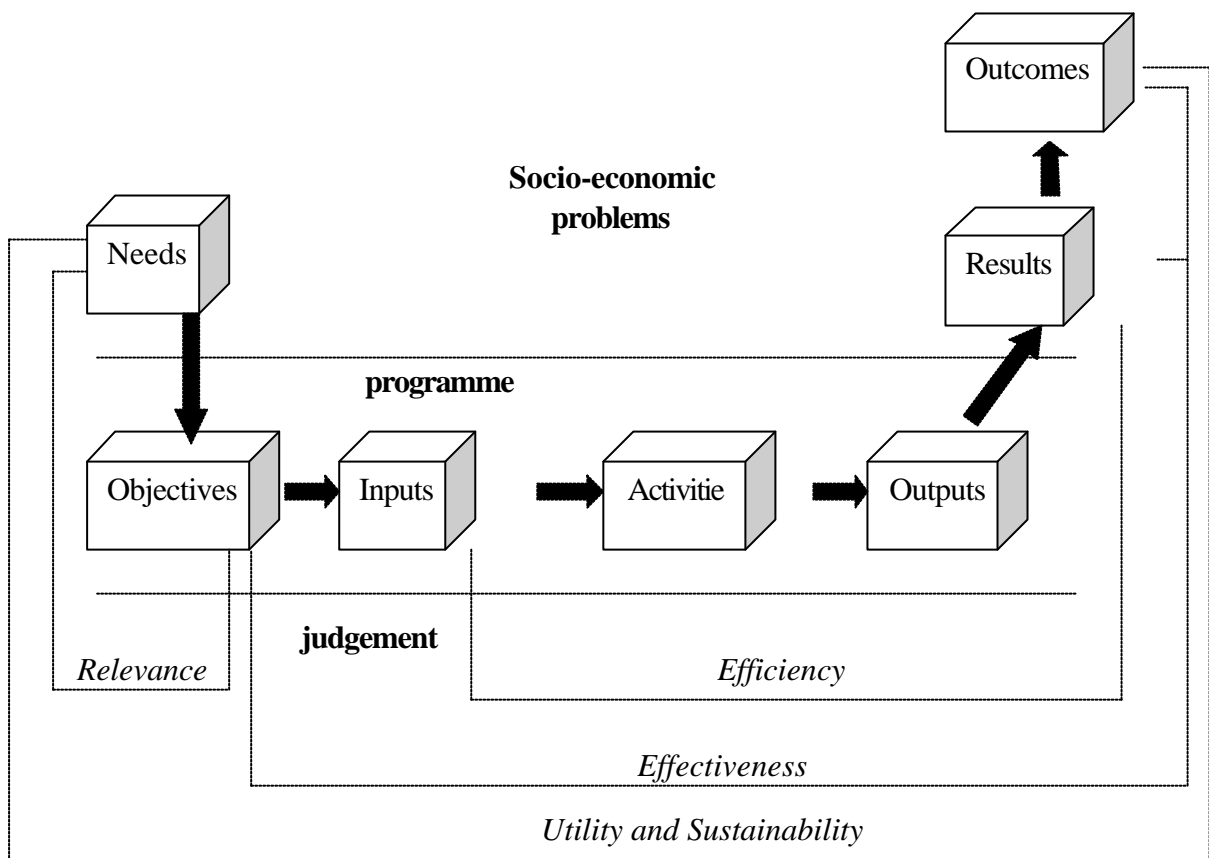


Figure 1 *Key evaluation issues based on an intervention logic of a programme.* (After Nagarajan and Vanheukeien 1997)

According to Nagarajan and Vanheukeien (1997) it is almost impossible to arrive at a single definition of evaluation, instead they suggest some crucial elements, which should normally characterise evaluations:

- evaluations should be analytical – they should be based on recognised research techniques;
- evaluations should be systematic – they require careful planning and consistent use of the chosen techniques;
- evaluations should be reliable – the findings of an evaluation should be reproducible by a different evaluator with access to the same data and using the same methods of data analysis;

- evaluations should be issue-oriented – evaluations should seek to address important issues relating to the programme, including its relevance, efficiency and effectiveness; and
- evaluations should be user-driven – this just means that successful evaluations should be designed and implemented in ways that provide useful information to decision –makers, given the political circumstances, programme constraints and available resources

Even if evaluation is a wide-ranging concept, in practice the interventions could be found at one or more of the following levels: *Project* – a single, non-divisible intervention with a fixed time schedule and dedicated budget; secondly a *programme* which is a set of organised but often varied activities (a programme may encompass several different projects, measures and processes) directed towards the achievement of specific objectives. Programmes also tend to have a definite time schedule and budget; and thirdly *policy* which is a set of activities, which may differ in type and may have different direct beneficiaries, which are directed towards common general objectives and goals. Unlike projects and programmes, a policy is usually not delimited in terms of time schedule or budget.

Programmes are always conceived with a given set of needs. These needs are the socio-economic problems which the programmes seek to address, expressed from the point of view of its particular target population(s), i.e. its intended beneficiaries. In order to tackle the socio-economic problems and address the needs of the target population, programmes pursue certain objectives (desired effects). For expenditure programmes, Nagarajan and Vanheukeien state, objectives can be expressed either in terms of

- *outputs* (the goods and services funded and directly produced by the programme);
- *impacts* (the socio-economic changes brought about by the programmes, thus the effects on the society).

To further emphasise this distinction: outputs are things the programmes produce, and impacts are the effects the program induces. Impacts can be further divided in

- *results* (the initial impact of the programme); and
- *outcomes* (the longer-term impact of the programme)

Three types of objectives correspond to the concepts of outputs, results and outcomes.

Operational objectives – are expressed in terms of outputs (e.g. to provide professional training courses)

Specific objectives are expressed in terms of results, which can differ for different target populations

General objectives are expressed in terms of outcomes.

In order to assess how a programme has met its various objectives we need indicators. An *indicator* is a characteristic or attribute, which can be measured to assess a programme in terms of output or impacts. They can be either quantitative or qualitative

An explanation of what the programme is supposed to achieve and how it is supposed to achieve it is called the *intervention logic* of the programme. The examination of the programme intervention logic is of central importance for most evaluations. The evaluator needs to ask how the inputs devoted to the programme lead to the various outputs, and how these outputs, in turn, lead to the

results and outcomes which are expected of the programme. In other words, how does the programme achieve its specific objectives, and how do the specific objectives contribute to the attainment of the general objectives?

As soon as the evaluator has described the programme and examined its intervention logic, he will typically move on to address several of the following key evaluation issues, related in figure 1.

Relevance – to what extent are the programme’s objectives pertinent in relation to the evolving needs and priorities at different levels

Efficiency – how economically have the various inputs been converted into outputs and results?

Effectiveness – how far have the programme’s impacts contributed to achieving its specific and general objectives?

Utility – how do the programme’s impacts compare to the needs of the target population(s)?

Sustainability – to what extent can the positive changes be expected to last after the programme has been terminated?

In Figure 1 there are three levels. The lowest level is that of judgement. Each of the above five issues is the responsibility of the evaluator using sound analytical techniques to arrive at judgements. The second level is that of the programme itself. The objectives behind programme are what motivate it. To meet these objectives, human and financial resources (inputs) are devoted to the programme, and are allocated to various programme activities. This process leads to the generation of good and services by the programme, which are the outputs. The highest level is that of socio-economic problems. It is at this level that we should consider the needs of the target population and the particular problems, which the programme is designed to address. The programme’s results and outcomes are placed at this level because they affect these needs and problems. The dashed lines in the figure indicate that the three levels are conceptually distinct from one another. For example, it may be difficult to identify what effects a programme genuinely causes and to separate these effects from the myriad of other influences on the socio-economic problems.

Lets return to the level of judgement, guided by Nagarajan and Vanheukeien (1997), and examine each of the key evaluation issues presented above. The importance of the relevance criterion is that it can lead to decisions about whether a programme should be allowed to continue in its current state, should be altered significantly, or merely allowed to lapse without being renewed. When examining the *relevance criterion*, the evaluator will typically be asking whether broad changes in society have altered the rationale for a programme, or may do so in future. The discussion of future relevance normally entails an examination of alternatives to the programme.

Efficiency thus compare inputs (resources) with the programmes outputs (the goods and services it provides) and results (its initial impact). An examination of efficiency involves asking: could the same benefits have been produced using less input? Alternatively, could the same inputs have produced

greater benefits? Discussions of efficiency necessarily entail comparison with alternatives to the programme.

An important point to bear in mind is that even if a programme is efficient, it can still be poorly designed, which take us to the discussion of *effectiveness* (comparing a programme's impacts with its objectives). It is worth remembering that in the case of poorly designed programmes, objectives may not have been stated sufficiently clearly or may even be missing. The evaluator may under these circumstance be called upon to transform vague or general goals into verifiable objectives. In addition, it must also be remembered that effectiveness is concerned with only one aspect of a programme's impact: the positive expected effects. A programme may also have positive, unforeseen effects as well as negative effects (both expected and unforeseen). If an evaluator want to go beyond effectiveness and assess the total impact of a programme, it is required to infer causality between it and the positive and negative, expected and unforeseen changes, which have come about. Attributing causality is a key problem in the design of evaluations. This brings us to the concept of *utility*, in which impact of a programme is compared with the needs, which gave rise to it. Programmes will only be useful if they manage to bring about changes in society which are beneficial given the needs of the target population. A particular problem with the concept of utility is that, given there is a multiplicity of different interest associated with public interventions, it is difficult to arrive at universally acceptable definitions of needs. This issue is discussed by Rootman et al. (1997) as a valuing component of evaluation. They argue that this has to be more addressed by evaluation thinkers and practitioners since first, social programmes are themselves value-laden. Second, because evaluation data are used to help decision-making that involves the distribution of social resources they bear value and ethical meanings. Third, data have to be interpreted to gain meaning. Theories about valuing can either be prescriptive or descriptive and the prescriptive theories promote particular values such as social justice, social equity and others.

Finally, *sustainability*, which is closely related to utility. Even if a programme generate benefits which are in tune with the needs of its target population, it may be of little value unless these benefits are still being enjoyed at some stage in the future. Sustainability is therefor concerned with what happens after a programme has been completed.

Another issue to consider is which individuals or groups who may have a legitimate interest in the evaluation. The term *stakeholders* is sometimes used to describe the various individuals and organisations who are directly and indirectly affected by the implementation and results of a given programme, and who are likely to have an interest in its evaluation (Nutbeam 1998). These stakeholders could be:

- Policy-makers and decision-makers;
- Those responsible for the evaluation of the programme;
- The target population of a programme;
- Programme managers and administrators; and
- Other individuals and groups with a legitimate interest in the programme.

In summing up Rootman et al (1997) say that *evaluation is about the systematic examination and assessment of features of a programme or other intervention in order to produce knowledge that can be used by different stakeholders for variety of purposes.*

References

Center for Disease Control. A Frame-work for Assessing the Effectiveness of Disease and Injury Prevention. Morbidity and Mortality Weekly report 1992;41:1–11.

Chelimsky E, Shadish W R (Eds.). Evaluation for the 21st Century. A Handbook. London: Sage Publications, 1997

Christenson G M, Dandoy S (Eds.) Research and Measurment in Public Health Practice. Preventive Medicine 1995; 11: supplement

Haglund BJA, Pettersson B, Finer D, Tillgren P. Creating supportive environments for health. Stories from the Third International Conference on Health Promotion, Sundsvall Sweden. Geneva: World Health Organization, 1996.

Hawe P, Degeling D, Hall J. Evaluating Health Promotion. A Health Workers Guide. London: MacLennan and Petty, 1990.

Jackson S, Aaron T, Badgley R, Boutilier M, Cava M, Hlibka C et al. A Conceptual Framework For Health Promotion research. Toronto: North York Community Health Promotion Research Unit, 1996

Macdonald G, Veen C, Tones K. Evidence for sucess in health promotion: suggestions for improvement. *Health Educ Res* 1996;**11**:367-76.

Macdonald G. Where next for evaluation? *Health Promot Int* 1996;**11**:171-3.

Nagarajan N, Vanheukeien M. Evaluating EU Expenditure Programmes. Ex post and Intermediate Evaluation. Luxembourg: European Commission, 1997.

Nutbeam D. Achieveing "best practice" in health promotion: improving the fit between research and practice. *Health Educ Res* 1996;**11**:317-26.

Nutbean D. Evaluating health promotion - progress, problems and solutions. *Health Promot Int* 1998;**13**:27-44

Pawson R, Tilley N. Realistic Evaluation. London: Sage Publications, 1997.

Robson C. Real World Research. A Resource for Social Scientists and Practitioner-Researchers. Oxford UK: Blackwell, 1997.

Rootman I, Goodstadt M, Potvin L, Springett J. Toward a Framework for Health Promotion Evaluation. Copenhagen: World Health Organization, Europe, 1997.

Rosén M, Örtendahl C. The Advantages of Health Promotion Practice is the Dilemma of Evaluation, (Folkhälsoarbetets fördelar är utvärderarens dilemma. Det subjektiva sunda förnuftet är en bra arbetspartner). Läkartidningen 1998;95:3742–4.

Sidell M, Jones L, Katz J, Peberdy A (Eds.) Debates and Dilemmas in Promoting Health. A Reader. London: The Open University, 1997.

Springett J., Practical Guidance on Evaluating Health Promotion. Copenhagen: World Health Organization, 1998.

Stachenko S, Jenicek M. Conceptual differences between prevention and health promotion: Research implications for community health programs. Canadian Journal of Public Health 1990;81: 53–9.

Towner EML. The role of health education in childhood injury prevention. Injury Prevention 1995;1:53–8.

WHO-Euro. WHO. Targets for health for all. Copenhagen: World Health Organization, Regional Office for Europe, 1985.

WHO. Declaration of Alma Ata. Geneva: World Health Organization, 1978.

WHO-Euro. WHO. Health for all targets - the health policy for Europe. Updated edition, September 1991. Copenhagen: World Health Organization, Regional Office for Europe, 1993.

WHO. Ottawa Charter for Health Promotion. Health Promotion International. 1986; 1: iii–v.

WHO. The Adelaide Recommendations: Healthy Public Policy. Health Promotion International. 1988;3:183–6.

WHO. Health Promotion – Challenges for the future. The WHO Health Promotion Project Outline. Copenhagen: World Health Organization, Regional Office for Europe, 1988.

WHO-EURO. Health Promotion Evaluation: Recommendations to Policymakers.
Copenhagen: World Health Organization, 1998.

Zwerling C, Daltroy LH, Fine LJ, Johnston JJ, Melius J, Silverstein BA. Design and Conduct of Occupational Injury Intervention Studies: A Review of Evaluation Strategies. *Am J Ind Med* 1997;**32**:164-79

2.2 The Development of the Biomedical oriented Cochrane collaboration

Biomedicine is considered to be based on a science on the art of intervening in the health of persons and populations. It has its basis in the successful quest for interventions that produce huge changes in the structure and function of cells, tissues, organs, and entire organisms, including humans and their societies. After the discovery that some of these art based interventions, developed and applied with the best of intentions, did more harm than good, health scientists developed powerful research methods for determining the efficacy and effectiveness of health interventions, culminating in the randomised controlled trial. Within the biomedical paradigm therefor the randomised trial is now the acknowledged gold standard for deciding whether a preventive, screening, diagnostic, therapeutic, rehabilitative, or even educational or administrative intervention does more good than harm.

Field by field, authoritarianism based on mere seniority is giving way to authoritativeness based on randomised trials. The commanding role of the randomised trial is seen in the striving of researchers to design them and granting bodies to support their execution, in the speed and prominence with which they appear in scientific journals and the lay press, in their incorporation into regulations of drug-licensing and other health care agencies, and in their currency at the bedside, in the boardroom, and in the corridors of health care institutions everywhere (Dowie 1996).

Too often, however, the results of randomised trials are ignored in providing health care; helpful manoeuvres often are omitted, and useless or even harmful interventions often are applied. The reasons for these failures are several, and important among them are the simple unawareness of trial results and the confusion that arises when several trials of the same manoeuvre provide individually inconclusive or conflicting results. To overcome this failure to provide evidence-based health care, a rapidly growing company of health care providers, consumers, and scientists have come together to engage in the "unselfish, collaborative enterprise of preparing, maintaining, and disseminating systematic, up-to-date reviews, by speciality, of all relevant randomised controlled trials of health care" (and, when they are not available, reviews of the most reliable evidence from other sources). This movement is called the Cochrane Collaboration (Chalmers 1993).

It is unreasonable to expect people such as clinicians, policy makers or patients who want reliable information about the effects of health care to unearth all the relevant evidence from reports of original research. These are far too numerous and too dispersed to be of practical use. Most people must rely on reviews of the primary research as a way of coping with the information overload confronting them. Reviews thus occupy a key position in the chain which should link the results of research at one end, to improved outcomes of health care at the other.

Unfortunately, the quality of reviews leaves much to be desired. This is because most reviewers do not approach their task systematically, with a respect for scientific principles, in particular, the control of biases and random errors. For example, most reviews of evidence about the care of patients with myocardial infarction have not reflected the strong evidence that has emerged in systematic reviews of the relevant RCTs . The poor quality of most reviews has meant that advice on some highly effective forms of health care has been delayed for many years, and that other forms of care have

been recommended long after controlled research has shown them to be either ineffective or actually harmful.

On the basis of shared interests and expertise in specific health problems, members in the Cochrane Collaboration are forming themselves into collaborative groups (called Collaborative Review Groups) that carry out exhaustive searches for all relevant trials, scrutinise these for their relevance and quality, assemble and analyse them, draw conclusions about how their net result should be applied in health care, and prepare structured reports for widespread dissemination to health care providers and planners (Goodman 1996).

The Cochrane Collaboration is thus an international network of individuals and institutions committed to preparing, maintaining, and disseminating systematic reviews of the effects of health care. In pursuing its aims, the Cochrane Collaboration is guided by six principles: collaboration, building on people's existing enthusiasm and interests, minimising duplication of effort, avoidance of bias, keeping up to date, and ensuring access.

These Collaborative Review Groups are assisted in each stage in their work by other elements of the Collaboration, co-ordinated by a world-wide network of Cochrane Centres. Through these centres, Collaborative Review Groups may be provided with extensive citations for potentially relevant trials (often assembled by teams of persons with special interests in a broad field of health care). They also are furnished a "tool kit" of scientific strategies and tactics for carrying out their reviews. Finally, they are provided with a wide array of multiple, co-ordinated approaches to the electronic and paper-based dissemination of their reports. Information about the Cochrane collaboration could be found on Internet at: <http://www.cochrane.dk/default.html>.

In Sweden the Swedish Council on Technology Assessment in Health Care (Statens beredning för utvärdering av medicinsk teknologi, SBU) is the national supported Cochrane centre. SBU have in 1994 published a review on Traffic accidents and also presented a report on Bone density measurements. In 1997 a review on prevention of Cardiovascular diseases was presented (SBU 1997), also including the assessment of community intervention strategies with quasi-experimental design.

References

Chalmers I. The Cochrane Collaboration: Preparing, maintaining, and disseminating systematic reviews of the effects of health care. *Ann NY Acad Sci* 1993;703: 156–65.

Cochrane collaboration on Websites: <http://www.cochrane.dk/default.html>.

Dowie J. Evidenced based, cost effective and preference driven medicine: decision analysis based medical decision making is the prerequisite. *J Health Serv Res Policy* 1996;1:104–13.

SBU 1997. Att förebygga sjukdom i hjärta och kärl genom befolkningsinriktade program - en systematisk litteratureöversikt. Stockholm: Statens beredning för utvärdering av medicinsk metodik (SBU-rapport nr134), 1997

2.3 Beyond the Randomised Control Trials

The economic climate in Europe and in other industrialised nations has created a critical attitude towards the constantly rising costs in the health sector. The above described Cochrane movement could be seen as an example in applying financial-economic concepts effect, effectiveness, and even cost-effectiveness and efficiency to health services. In many parts of the world preventive activities have gained political relevance due to the presumed cost-saving role on the development of health care costs. At the same time, there is strong interest in the effectiveness of preventive activities in questions like: do these activities improve the health of the population, and consequently decrease the demand for health care services?

In clinical medical interventions a ranking procedure has been developed and used for the Cochrane procedures, described in the previous chapter (Table 2:1).

Table 2:1: Ranking Evidence from Strongest to Weakest

1. Large randomised controlled trials
2. Small randomised controlled trials
3. Non randomised trial with contemporaneous controls
4. Non randomised trial with historical controls
5. Cohort study
6. Case-control study
7. Cross-sectional study
8. Surveillance (e.g. databases)
9. Series of consecutive cases
10. Single case report (anecdote)

The critical question is whether the described way of finding best evidence also is appropriate for evaluation of prevention and health/ safety promotion interventions (Macdonald 1996, Macdonald et al. 1996, Green & Tones 1999). Obviously it is very seldom that preventive actions can be assessed in terms of efficacy, the results produced under ideal conditions, but as effectiveness i.e. interventions deployed under routine practice or everyday situations. This is especially true when discussing community action for health and safety promotion (Weinehall 1998).

It is in spite of the difficulties important to develop instrument for reviewing the effectiveness of prevention and health promotion activities (Nilsson et al. 1998). Some European efforts have been implemented during the last years. The first was a European -wide project called "*Improvement of the effectiveness of health education and health promotion*" carried out by the Regional Office for Europe of the International Union for Health Promotion and Education, in close co-operation with the Dutch Centre for Health Promotion and Health Education, supported by the European Commission. The aim of this project was to gather and store available information from evaluation studies on effectiveness of health promotion and health education, and to improve the accessibility of these data (Towner 1994).

Although issues related to the evaluation of comprehensive community programmes have been discussed in the evaluation literature since the 1970's, it is first in the end of the 1980's after the large scale US heart health programmes, that epidemiology, public health, and health promotion journals started publishing papers in which issues concerning evaluation of community health promotion programmes were debated. Since community programmes are complex interventions involving many community actors from a variety of backgrounds with diversified interest many issues are raised regarding this type of studies (Green & Tones 1999). In their framework of health promotion evaluation Rootman et al. (1997) claim that the increasing complexity of health (and safety) promotion interventions also poses considerable methodological challenges for health promotion, and *a key challenge is to determine what is the optimal intervention package and what is the efficacy of its individual parts.*

The International Working Group (IWG) on Evaluating Health Promotion Approaches has questioned the biomedical perspective of the Cochrane groups and suggested based on conclusions recommendations for the evaluation of health promotion initiatives (WHO 1998, Springett 1998). These are to "Encourage the adoption of participatory approaches to evaluation that provide meaningful opportunities for involvement by all of those with a direct interest in health promotion initiatives. A minimum of 10% of the total financial resources for health promotion initiatives should be allocated to evaluation. Because of the complexity of health or safety promotion initiatives they require evaluations in terms of their processes as well as their outcomes". They also suggest that "the use of randomised control trials to evaluate health promotion initiatives is, *in most cases, inappropriate, misleading and unnecessarily expensive and therefor suggest to support the use of multiple methods to evaluate health promotion initiatives, and support further research into the development of appropriate approaches to evaluating health promotion initiatives*".

The recommendations thus consider the conceptual issues of health and safety promotion and their implications for evaluation. One of the issues concerns health promotion's emphasis on "*empowerment*". Empowerment evaluation provides additional insight into this new evaluation approach, including information about how to conduct workshops to train programme staff members and participants to evaluate and improve programme practice (Fetterman et al. 1996). Empowerment evaluation is the use of evaluation concepts, techniques, and findings to foster improvement and self-determination. It employ's both qualitative and quantitative methodologies.

Another conceptual issue is *participation*. Also regarding this concept there has been recent development. Participatory research calls for the active involvement of, and often control by, those people who would be among the objects of beneficiaries of the research. Their roles should include defining the questions, controlling the process, and interpreting the findings, ideally as originators, proponents and executors of the research. (Green et al. 1995). Recently, some progress has been made in developing community-based storytelling using structured narratives as an approach to evaluation in health promotion. This was one basis for the handbook on creating supportive environments for health at the 3rd International Conference on health promotion in Sundsvall, 1991. (Haglund et al. 1996). This has been further developed since then by Feather and Labonte (1996).

Other health promotion concepts including "capacity building", and "control" also pose challenges for evaluation. These and other concepts are in their early stages of development, making them elusive for evaluation purposes, requiring the development of new research procedures and technologies. (Rootman et al 1997, Frohlich and Potvin 1999).

Finally, some reflections on effect and effectiveness in the injury field. In order to develop effective interventions for the prevention of e.g. injury to children, we need a better understanding of the antecedents of accidents, the environments in which injuries are produced, and the behaviours – of planners, architects, drivers and others, as well as of children and parents – which make accidents more likely (Roberts 1997). Recently it has been demonstrated an increase in the UK in socio-economic inequalities in child injury deaths. If this trend persists, the Health of the Nations target on accidents is likely to be met for children in the non-manual classes, but not for those children from the manual classes who are at greatest risk. Against this, Roberts (1997) argues, we need well conducted qualitative research that enables us to explore why, rather than how often phenomena occur, and can give us insight into what those on the receiving end of accident prevention initiatives make of them. Without this understanding and without understanding the social worlds in which child accidents take place, we are unlikely to progress far in effective prevention. She suggests a number of qualitative methods in exploring child accidents like focus group interviews, observational methods, structured and semi-structured interviews and case studies. Then she concludes. *In the area of child accidents, we cannot hope to devise effective prevention procedures without drawing on the reservoir of local knowledge that ordinary children and adults living in unsafe communities can share with us. The really interesting question about child accidents is that given all the dangers, how do so many people manage to keep their children safe in unsafe environments? Only qualitative data can help us unravel this.*

References

- Feather J, Labonte R.* Handbook using stories in health promotion practice. Ottawa: Health Canada, 1996.
- Fetterman DM, Kaftarian SJ, Wandersman A (Eds.).* Empowerment evaluation. Knowledge and Tools for Self-Assessment & Accountability. London: Sage publications, 1996.
- Frohlich K L, Potvin L.* Health Promotion through the lens of population health: toward a salutogenic setting. *Critical Public Health* 1999; 3: 211-22
- Green LW, George MA, Daniel M, Frankish CJ, Herbert CJ, Bowie WR, O'Neill, M.* Study of Participatory Research in Health Promotion. Review and Recommendations for the Development of Participatory Research in Health Promotion in Canada. Vancouver: University of British Columbia, Institute of Health Promotion Research, 1995.
- Green J, Tones K.* Towards a secure evidence base for health promotion. *Journal of Public Health Medicine* 1999; 21: 133-9
- Haglund BJA, Pettersson B, Finer D, Tillgren P.* Creating supportive environments for health. Stories from the Third International Conference on Health Promotion, Sundsvall, Sweden. Geneva: World Health Organization, 1996.
- Macdonald G.* Where next for evaluation? *Health Promot Int* 1996;11:171–3.
- Macdonald G, Veen C, Tones K.* Evidence for success in health promotion: suggestions for improvement. *Health Educ Res* 1996;11:367–76.
- Nilson P, Isacson Å.* Även preventionen bör vara evidensbaserad. *Prevention och folkhälsoarbete i primärvården. Läkartidningen* 1998;95:1810–5.
- Roberts H.* Qualitative research in interventions in injury. *Arch Dis Child.* 1997; 76 (6) 487-9
- Rootman I, Goodstadt M, Potvin L, Springett J.* Toward a framework for Health Promotion Evaluation. Copenhagen: World Health Organization, Europe, 1997.
- Springett J.* Practical Guidance on Evaluating Health Promotion. Copenhagen: World Health Organization, Europe, 1998.
- Towner E M L.* Unintentional injuries in childhood. A review of the effectiveness of health education and health promotion. Utrecht: NIGZ, 1994

Weinehall L, Janlert U, Asplund K, Wall S. Folkhälsoarbetet behöver nya utvärderingsmodeller. Primärvårdsstödda program når djupare än storskaliga kampanjer. *Läkartidningen* 1998;95:3812–6.

WHO-EURO. Health Promotion Evaluation: Recommendations to Policymakers. Copenhagen: World Health Organization, 1998

Zwerling C, Daltroy LH, Fine LJ, Johnston JJ, Melius J, Silverstein BA. Design and Conduct of Occupational Injury Intervention Studies: A Review of Evaluation Strategies. *Am J Ind Med* 1997;32:164–79.

2.4 Concepts and definitions of Injury Prevention and Safety Promotion

Generally speaking there is the same contradiction between the concepts of *injury prevention* and *safety promotion* as between disease prevention and health promotion. The starting point of injury prevention is an outcome of a process where the medical view decides the prevention activities in the same way as in disease and disease prevention. However, safety as well as health is a much broader concept and safety promotion is based in the society and community and how the individual or populations understand the concept of safety and what measures need to be taken. Such actions might lead to prevention of injuries or might not.

Because health and *safety is a fundamental right of human beings*, safety is also a prerequisite to the maintenance and improvement of the health and welfare of a population. It is a fundamental need of human beings.

Safety can be defined as a state or situation characterised by an adequate control of physical, material or moral threats and which contributes to a perception of being sheltered from danger (Andersson & Svanström 1998).

Thus safety cannot be defined in absolute terms. Safety is a dynamic state. Safety is not merely the absence of injuries or threats. Safety should not be narrowed down to injury.

Safety promotion can be defined as a process that aims to provide populations the means to ensure the presence and maintain the conditions that are necessary to reach and sustain an optimal level of safety. This has a strong parallel to the earlier presented definition of health promotion by Stachenko and Jenicek (1990): "The process of enabling individuals and communities to increase control over the determinants of health and safety and thereby improve their health".

Safety promotion is all organised efforts by individuals, organisations and communities to achieve that ultimate goal. Structural as well as attitudinal and behavioural changes all aim at creating sustained *supportive environments for safety*.

By environment we mean not only the physical but also the social, cultural, technological, politic, economic and organisational environment. Changing attitudes and behaviours of man is not a goal in itself but merely a means to achieve an environment and social structure where safety is built in.

In practise, on the road to achieve that goal, man has used a combination of efforts like safety promotion, injury prevention, treatment and rehabilitation. The choice of *one* approach over the other is important. Structural and environmental change demands a democratic work, both participatory and representative, and can be more demanding than the choice of organising treatment and rehabilitation after lack of real safety leading to injury or environmental or machine damages.

If injury prevention is the main entrance into this area of practise there is nowadays a distinction between non-intentional as intentional injuries. *Non-intentional injuries* are caused by a process with no intent to harm or destroy human beings or machinery or environment. Very common expressions for these events are still accidents. The term accident is widely used around the world in

spite of the connotation that it leaves a room for superstition and the idea that nothing can be done. *The intentional injuries* are either directed towards others, the often-used expressions for these events are violence. Other types of events are directed towards the subject itself, often expressed as self-inflicted injuries where there is a suicidal attempt or even a completed suicidal death.

If the entrance to this area is from the safety promotion side this is a very broad concept including both safety and security. This concept has the same closeness to well being as the health concept.

For practical reasons there are many attempts in the world to bring safety promotion and injury prevention together, sometimes injury prevention is included in the concept of safety promotion. There are even a number of attempts to, based on classification of the very injury itself, go backwards and classify the environments where these events happened as well as the process under which this happened. This is a more operational medical based model where however the work itself is left to individuals, organisations, communities or society to organise the prevention. The more involvement of the community and its network the stronger is the input of individuals and organisations, which immediately leads to a work based on a broader safety concept.

The idea of an *evidence-based safety promotion* is based on the closeness between the concepts of injury prevention and safety promotion. Evidence-based safety promotion the way it has been documented so far is always related to a defined outcome. We have not been able to identify any studies of scientific character where the outcome is a feeling of safety among individuals or populations. Most outcomes are defined as injuries or lack of injuries or change of injury incidence.

Although it is the opinion of the authors of this chapter that the safety promotion approach in essence is contradictory to an injury prevention approach the very questions behind evidence-based intervention is that there is such a link between safety promotion and outcome in injury incidence rates. In safety promotion evaluation you will be able to collect the information from evaluations and research done with different approaches in order to create a broader understanding of the reality of safety promotion. This means that population study without controls and even case studies might have a value in that understanding.

In order to develop effective interventions for the prevention of e.g. injury to children, we need a better understanding of the antecedents of accidents, the environments in which injuries are produced, and the behaviours - of planners, architects, drivers and others, as well as of children and parents - which makes accidents more likely (Roberts 1997). We need well conducted qualitative research where the neighbours are asked to explore *why* rather than how often phenomenon occur, and can give us insight into what those on the receiving end of accident prevention initiatives make of them. Without this understanding and without understanding the social worlds in which child accidents take place, we are unlikely to progress far in effective prevention. *"In the area of child accidents, we cannot hope to devise effective prevention procedures without drawing on the reservoir of local knowledge that ordinary children and adults living in unsafe communities can share with us. The really interesting question about child accident is that given all the dangers, how does so many people manage to keep their children safe in unsafe environments? Only qualitative data can help us unravel this."*

References

Andersson R & Svanström L. Critical Factors Required for the Successful Mobilisation of Communities to Enhance Safety. Manuscript prepared for Seminar on Safety and Safety Promotion: Conceptual and Operational Aspects. Château Frontenac, City of Quebec, Canada. February 5 and 6, 1998. Karolinska Institutet, Department of Public Health Sciences, Division of Social Medicine, 1998.

Robersts H. Qualitative research in interventions in injury. *Arch Dis Child.* 1997; 76;6:487–9.

Stachenko S, Jenicek M. Conceptual differences between prevention and health promotion: Research implications for community health programs. *Canadian Journal of Public Health* 1990;81:53–9.

2.5 Theories and Models of Injury Prevention and Safety Promotion

A number of conceptual models and frameworks have been presented basically aiming at analysing injury-producing events. In searching for evidenced-based safety promotion the model chosen will guide you to find relevant knowledge. Most efforts have their root in a model developed by William Haddon. "The Haddon Matrix" analyses injuries according to three phases and three factors. The phases of injury are chronological; pre-event, event, and post-event. The three factors correspond to the host-agent-environment model, well known in epidemiological research and public health work. The host is the human factor the driver of a car, a pedestrian, or a child playing in a hazardous environment. The agent refers to the energy transmitting vehicle, motorcycle, pot of boiling water. The environment includes both the physical environment (road, factory, residence) and the social environment (enforcement of speed limit laws, social acceptability of firearms) (Berger and Mohan 1996). Any type of injury can be analysed by this model, and it can be used for analysing both risk factors and possible interventions. In table 2: 2 an example is presented for motor vehicle crashes and its potential preventive measures. In table 3:2 the matrix is used for analysing the potential preventive measures for motor vehicle crashes.

Table 2:2 The "Haddon Matrix"

		Factors		
		Human	Vehicle and Equipment	Environment
Phases	Pre-crash			
	Crash			
	Post-crash			

After Berger and Mohan 1996

In addition to the matrix, Haddon has also developed ten strategies for injury control and accident prevention emphasised on technological modification to reduce injuries. Two examples of the use of the strategies are presented for Injury to motor vehicle occupants in table 2:3 and for the development of surveillance on farm-work-related accidents, in table 2:4. The farm-work example also presents the possibilities for outcome levels when building a surveillance system in order to measure effects (Jansson 1987).

The "Haddon Matrix" a model for guiding the analysis of motor vehicle crashes and potential preventive measures

Factors

		Human	Vehicles and Equipment	Physical Environment	Socio-Economic Environment
Phases	Pre-crash	Alcohol Impairment	Deficient Brakes	Road Lights	DWI Laws
	Crash	Seat Belt Use	Size of Car	Break-away Sign Post	Seat Belt Laws
	Post crash	Severity of Bleeding	Post-crash Fires	Access to Crash Sites	Emergency Medical Response
	Losses	DAMAGE TO PEOPLE	DAMAGE TO VEHICLES & EQUIPMENT	DAMAGE TO PHYSICAL ENVIRONMENT	DAMAGE TO SOCIETY

Table 2:3.

Table 2:4. Example of use of Haddons 10 Basic Strategies for reducing injuries and deaths adapted for injury to motor vehicle occupants (After Berger and Mohan 1996).

	Strategy	Example
(1)	Preventing the marshalling of potentially injurious agents or reducing their amounts	Alternative travel modes; reduction in speed limits and speed capabilities of cars
(2)	Preventing inappropriate release of the agent	Vehicle and road designs that simplify driver's task
(3)	Modifying release of the agent	Use of seat-belts, to decelerated occupant with vehicle.
(4)	Separating in time or space or with physical barriers	Restricting transport of hazardous materials to certain times and places; highways medians.
(5)	Modifying surfaces and basic structures.	Airbags to spread forces over wide area of body; removing projections in car.
(6)	Increasing resistance to injury.	Therapy for osteoporosis
(7)	Emergency response or medical care and rehabilitation	Systems that route patients to appropriately trained physicians.

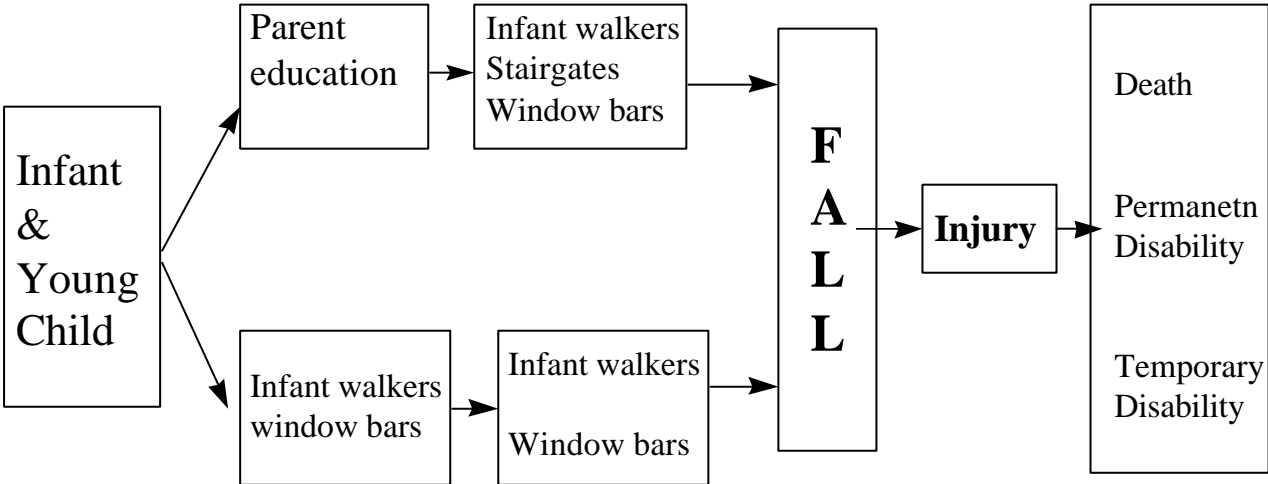
Table 2:5. Injury surveillance on farm-work related accidents by category and data (After Jansson 1987)

Category	Data
Farm structure	farm size, production, profitability
Supervision and safety work	Safety inspections, membership of the Swedish farmners Safety and Prevetntive Associati0onn, safety instructions
Works Organisation	Working alone, working hours, hours worked at time of accident
Environment	Time, place , weather
Host factors	Age, sex, work experience, fatigue, permanent or temporary disability, main occupation, alcohol, drugs, accident repeaters
Contributory factors	Unsuitable methods of working, failure to use personal safety equipment, deficient inspections, haste, safety device lacking, design deficiency
Sequence of events (pre-injury and injury phase)	Activity, bodily motion, triggering agent, triggering event, physical energy, injurious agent, injurious event
Injuries	Diagnosis, part of body, severity
Treatment (post-injury phase)	Outpatient and inpatient care, medical treatment,

In the international efforts using the Cochrane methods the Harborview Injury Prevention and Research Centre (HIPRC) has developed models for systematic reviews of literature based on the Haddon principles. It can be seen at <http://weber.u.washington.edu/~hiprc/childinjury/>. At present the most extensive reviews on evidenced-based injury prevention and safety promotion on Internet.

One example adapted to prevention of falls among children is presented in figure 2:1. Under the result section a more extensive example is presented on bicycles accidents intervention.

Figure 2:1 Evidence model for Prevention of Falls among children (After Seattle web page)



References

Berger LR, Mohan D. Injury Control. A Global View. Dehli: Oxford University Press, 1996

Jansson B. The Yield of Systems for Continuos and Periodic Injury Surveillance in Emergency Care with Emphais on Farm-work-related Accidents. Scand J Soc Med 1987;15:247-52.

3. MATRIX OF AN EVIDENCED-BASED INJURY PREVENTION AND SAFETY PROMOTION MODEL

Based on the theories and models, and in order to have literature on different types of interventions organised, a framework was developed. This framework for the presentation of the "Evidenced Based Safety Promotion" is a model or matrix including intervention areas and intervention levels, presented in figure 3:1. The NOMESCO classification of external causes of injuries (1997) has been used for the areas of intervention including 1. Reasons for contacts and 2. Place of occurrence. 3. Age groups, 4. Gender, 5. Social groups, 6 Ethnicity and 7. Products, Economics, Models etc. The following levels have been used: Individuals/group, organisation, community and nation. Also the interventions can be mono factorial or multi-factorial concerning the components of the intervention at each level. The same article describing a certain type of intervention can however be classified in several parts of the matrix.

Figure 3: 1 Matrix of Evidenced Injury prevention and Safety promotion

Intervention area	Intervention level							
	Group		Organisation		Community		Nation	
	Monof.	Multif.	Monof.	Multif.	Monof.	Multif.	Monof.	Multif.
1.CONTACT								
1.1 Accident								
1.2 Violence								
1.3 Int Self-harm								
1.4 Legal intv'n								
1.5 Other								
2.PLACE OCC.								
2.0 Transport								
2.1 Residential								
2.2 Production								
2.3 Retail etc								
2.4 School,public								
2.5 Sports								
2.6 Amusement								
2.7 Open nature								
2.8 See,lake,river								
2.9 Other								
3. AGE GROUP								
3.0 Children								
3.1 Adolescents								
3.2 Adults								
3.3 Elderly								
3.4 Other								
4. GENDER								
4.1 Females								
4.2 Males								
5. SOCIAL G.								
5.1 Low								
5.2 Middle								
5.3 High								
5.4 General								
6. ETHNIC								
7. OTHER								
7.0 Products								
7.1 Economics								
7.2 Models								
7.3 Prognoses								
7.4 Time-series								
7.5 National diff.								

7.7 Alcohol								

Reason for contact includes Unintentional accidents, Violence, intentional self-harm and legal interventions or operations of war.

Place of occurrence include the transport area, the residential area or the housing conditions, production and workshop area including e.g. farm, forest, factory, buildings, etc. Retail, commercial and services area, Schools, institutional and public premises e.g. buildings and offices accessible to the public, hospitals, and nursing homes. Sports areas could be sportshall, racetrack, indoor ice rink or other outdoor sports areas. Amusement, entertainment and park area is exemplified as restaurants, cafeterias, dance hall, theatre, playground in park area, public gardens. Open nature is uncultivated land, beaches, camping sites, and military training area. Sea, lake, river and other unspecified areas are the final places of occurrence.

References

Nomesco. NOMESCO Classification of External Causes of Injuries Third revised edition. Copenhagen: Nordic Medico Statistical Committee 48:1997.

4. METHODS IN SEARCHING FOR LITERATURE

The strategy used for collecting the evidences on effect and effectiveness of injury prevention and safety promotion have been firstly to identify relevant literature by a search of computerised databases of the period of 1994 to 1997, citation in identified papers and previous reviews. The years were set since international reviews tended to be seen in international scientific literature after 1994.

Secondly, a number of international research centres on safety promotion were identified and contacted by e-mail with a request on, on—going or recently published systematic reviews in the field. Through Internet and requests on discussion lists thus an additional numbers of international groups currently working with systematic reviews were identified and contacted. Further hand searching has in addition been implemented.

In spite of our criticism of the Cochrane groups we have taken the advantage of their work presenting reviews on accident and injury prevention interventions until the Cochrane Library, 1998 Issue 1.

The material selected has been classified to the different parts of the matrix of the safety promotion model. Every "article" has its identification number and the "Get a Ref TM" programme has been used to build a database.

5 RESULTS

In this chapter first, classified articles are presented within the framework of the Matrix of Evidenced Injury prevention and Safety promotion. Second, headlines and examples of articles could be seen providing a flavour what is in the "Get a Ref" database.

5.1 Classified articles using the matrix

In the Matrix in chapter 3 the safety promotion model presented earlier is used for classification of the articles and books. At this stage a total of 345 "articles" has been selected and classified. Below some examples are presented from different parts of the matrix. Examples from "Get a Ref" print outs are presented in appendix 1.

Figure 5: 1 Matrix of Evidenced Injury prevention and Safety promotion

Intervention area	Intervention level								
	Group		Organisation		Community		Nation		
	Monof.	Multif.	Monof.	Multif.	Monof.	Multif.	Monof.	Multif.	
1.Contact									
1.1 Accident	1,2,3,4,5,6,8,9,13,15,16,17,18,22,23,24,25,26,29,30,31,32,33,34,35,39,40,43,45,46,47,49,57,59,62,63,65,99,100,101,111,112,113,115,116,117,118,119,123,127,128,134,135,136,143,144,145,146,147,153,154,180,181,183,184,185,187,188,189,192,195,197,198,199,201,202,208,209,245,250,263,266,	1,2,3,10,14,15,16,17,20,21,27,29,30,32,33,36,42,45,46,49,50,56,62,65,108,124,125,126,132,133,148,149,150,151,155,156,182,200,203,204,205,206,207,208,210,213,214,215,244,247,248,249,336,341	1,2,3,8,15,16,17,29,30,32,33,40,47,49,62,64,65,119,123,127,128,181,208,281,289,310,318,	1,2,3,15,16,1,7,19,2,7,29,3,0,32,3,4,41,4,9,62,6,5,68,8,6,87,120,121,125,126,129,130,131,161,182,190,191,193,194,205,	1,2,3,1	1,2,3,8	1,2,3,15,16,17,29,30,41,4,26,29,2,48,49,30,36,50,37,38,52,53,62,47,49,86,87,8,8,89,90,91,92,93,94,95,96,98,99,102,108,109,110,114,125,182,186,210,248,249,319,328,330,331,332,340,	1,2,3,6,7,9,11,12,15,16,17,24,29,47,49,55,56,57,59,62,65,100,101,186,205,214,248,249,281,	1,2,3,16,17,2,6,17,2,9,49,58,65

	268,269,271, 273,277,278, 280,281,282, 283,284,286, 287,288,289, 290,291,292, 295,296, 310, 312,313,314, 323,324,325, 344			208, 211, 212, 214, 215, 244, 248, 249, 251, 285, 293, 294, 296, 321, 322, 329, 333, 334, 337, 339, 342				
1.2 Violence	65,66,113, 156, 157,158 ,160	159,162, 163,165, 166,167, 168,171, 173,174, 175,176, 177,178, 179,244, 336	66,157 ,158	159, 163, 164, 168, 169, 170, 171, 172, 211, 244, 272	66	98,164, 167		
1.3 Intentional Self-harm	28,69,70,71, 72 ,73 ,74,75, 76, 78, 80,81, 137,138 ,141, 142,216,217, 218,219,220, 221,222,223, 224,225,226, 227,228,229, 231,232,233 , 234,235,236, 237,238, 239, 240, 241,242,	69	77,78, 79,82, 83, 84,85, 86,218 ,221, 225, 226, 231 , 234, 301, 306, 307,	69,139 ,140, 297, 298	69,82, 246	69,142	69,	

	243,246,274, 275,276,299, 300, 301,303, 304,305, 308,		309					
1.4 Legal intervention								
1.5 Other								
2.PLACE of OCCURANCE.								
2.0 Transport	1,2,3,5,15,16, 17,18,24,25, 29,30,32,47, 49,57,59,62, 99,100,101, 112,115,117, 118,127,128, 143,144,145, 146,147,153, 154,180,195, 198,208,250, 263,268,269, 277,278,279, 281,282,289, 313,323,324, 345	1,2,3,15, 16,17,20, 21,27,29, 30,32,49, 56,62,133 148,149, 150,151, 155,156, 205,208, 247,248, 249,336	1,2,3,1 5,16,1 7,19,2 9,30, 32,47, 49,62, 127, 128, 208, 281, 289	1,2,3,1 5,16,1 7,27,2 9,30,3 2,48,4 9,52 ,53,62 ,86,87, 129, 130, 131, 193, 205, 208, 248, 249, 251, 321, 334, 337, 342	1,2,3,1 5,16,1 7,29,3 0,47,4 9,55,6 0,61,6 2, 129, 152, 191, 289, 311, 316, 317	1,2,3,15, 16,17,29 ,30,48,4 9, 52,53,62 ,86,87,8 8, 90,91,92 ,93,95,9 9, 109,110 114,248, 249	1,2,3,7, 15,16,1 7,29, 47,49,5 5, 56,57,5 9, 62, 100, 101, 248, 249, 281	1,2,3,1 5,16,1 7,24,2 9, 49,62, 205
2.1 Residential	1,2,3,4,6,8,13 ,14,15,16,17, 18,24,29,30, 32,33,34,35, 40,62,113, 119,123,181, 192,202,208, 209,266,271, 280,281,283, 289,290,292, 295,296,344	1,2,3,10, 15,16,17, 20,27,29, 30,32,33, 42,50,62, 124,125, 126,132, 182,203, 205,208, 210,214, 215,244, 248,249, 336	1,2,3,8 ,15,16, 17,29, 30,32, 33,35, 36,40, 62,86, 119, 123, 181, 208, 281, 289,	1,2,3,1 5,16,1 7,27,2 9,30,3 2,33,4 1,62, 87,120 ,129 121, 125, 126, 182, 194,	1,2,3,8 ,15,16, 17, 29,30, 36,37, 38,62, 86, 186, 289	1,2,3,15, 16,17,29 ,30,41,4 2, 50,62,87 ,88,90,9 4, 95,98, 109,110, 125,182, 248,249, 319,330, 331,332	1,2,3,6, 9, 11,12,1 5, 16, 17,24,2 9, 62, 102, 186, 248, 249, 281	1,2,3,1 5,16,1 7 ,29,62, 205 214

			296	205, 208, 211, 212, 214, 215, 244, 248, 249, 285, 293, 333,				
2.2 Production	3,65,100,101, 135,183,185, 187,188,189, 281,286,287, 310,312,314, 315	3,65,151, 200,204, 207,249	3,64, 65,281 ,310, 318,	3,65, 87,261 ,294, 322, 339, 343	3,310, 314, 315, 316, 317	3,87,88, 90,91, 100,101 109,110, 152	3,267,2 81	3
2.3 Retail etc	65	65	65	65				
2.4 School,public	1,2,62,134	1,2,62, 215,336	1,2,62, 86	1,2,62, 129, 215, 297, 329, 337	86	95,110		
2.5 Sports	1,2,3,16,17, 29,62,111, 113,134,135, 136,183,184, 185,196,197, 199,201,208, 281,288,289	1,2,3,16, 17,29,62, 206,208, 213,336	1,2,3,1 6,17,2 9,62, 86,208 ,281, 289	1,2,3, 16,17, 29,62, 208	3,16, 17,29, 62,86, 289	3,16,17 ,29,62,8 8,90,96, 98	29, 281	29
2.6 Amusement								
2.7 Open nature	1,2	1,2	1,2	1,2	1,2	1,2		
2.8 See, lake, river	1,2,17,22,23, 25,113	1,2,17,20, 336,341	1,2,17	1,2,17	2,17	2,17,340	1,2, 17	1,2,17
2.9 Other						90,94		
3. AGE GROUP								
3.0 Children	1,2,4,5,6,8,13 ,14,15,17,18, 22,23,24,25, 26,29,57,59,	1,2,10,15, 17,20,21, 27,29,62, 132,133,	1,2,8,1 5,17,1 9,29,6 2,127,	1,2,15, 17,27, 29,62, 68,86,	1,2,8, 15,17, 26,29, 55,62,	1,2,15,1 7,29,62, 86,89,91 ,92,93,9	1,2,6,7, 9, 11,12,1 5,	1,2,15, 17,29, 58 ,62

	62,99,108, 127,128,147, 181,192,195, 198,201,208, 245,263,289, 295,324,326, 345	148,149, 150,155, 156,162, 163,171, 182,208, 214,215, 244,248, 336,341	128, 181, 208, 289	120, 121, 163, 164 , 169, 171, 172 , 182 , 208 , 212, 214 , 215, 244 , 248, 285, 293, 297, 320, 337	129, 186, 289	4,98,99, 108, 109 ,110, 164,182, 248,319, 328,330, 331,340,	17,24,2 9, 55,57,5 9, 62, 186, 248, 335	
3.1 Adolescents	2,3,5,16,23, 25,29,66,116 117,118,134, 136,137,153, 154,156,157, 158,160 ,180, 185,187, 196, 197,199,201, 217,218,221, 229,231,234, 239, 240,241, 243 ,245,266 ,279,281,289,	2,3,16,29 ,167,168, 174, 205, 206,213, 247	2,3,16, 29,66, 157, 158, 218, 221, 231 , 234 , 281, 289	2,3,16, 29,129 ,130, 131, 139, 161, 167, 168 , 169, 170 , 172 , 190, 191 , 193, 194 , 205 , 272 , 307, 329, 334, 337, 342	2,3,16, 29, 66 , 289,	2,3,16,2 9,89,92, 98 ,319	2,3, 9,16,29 , 281	2,3,16 ,29 205
3.2 Adults	5,8,28,65,100 ,101,116,118, 135,136,137, 138,143,144,	65,159, 165,166, 173,174, 175,176,	64,65, 226, 310	65,140 ,159, 211, 225,	8,310,	89,91,92 ,93,98, 109,319, 331	100, 101	

7. OTHER								
7.0 Products	25,29,34,47, 57,62,65,69, 100,101,111, 127,128,188, 189,214,250, 263,269,278, 296, 336,344, 345		8,29,4 7,62,6 5,69, 127, 128, 214, 272, 296, 337,		8,29, 37,38, 47,55, 62,69. 129		2,7,9,1 1,12,17 ,29, 27 , 55,57,6 2, 69, 100, 101, 214	
7.1 Economics	3,28,29,49,63 142,209,259, 260, 262,263, 264,266,268, 269,270,271, 273,274,275, 276,277,278 , 279,280,281, 284,286,325,	3,14,29, 49,255,	3,49, 252, 253, 281,	3,49, 88,261 ,272, 320, 343	49	49,88, 256	49, 254 , 257, 258, 265, 267, 281	49
7.2 Models		67	65	51 52, 53,67, 343		51,52,53 ,67,103, 104,105, 106,107, 110,129, 340		51, 52, 53
7.3 Prognosis				52,53				52,53
7.4 Time-series				52,53, 54,86, 87,95	55,60	55,86, 87,89, 93,94 , 95 ,96 , 103,104, 105 , 328	55	52,53, 54,58
7.5 National differences	100			54		110	100, 101	54
7.7 Alcohol	114,115,116, 117,118,143, 144,145,146, 153,154,227, 232,245,247, 313			131		152,311		

7.8 Others	326,			343			335	
------------	------	--	--	-----	--	--	-----	--

5.2 Examples of articles with headlines in the database

5.1.1.1 Accident intervention at group level using mono-factorial design

Here some examples is presented on accident prevention to children and adolescents and directed towards one risk-factor like wearing bicycle helmets or preventing burns, e.g. from tap water.

Towner E, Dowswell T, Jarvis S. Reducing Childhood Accidents. The effectiveness of health promotion interventions: a literature review. London: Health Education Authority, 1993. (Acc # 1)

Towner E, Towner T, Simpson G, Jarvis S. Health Promotion in childhood and young adolescence of the prevention of unintentional injuries. London: Health Education Authority, 1996. . (Acc # 2)

Coleman P, Harper R, Kent G, Munro J, Nicholl JP, Wild D. The effectiveness of interventions to prevent accidental injury to adolescents and young adults aged 15-24 years: a review of the evidence. Sheffield: Sheffield Centre for Health and Related Research, University of Shefiled, 1990. (Acc # 3)

Katcher ML, Landry GL, Shapiro MM. Liquid_Crystal Thermometer Use in Paediatric Office Counselling About Tap Water Burn Prevention. *Paediatrics* 1989;**83**:766-71. (Acc # 4)

Thompson RS, Rivara FP, Thompson DC. A Case-control study of the effectiveness of bicycle safety helmets. *N Engl J Med* 1989;**320**:1361-7. (Acc # 5)

Erdmann TC, Feldman KW, Rivara FP, Heimbach DM, Wall HA. Tap water burn prevention: The Effect of Legislation. *Pediatrics* 1991;**88**:572-7. (Acc # 6)

McLoughlin E, Vinc CJ, Lee AM, Crawford JD. Project Burn Prevention: Outcome and Implications. *Am J Public Health* 1982;**72**:241-7. (Acc # 8)

Lawson GR, Craft AW, Jackson RH. Changing pattern of poisoning in children in Newcastle, 1974-81. *Br Med J* 1983;**287**:15-7. (Acc # 9)

Katcher ML. Prevention of Tap Water Scald Burns: Evaluation of a Mult-Media Injury Control Program. *AJPH* 1987;**77**:1195-7. (Acc # 13)

5.1.1.2 Accident intervention at group level using multi-factorial design

Ueland Ö, Kraft P. Safety measures taken by Norwegian mothers. *Inj pre* 1996;**2**:197-201. (Acc # 10)

Miller TR, Galbraith M. Injury Prevention Counselling by Pediatricians: A Benefit-Cost Comparison. *Pediatrics* 1995;**96**:1-4. (Acc # 14)

Towner EML. The role of health education in childhood injury prevention. *Injury Prevention* 1995;1:53-8. (Acc # 15)

Munro J, Coleman P, Nicholl J, Harper R, Kent G, Wild D. Can we prevent accidental injury to adolescents? A systematic review of the evidence. *Injury Prevention* 1995;1:249-55. (Acc # 16)

Downswell T, Towner EML, Simpson G, Jarvis SN. Preventing childhood unintentional injuries - what works? A literature review. *Injury Prevention* 1996;2:140-9. (Acc # 17)

Sundelin C, Rasmussen F, Berfenstam R, Troedsson K. Information through television: does it promote child safety? *Injury Prevention* 1996;2:36-40. (Acc # 20)

5.1.1.3 Accident intervention at organisational level using mono-factorial design

Munro J, Coleman P, Nicholl J, Harper R, Kent G, Wild D. Can we prevent accidental injury to adolescents? A systematic review of the evidence. *Injury Prevention* 1995;1:249-55. (Acc # 16)

Downswell T, Towner EML, Simpson G, Jarvis SN. Preventing childhood unintentional injuries - what works? A literature review. *Injury Prevention* 1996;2:140-9. (Acc # 17)

Effective Health Care. Preventing unintentional injuries in children and young adolescents. *Effective Health Care* [0167-871X] 1996;2:1-16. (Acc # 29)

Fildes B. Injuries Among Older People. In: Fildes B, editor. *Injuries Among Older People. Falls at home and pedestrian accidents*. Victoria: Vic Health Foundation Monograph Series, 1994. (Acc # 30)

Rubenstein LZ. Preventing Falls in the Nursing Home. *JAMA* 1997;278:595-6. (Acc # 32)

Ray WA, Taylor JOA, Meador KG, Thapa PB, Brown AK, Kajihara HK, et al. A Randomized Trial of a Consultation Service to Reduce Falls in Nursing Homes. *JAMA* 1997;278:557-62. (Acc # 33)

Oakley A. Preventing Falls and Subsequent Injury in Older People. *Effective Health Care* [0167-871X] 1996;2:1-16. (Acc # 40)

5.1.1.4 Accident intervention at organisational level using multi-factorial design

Towner EML. The role of health education in childhood injury prevention. *Injury Prevention* 1995;1:53-8. (Acc # 15)

Munro J, Coleman P, Nicholl J, Harper R, Kent G, Wild D. Can we prevent accidental injury to adolescents? A systematic review of the evidence. *Injury Prevention* 1995;1:249-55. (Acc # 16)

Downswell T, Towner EML, Simpson G, Jarvis SN. Preventing childhood unintentional injuries - what works? A literature review. *Injury Prevention* 1996;**2**:140-9. (Acc # 17)

5.1.1.5 Accident intervention at local community level using mono-factorial design

Schlesiger ER, Dickson DG, Westaby J, Lowen L, Logrillo VM, Maiwald AA. A controlled study of health education in accident prevention: the Rockland County Child Injury Project. *Injury prevention* 1996;**2**:218-23. (Acc # 26)

Effective Health Care. Preventing unintentional injuries in children and young adolescents. *Effective Health Care* [0167-871X 1996;**2**:1-16. (Acc # 29)

Tinetti ME, Baker DI, Garrett PA, Gottschalk CN, Koch ML, Horowitz RI. Yale Ficsit: Risk Factor Abatement Strategy for Fall Prevention. *J Am Geriatr Soc* 1993;**41**:315-20. (Acc # 36)

Gorman RL, Charney E, Holtzman NA, Roberts KB. A successful City-Wide Smoke Detector Give-a-way Program. *Pediatrics* 1985;**75**:14-8. (Acc # 38)

5.1.1.6 Accident intervention at local community level using multi-factorial design

Towner E, Dowswell T, Jarvis S. Reducing Childhood Accidents. The effectiveness of health promotion interventions: a literature review. London: Health Education Authority, 1993. (Acc # 1)

Towner E, Towner T, Simpson G, Jarvis S. Health Promotion in childhood and young adolescence of the prevention of unintentional injuries. London: Health Education Authority, 1996. . (Acc # 2)

Coleman P, Harper R, Kent G, Munro J, Nicholl JP, Wild D. The effectiveness of interventions to prevent accidental injury to adolescents and young adults aged 15-24 years: a review of the evidence. Sheffield: Sheffield Centre for Health and Related Research, University of Sheffield, 1990. (Acc # 3)

Towner EML. The role of health education in childhood injury prevention. *Injury Prevention* 1995;**1**:53-8. (Acc # 15)

Munro J, Coleman P, Nicholl J, Harper R, Kent G, Wild D. Can we prevent accidental injury to adolescents? A systematic review of the evidence. *Injury Prevention* 1995;**1**:249-55. (Acc # 16)

Downswell T, Towner EML, Simpson G, Jarvis SN. Preventing childhood unintentional injuries - what works? A literature review. *Injury Prevention* 1996;**2**:140-9. (Acc # 17)

Effective Health Care. Preventing unintentional injuries in children and young adolescents. *Effective Health Care* [0167-871X 1996;**2**:1-16. (Acc # 29)

Fildes B. Injuries Among Older People. In: Fildes B, editor. *Injuries Among Older People. Falls at home and pedestrian accidents*. Victoria: Vic Health Foundation Monograph Series, 1994. (Acc # 30)

Svanström L, Ader M, Schelp L, Lindström Å. Preventing femoral fractures among elderly: The community safety approach. *Safety Science* 1996;**21**:239-46. (Acc # 41)

Tinetti ME, Baker DI, McAvay G, Claus EB, Garrett P, Gottschalk M, et al. A Multifactorial intervention to reduce the risk of falling among elderly people living in the community. *N Engl J Med* 1994;**331**:821-7. (Acc # 42)

Sabey B. Engineering safety on the road. *Injury Prevention* 1995;**1**:182-6. (Acc # 48)

Graham JD. Injuries from Traffic Crashes: Meeting the Challenge. *Annu Rev Public Health* 1993;**14**:515-43. (Acc # 49)

Towner E, Simpson G, Jarvis S, Downswell T, Sowden A, Sheldon T, et al. Preventing unintentional injuries in children and young adolescents. *Effective Health Care [0167-871X]* 1996;**2**:1-16. (Acc # 62)

Svanström L, Ekman R, Schelp L, Lindström Å. The Community Approach of Preventing Childhood Injuries - Experiences from the Lidköping Accident Prevention Programme in Sweden. *Injury Prevention* 1995;**1**:169-72. (Acc # 86)

Svanström L, Schelp L, Ekman R, Lindström Å. Falköping, Sweden, ten years after: still a safe community? *International Journal for Consumer Safety* 1996;**3**:1-7. (Acc # 87)

Andersson L. (Det skadepreventiva arbetet i Motala Safe Community - en fallstudie.) The injury prevention in Motala Safe Community. A case study. D-uppsats i Folkhälsovetenskap vid Institutionen för Miljö och Hälsa, Linköpings universitet. Februari 1998. *D-uppsats* 1998; In Swedish (Acc # 88)

Schelp L. Community intervention and changes in accident pattern in a rural Swedish municipality. *Health Promot* 1987;**2**:109-25. (Acc # 91)

Ytterstad B, Wasmuth HH. The Harstad injury prevention study: evaluation of hospital-based injury recording and community-based intervention for traffic injury prevention. *Accid Anal Prev* 1995;**27**:111-23. (Acc # 92)

Jeffs D, Booth D, Calvert D. Local injury information, community participation and injury reduction. *Aust J Public Health* 1993;**17**:365-72. (Acc # 108)

5.1.1.7 Accident intervention at National level using mono-factorial design

Springfeldt B. Rollover of tractors - international experiences. *Safety Science* 1996;**24**:95-110. (Acc # 100)

Springfeldt B. Effects of occupational safety rules and measures with special regard to injuries. Advantages of automatically working solutions. Doctoral dissertation. Stockholm: The Royal Institute of Technology, Department of Work Science, 1993. (Acc # 101)

5.1.1.8 *Accident intervention at National level using multi-factorial design*

Graham JD. Injuries from Traffic Crashes: Meeting the Challenge. *Annu Rev Public Health* 1993;**14**:515-43. (Acc # 49)

Bergman AB, Rivara FP. Sweden's Experience in Reducing Childhood Injuries. *Pediatrics* 1991;**88**:69-74. (Acc # 58)

Towner E, Simpson G, Jarvis S, Downswell T, Sowden A, Sheldon T, et al. Preventing unintentional injuries in children and young adolescents. *Effective Health Care [0167-871X]* 1996;**2**:1-16. (Acc # 62)

5.1.2.1 *Violence intervention at group level using mono-factorial design*

Powell KE, Hawkins DE. Youth Violence Prevention. Descriptions and Baseline Data from 13 Evaluation Projects. *Prev Med* 1996;**12**:1-134. (Acc # 66)

5.1.2.2 *Violence intervention at group level using multi-factorial design*

Gage M, Kingdom D. Breaking the cycle of aggression. *J Nurs Adm* 1995;**25**:55-64. (Acc # 159)

5.1.2.3 *Violence intervention at organisational level using mono-factorial design*

Foshee VA, Linder GF, Bauman KE, Langwick SA, Arriaga XB, Heath JL, et al. The Safe Dates Project: theoretical basis, evaluation design, and selected baseline findings. *Am J Prev Med* 1996;**12**:39-47. (Acc # 157)

5.1.2.4 *Violence intervention at organisational level using multi-factorial design*

Olds DL, Henderson CRJ, Chamberlin R, Tatelbaum R. Preventing child abuse and neglect: a randomized trial of nurse home visitation. *Pediatrics* 1986;**78**:65-78. (Acc # 163)

5.1.2.5 *Violence intervention at local community level using mono-factorial design*

Powell KE, Hawkins DE. Youth Violence Prevention. Descriptions and Baseline Data from 13 Evaluation Projects. *Prev Med* 1996;**12**:1-134. (Acc # 66)

5.1.2.6 *Violence intervention at local community level using multi-factorial design*

Day LM, Ozanne-Smith J, Cassel E, McGrath A. Latrobe Valley Better Health Project. Evaluation of the Injury Prevention Program 1992-1996. Report No 114. Victoria: VicHealth, Monash University, 1998. (Acc # 98)

5.1.3.1 *Self-harm intervention at group level using mono-factorial design*

Isacsson G, Holmgren P, Wasserman D, Bergman U. Use of antidepressants among people committing suicide in Sweden. *BMJ* 1994;**308**:506-9. (Acc # 74)

5.1.3.2 *Self-harm intervention at group level using multi-factorial design*

Thorson J. Prevention av självmord (To Prevent Suicides in Sweden), with English summary. Stockholm: Folkhälsoinstitutet, 1997. (Acc # 69)

5.1.3.3 *Self-harm intervention at organisational level using mono-factorial design*

Gunnell D, Frankel S. Prevention of suicide: aspirations and evidence. *BMJ* 1994;**308**:1227-33. (Acc # 78)

5.1.3.4 *Self-harm intervention at organisational level using mono-factorial design*

Ploeg J, Ciliska D, Dobbins M, Hayward S, Thomas H, Underwood J. A systematic overview of the effectiveness of public health nursing interventions: an overview of adolescent suicide prevention programs. *Cochrane review* 1995; (Acc # 139)

5.1.3.5 *Self-harm intervention at local community level using mono-factorial design*

Mari JJ, Streiner D. Family intervention for schizophrenia. *DARE database* 1997; (Acc # 82)

5.1.3.6 *Self-harm intervention at local community level using multi-factorial design*

Mari JJ, Streiner D. Family intervention for schizophrenia. Cochrane review. Date of most recent substantive amendment : 23 February 1996. *Cochrane review* 1996; (Acc # 142)

5.1.3.7 *Self-harm intervention at National level using mono-factorial design*

Thorson J. Prevention av självmord (To Prevent Suicides in Sweden), with English summary. Stockholm: Folkhälsoinstitutet, 1997. (Acc # 69)

5.2.0.0 *Interventions based on place of occurrence, transport, at group level using mono-factorial design*

Gregersen NP. Prevention of road accidents among young novice car drivers. Linköping: Linköping University Medical Dissertations No.444, 1995. (Acc # 59)

5.2.0.1 *Interventions based on place of occurrence, transport, at group level using multi-factorial design*

Towner E, Simpson G, Jarvis S, Downswell T, Sowden A, Sheldon T, et al. Preventing unintentional injuries in children and young adolescents. *Effective Health Care* [0167-871X 1996;2:1-16. (Acc # 62)

5.2.0.2 *Interventions based on place of occurrence, transport, at Organisational level using mono-factorial design*

Cushman R, Down J, MacMillan N, Waclawik H. Helmet promotion in the emergency room following a bicycle injury: a randomized trial. *Pediatrics* 1991;88:43-7. (Acc # 127)

5.2.0.3 *Interventions based on place of occurrence, transport, at Organisational level using multi-factorial design*

Svanström L, Schelp L, Ekman R, Lindström Å. Falköping, Sweden, ten years after: still a safe community? *International Journal for Consumer Safety* 1996;3:1-7. (Acc # 87)

5.2.0.4 *Interventions based on place of occurrence, transport, at Local Community level using mono-factorial design*

Ekman R, Welander G. The results of 10 years' experience with the Skaraborg bicycle helmet program in Sweden. *International Journal for Consumer & Product Safety* 1998;5:000. (Acc # 129)

5.2.0.5 *Interventions based on place of occurrence, transport, at Local Community level using multi-factorial design*

Frimodt-Möller B. Community-based injury prevention - success or failure? Results from the 5-community-project in Denmark. Abstract to Third International Conference on Injury Prevention and Control, Atlanta. *Abstract* 1993; (Acc # 109)

5.2.0.6 *Interventions based on place of occurrence, transport, at national level using mono-factorial design*

Ekman R, Schelp L, Welander G, Svanström L. Can a combination of Local, Regional and National Information substantially increase Bicycle-Helmet wearing and reduce injuries? Experiences from Sweden. *Accid Anal Prev* 1997;29:321-8. (Acc # 55)

5.2.0.7 *Interventions based on place of occurrence, transport, at National level using multi-factorial design*

Preston B. Cost effective ways to make walking safer for children and adolescents. *Injury Prevention* 1995;1:187-90. (Acc # 24)

5.2.1.1 Interventions based on place of occurrence, residential, at group level using mono-factorial design

Hornbrook MC, Stevens VJ, Wingfield DJ. Seniors' Program for Injury Control and Education. *J Am Geriatr Soc* 1993;**41**:309-14. (Acc # 123)

5.2.1.2 Interventions based on place of occurrence, residential, at group level using multi-factorial design

Kutner NG, Ory MG, Baker DI, Schechtman KB, Hornbrook MC, Mulrow CD. Measuring the quality of life of the elderly in health promotion intervention clinical trials. *Public Health Rep* [0094-6214 1992;**107**:530-9. (Acc # 124)

5.2.1.3 Interventions based on place of occurrence, residential, at organisational level using mono-factorial design

Reinsch S, MacRae P, Lachenbruch PA, Tobis JS. Attempts to prevent falls and injury: a prospective community study [see comments. *Gerontologist* 1992;**32**:450-6. (Acc # 119)

5.2.1.4 Interventions based on place of occurrence, residential, at organisational level using multi-factorial design

Bablouzian L, Freedman ES, Wolsk KE, Fried LE. Evaluation of a community based childhood injury prevention program. *Inj pre* 1997;**3**:14-6. (Acc # 120)

5.2.1.5 Interventions based on place of occurrence, residential, at local Community level using mono-factorial design

Gorman RL, Charney E, Holtzman NA, Roberts KB. A successful City-Wide Smoke Detector Give-a-way Program. *Pediatrics* 1985;**75**:14-8. (Acc # 38)

5.2.1.6 Interventions based on place of occurrence, residential, at local Community level using multi-factorial design

Bowling A, Formby J, Grant K. Accidents in elderly care: a randomised controlled trial (part 3). *Nurs Stand* 1992;**6**:25-7. (Acc # 125)

5.2.1.7 Interventions based on place of occurrence, residential, at national level using mono-factorial design

Downswell T, Towner EML, Simpson G, Jarvis SN. Preventing childhood unintentional injuries - what works? A literature review. *Injury Prevention* 1996;**2**:140-9. (Acc # 17)

5.2.1.8 Interventions based on place of occurrence, residential, at national level using multi-factorial design

Effective Health Care. Preventing unintentional injuries in children and young adolescents. *Effective Health Care* [0167-871X 1996;2:1-16. (Acc # 29)

5.2.2.1 Interventions based on place of occurrence, production, at group level using mono-factorial design

Clark JE, Scott SG, Mingle M. Viscoelastic shoe insoles: their use in aerobic dancing. *Arch Phys Med Rehabil* 1989;70:37-40. (Acc # 135)

5.2.2.2 Interventions based on place of occurrence, production, at group level using multi-factorial design

Ludwig,T D, Geller ES. Assigned versus participative goal setting and response generalization: managing injury control among professional pizza deliverers. *J Appl Psychol* 1997;82:253-61. (Acc # 151)

5.2.2.3 Interventions based on place of occurrence, production, at organisational level using mono-factorial design

Menckel E. Intervention and Coperation. Occupational Health Services and Prevention of Occupational Injuries in Sweden. *Arbete och Hälsa, Vetenskaplig skriftserie no 1990:31, Doctoral Dissertation* 1990; (Acc # 64)

5.2.2.4 Interventions based on place of occurrence, production, at organisational level using multi-factorial design

Svanström L, Schelp L, Ekman R, Lindström Å. Falköping, Sweden, ten years after: Still a safe community? *International Journal for Consumer Safety* 1996;3:1-7. (Acc # 87)

5.2.2.4 Interventions based on place of occurrence, production, at local community level using mono-factorial design

Coleman P, Harper R, Kent G, Munro J, Nicholl JP, Wild D. The effectiveness of interventions to prevent accidental injury to adolescents and young adults aged 15-24 years: a review of the evidence. Sheffield: Sheffield Centre for Health and Related Research, University of Shefiled, 1990. (Acc # 3)

5.2.2.5 Interventions based on place of occurrence, production at local community level using multi-factorial design

Lindqvist K, Timpka T, Schelp L, Åhlgren M. The WHO Safe Community program for injury prevention: evaluation of the impact on injury severity. *Manuscript* 1998; (Acc # 90)

5.2.2.6 Interventions based on place of occurrence, production, at national level using mono-factorial design

5.2.2.7 Interventions based on place of occurrence, production, at national level using multi-factorial design

5.2.3 Interventions based on place of occurrence, retailers etc, at different levels

Zwerling C, Daltroy LH, Fine LJ, Johnston JJ, Melius J, Silverstein BA. Design and Conduct of Occupational Injury Intervention Studies: A Review of Evaluation Strategies. *Am J Ind Med* 1997;**32**:164-79. (Acc # 65)

5.2.4 Interventions based on place of occurrence, school public places etc, at different levels of occurrence, sports etc, at different level

5.3 Interventions based on age groups

children

5.3.0.1 Interventions based on age groups, at group level using mono-factorial design

5.3.0.2 Interventions based on age groups, at group level using multi-factorial design

5.3.0.3 Interventions based on age groups, at organisational level using mono-factorial design

5.3.0.4 Interventions based on age groups, at organisational level using multi-factorial design

5.3.0.5 Interventions based on age groups, at local community level using mono-factorial design

5.3.0.6 Interventions based on age groups, at local community level using multi-factorial design

5.3.0.7 Interventions based on age groups, at national level using mono-factorial design

5.3.0.8 Interventions based on age groups, at national level using multi-factorial design

6 THE SAFETY IMPACT OF THE EVALUATED INTERVENTIONS

In this chapter we try to summarise the safety impacts of interventions based on activities in different age groups, starting with children.

6.1 *Child safety interventions*

There is a recently published review on the evidence-base for safety promotion for children (Effective Health Care 1996). Their conclusions are based on two reviewers' extract of the data from each study using a standard form. A hierarchy of evidence base on study designs was used to just a degree to which a study was acceptable to bias. Within each type of study design three reviewers independently assessed the quality of evidence for each of the studies.

6.1.1 *Safety promotion in the traffic environment*

"There is good evidence that the use of cycle helmets and child car seat restraints can reduce serious injury to children involved in road traffic accidents. Urban road safety measures such as a provision of crossing patrollers, measures to re-distribute traffic and improve the safety of individuals can reduce the rate and severity of childhood accidents." (Effective Health Care 1996).

In an urban safety project the effect of measures to redistribute traffic and improve the safety of individual roads was assessed in five English towns compared to match control areas (Lynam D et al. 1988). There was an overall accident reduction of 13% attributable to the schemes but there were great variations between schemes. Slight injuries declined proportionately more than serious ones. Measures that were particularly successful were those which protected two-wheeled vehicles (such as right turn prohibition and central road dividers) and there was a general reduction in child cyclist casualties. Each scheme cost about 250,000 Pounds and first year rates of return indicated considerable accident costs savings.

The speed at which a car is driven affects the severity of pedestrian injuries (20 miles mph leads to 5% death; 30 mph - 45%; 40 mph - 85%). Therefore transport policies aiming at reducing excessive car speeds may be effective. However, there are very few evaluation of such interventions.

"There is little reliable evidence to suggest that children can be successfully trained to avoid injury on the roads." (Effective Health Care 1996). Controlled trials indicate that teaching children road crossing skills, however, can change reported behaviour and that instruction in the classroom can be as effective as the road sign. "Educational programs by themselves appear to have little effect. However, a number of community programs, which involve local participation, and use of broad range of interventions have been effective at reducing childhood injuries from a wide variety of causes. These need to be based on accurate data derived from surveillance systems." (Effective Health Care 1996).

Some studies show no evidence that children's knowledge of road safety (e.g Traffic Clubs) had been improved. "The Streetwise Kids Club" was introduced in London, but membership was low, particularly in lower social class groups (Downing C 1987). An evaluation of the "Eastern Region Traffic Club" showed increased participation and a positive effect on aspects of behaviour and a 20 % reduction in casualties involving children emerging from behind a vehicle (Bryan-Brown K 1995).

Renaud et al. (1989) has evaluated simulation games promoting traffic safety for children. Using a simulation game designed to teach children to obey certain traffic safety rules, an experimental study was conducted with 136 five-year-old children in four Quebec schools. Within each classroom, subjects were randomly divided into four groups: three intervention groups and one control group. Each of the experimental groups was subjected to a different intervention with outcome measured using three instruments related to attitudes, behaviour and transfer of learning of pedestrian traffic safety. Results suggest that simulation games including role-playing/group dynamics and modelling/training can change attitudes and modify behaviour in the area of pedestrian traffic safety and children of this age.

Several surveys and epidemiological studies have reported that cyclists who wear helmets have a reduced risk of severe head injuries (Graitcer et al. 1995). In the past decade there have been a variety of educational approaches used to promote the use of bicycle helmets. These programs have included classroom curricula, programs that subsidise the purchase of helmets, and programs that provide helmets in a health care setting. None of these individual educational strategies has been shown to have any significant impact in increasing helmet use. Only helmet promotion programs that are organised by community-wide coalitions and use a variety of educational and publicity strategies have been shown to be effective. The most successful of these programs - the Seattle Children's Bicycle Helmet Campaign organised by Harborview Injury Prevention and Research Center - used multiple strategies. These included classroom education, discount purchase programs, bike rodeos, distribution of printed material through a variety of venues, and intensive promotional efforts by sports leaders, bicycle clubs, and the media to increase children's helmet use (Bergman A B et al. 1990). Using this broad based approach, the Harborview program has been able to increase helmet wearing rates among children to more than 40% (Rivara F P et al. 1994). No information is available on the direct and indirect cost of these promotional efforts. The relative difficulty in implementing educational programs to promote helmet use, their potentially great costs, and their limited success in greatly increasing helmet use, have led to the introduction of mandatory helmet wearing laws as a principle strategy of many governmental jurisdictions. Studies from the introduction of legislation on helmets in Victoria, Australia, showed that during the period 1975-1980 less than 5% of all Victorian bicyclists wore helmets. In March 1991, approximately 9 months after implementation of the law, the average use rate for Victoria bicyclist was 75.2 %. A special survey, conducted in May 1992, indicated that this rate increased further to 83% (Cameron et al. 1994). The number of head injuries decreased by 48% during the first year and an additional decline to 70% of the pre-law levels was noted in 1991/2.

One major evaluation of the effect of community wide programs to promote the wearing of cycle helmets showed a significant reduction in the rate and severity of casualties. In 1990, following ten

years of cycle helmet promotion campaigns, the state of Victoria in Australia introduced the first law in the world requiring cyclists to wear helmets. The increase of helmet wearing rates from 31% immediately before to 75% in the year following legislation was associated with a 48% reduction in head injury admissions or death between 1989/90 and 1990/91 and a reduction of 70% over the two year period 1989/90-1991/92. As with seat belt legislation, the experience in Victoria has shown that legislation following education campaigns can increase use. In a recently published study Ekman et al. (1997) shows for some intervention areas of Sweden, for children under 15, an average annual decrease in all bicycle-related injuries of 3.1%, equivalent to a decrease of 48% over the study period, 1978-93 (for head injuries, 59%). Sweden as a whole showed a reduction of 32% in bicycle-related injuries (head injuries, 43%). In Skaraborg, children have been the target of helmet-wearing programs at local and regional levels since 1982, and at national level since 1987.

There is considerable evidence that child car seat restraints (for young children) when properly used, reduce car occupant injuries (Agran P et al. 1989).

In the United States Child passenger restraint use and motor-vehicle related fatalities among children (MMWR 1991) are studied. In 1990, child safety seats were used for an estimated 83% of infants and 84% of toddlers, compared with 60% and 38%, respectively, in 1983. Use of child safety seats reduced the likelihood of fatal injury by an estimated 69% for infants and 47% for toddlers. Adult safety belts used for toddlers reduced the likelihood of fatal injury by 36%.

6.1.2 Safety promotion in the home environment.

Generally home injuries are more common in households with poor social circumstances. Rather than focusing on individual parenting behaviour it has been suggested that increasing financial and social support to deprived households with young children would have a beneficial effect on injury rates. However, no relevant evaluation has been identified. A programme targeting poor, unmarried or teenage mothers of pre-school children in the U S A indicated that homes which had several visits from a nurse home visitor had fewer home hazards than those which had not been visited (Olds et al. 1994). The use of safety devices in the home such as smoke detectors, child resistant containers and thermostat control for tap water can reduce the risks of home injuries. Targeting of households at higher risk combined with home visits, education and the free distribution of devices is likely to make the most impact.

A variety of protective *safety devices* have been tested under experimental and field conditions and have been shown to reduce the risks of home injuries.

These include smoke detectors and child resistant container closures. Others are also associated with reduced risk such as fireguards, stairgates, safety catches for cupboards, coiled kettle flexes, safety harnesses, safety film for interior glazing and thermostat control of tap water (Department of Trade and Industry 1991).

Programs aimed at raising awareness of home hazards encouraging parents and children to reduce or avoid these risks have met with varying success. Home visits to people in poorer areas with specific

advice on hazards, combined with health education and media campaigns resulted in around 50% more households making changes to the home environment (Colver et al. 1982).

6.1.3. *Burns, scalds and smoke detectors.*

There have been a series of evaluations of programs designed to increase the use of smoke detectors. In one program, smoke detectors were given away free and 81% were operational 8-12 months after the campaign (Gorman R et al. 1985). One study showed a small reduction in fatalities due to fires in a community where smoke detectors were required by law in all homes. However, compliance was low (McLoughlin E et al. 1985).

6.1.4 *Tap water temperature reduction.*

One study showed that provision of a free thermometer when combined with physician counselling was more effective than counselling by itself at reducing scalds (Katcher M et al. 1989).

Erdmann et al. (1991) points to the importance of legislation. Five years after a 1983 Washington State law required new water heaters to be pre-set at 49°C, 77% of homes had tap water temperatures of less than 54°C. In 1977, 80% of homes had tap water temperatures greater than 54°C. The period of July 1979 through May 1988 showed an average admission rate of 2.4 per year, compared with 5.5 per year in the 1970s.

6.1.5. *Poisoning and suspected poisoning.*

Clarke et al. (1979) points to the effectiveness of child-resistant closures, required under the Poison Prevention Packaging Act of 1970, in reducing the incidence of accidental ingestion of aspirin and aspirin-containing products among children less than 5 years of age has been investigated. For baby aspirin, it is estimated that safety packaging has reduced the incidence of ingestion's 45% to 55%. For non-baby aspirin products, the reduction has been 40% to 45%.

A controlled trial of children resistant containers for paraffin showed a 47% drop in paraffin ingestion compared to no change in the control area. Walton W W (1982) reported on a study involving regulated substances like aspirin, acetaminophen, prescription drugs and household chemicals. The ingestion rates for all substances that require child resistant closures has declined from 5.7 per 1,000 children 1973 to 3.4 per 1,000 children in 1978. It is estimated that child resistant closures have prevented nearly 200, 000 accidental ingestions since 1973 in the USA. The death rate due to poisoning of children has declined from 2.0 per 100, 000 children to 0.5 per 100, 000.

6.1.6. Safety promotion in the play and sport environment.

In the review over child injury prevention (Effective Health Care 1996) no good quality studies were

paediatrician to tailor the counselling to the educational needs of the parents. Topics covered before age five include child safety seat and smoke detector use, crib safety, water safety, firearm safety, pedestrian safety, play equipment safety, fall prevention, burn prevention, choking and suffocation prevention and poisoning prevention.

Bablouzian et al. (1997) has evaluated how high risk pregnant women, who were enrolled in home visiting program that augments existing health and human services, received initial home safety assessments. Clients received education about injury prevention practices, in addition to receiving selected home safety supplies.

Results showed a significantly larger proportion of homes were assessed as safe at discharge compared with the initial assessment, for the following hazards: children riding unbuckled in all auto travel, Massachusetts Poison Centre sticker on the telephone, outlet plugs in all unused electrical outlets, safety latches on cabinets and drawers, and syrup of ipecac in the home. Thus four home hazards were significantly reduced for which safety supplies were provided. Education and promotion of the proper use of child restraint systems in automobiles significantly reduced a fifth hazard, children riding unbuckled in auto travel.

6.1.8 Community-based interventions on child accidents

The Falköping Program in Sweden included establishment of an extensive network of people interested in injury prevention, education of policy makers and health workers, raising a public awareness, and provision of a local shop selling child safety products. The intervention area experienced a reduction of 27% in home accidents and 28% in occupational accidents (Schelp L 1987).

In the "State-wide" Child Injury Prevention Program (SCIPP) U S A (Guyer B et al 1989).

Nine intervention communities and five control communities were selected in Massachusetts. Interventions targeted burns, poisoning, falls, suffocation's and passenger traffic accidents. Households in the intervention communities had greater safety knowledge and higher behaviour scores than controls. There was a significant reduction of motor vehicle passenger injuries in the intervention communities. No evidence was found for the reduction of other target injuries.

The "Safe Block Project", in Philadelphia, U S (Schwarz D F et al. 1993) targeted a poor inner-city African-American community, using community workers and recruiting black representatives from the local community. This method of "cascade training" was successful in getting households involved. The intervention included an educational program, home visits and the provision of safety equipment. The intervention was partially effective for those home hazards requiring minimal or moderate effort to correct. No information was provided on baseline comparability of the areas and no data were collected on accident rates.

In a community intervention study Svanström et al. (1995) reports on a programme focusing childhood safety. In Sweden about 100 children 0-14 years die from accidental injuries every year,

roughly 40 girls and 60 boys. The Lidköping Accident Prevention Program was compared with four bordering municipalities and to the whole of Skaraborg County and included five elements: surveillance, provision of information, training, supervision and environmental improvements. Process evaluation was based mainly on notes and reports made by the health planners, combined with newspaper clippings and interviews with key people. Outcome evaluation was based on information from the hospital discharge registry.

In Lidköping there was an on average annual decrease in injuries leading to hospital admissions from 1983 to 1991 of 2.4% for boys and 2.1% for girls compared with an smaller increase in one comparison area and a decline in the other (Four border municipalities: girls +2.2%, boys +0.6%; Skaraborg county -0.3% for girls and -1.0 for boys).

6.1.9. Conclusion preventing Childhood unintentional injuries

In a review made by Dowswell et al. (1996) it is concluded that examples of interventions that have been effective in reducing injury include are bicycle helmet legislation, area wide traffic calming measures, child safety restraint legislation, child resistant containers to prevent poisoning, and window bars to prevent falls. Interventions effective in changing behaviour include bicycle helmet education and legislation, child restraint legislation, child restraint loan schemes, child restraint educational campaigns, pedestrian education aimed at the child/parent, provision of smoke detectors, and parent education on home hazard reduction. For the community based campaigns, the key to success has been the sustained use of surveillance systems, the commitment of interagency of co-operation and the time needed to develop networks and implement a range of interventions. Education, environmental modification and legislation all have a part to play and their effect in combination is important.

Another review (Effective Health Care 1996) covering unintentional injuries in children and young adolescents included randomised controlled trials (RCTs), non-randomised controlled trials, uncontrolled before and after studies, and time series analyses. 49, studies of which 22 were randomised controlled trials and 22 were non-randomised controlled trials. The reviewers concluded: "The use of cycle helmets and child car seat restraints can reduce serious injury to children involved in road accidents. Urban road safety measures (e. g. provision of crossing patrollers, measures to redistribute traffic and improve the safety of individual roads) can reduce the rate and severity of childhood accidents".

"The use of safety devices in the home (e. g. smoke detectors, child resistant containers, thermostat control for tap water) can reduce the risks of home injuries. Targeting of households at higher risk is likely to make the most impact. Rule changes and the use of safety equipment may be effective at reducing injuries resulting from organised sports in the 15-24 years age group".

"Educational programs by themselves appear to have little effect. However, a number of community programs which involve local participation and use of a broad range of interventions have been effective at reducing childhood injuries from a wide variety of causes. These need to be based on accurate data derived from surveillance systems.

Schemes to improve urban road safety cost approximately USD 250,000 for each town (from 1990 report). First year rates of return indicated considerable accident cost saving. A U S study carried

out in 1995 showed that legislation and community-based programs to increase cycle helmet use cost approximately USD 37,000 per head injury avoided, compared to the cost for school based programs, USD 144,000. The cost per live year saved is approximately USD 935,000. The conclusion is that there is some evidence that unintentional injury can be prevented by legislation, environmental modification and occasional by educational programs or a combination of these measures."

6.2 Promoting Safety for adolescents

Literature has been reviewed under the standard setting headings of road, work, home, and sports and leisure (Munro J et al, 1995). The most effective measures appear to be legislative and regulatory controls in road, sport and workplace settings. Environmental engineering measures on the road and in sports have relatively low implementation costs and result in fewer injuries at all ages. There is little evidence that purely educational measures reduced injuries in the short term. Community based approaches may be effective in all age groups, and incentives to encourage safer behaviour hold promise but require further evaluation. The potential of multifactorial approaches seems greater than narrowly based linear approaches. The conclusion is however that few interventions to reduce injury in adolescents have been rigorously evaluated using good quality randomised controlled trials, and where such evidence is available, fewer have been shown to be definitely worthwhile. There were no studies identified relating to 15-24 year olds in domestic settings. Studies, however demonstrating the effectiveness of smoke detector programs are clearly relevant to this age group. The review identified only two examples of interventions studies aimed specifically at young people at work, although in both, unfortunately, evaluation was inconclusive. In another report (Coleman P et al. 1985) the same group concludes: "There is encouraging evidence, mainly from Sweden, that community-based approaches promoting safety measures in many settings simultaneously, may be effective in all age groups. However, there is little evidence that purely educational measures, including skills training, mass media exposure, and targeted education courses reduce the numbers of accidental injuries in the short term.

1. Interventions evaluated in well-design trials for which there was good evidence to support their recommendation were:
 - raising the minimum legal drinking age between 18 and 21 years
 - environmental engineering changes to sports environment
 - prophylactic injury prevention programs
2. Interventions evaluated in studies indicating fair evidence to support their recommendation were:
 - area wide urban traffic safety measures
 - speed control humps
 - warning notices combined with low costs of compliance measures to encourage use of protective devices (sport)
 - cost benefit studies"

Alcohol being a major risk problem has led to a number of studies on prevention, as Foxcroft et al. 's (1992) review. 33 studies of which 24 were randomised controlled trials or had well matched controls were evaluated. Studies were combined through narrative synthesis by effectiveness (behavioural outcomes) and by follow-up period. Follow-up periods were classified as short term (up to one year), medium term (one to three years) and long term (over three years).

Assessment of the quality of the studies showed that only 10 of the 33 studies included met four core methodological criteria, indicating the poor quality of the studies. Overall, no prevention program was convincingly effective. Of the 29 studies of prevention programs with short-term follow-up, 16 were partially effective, 11 were ineffective and 5 had negative effects (increased alcohol

consumption). There were 12 prevention programs with medium-term follow-up. Of these five were partially effective, five ineffective and two had negative effects. Only two prevention programs had long-term follow-up, one was effective and one ineffective.

The conclusion is that the prevention programs reviewed provided limited evidence to recommend any of the programs. There were limited differences between the programs that claimed partial success, no effects or negative effects. Good quality research, in terms of methodology, was rare.

6.3 Safety Promotion in the Work environment

Prevention work designed to reduce the number of occupational injuries can be undertaken at a national or regional level and can also take place locally at the level of the organisation and the individual (Menckel 1990). Accident reporting has been used as one method. This has been done in order to maintain knowledge of accidents and accident risks at company level and of utilising this knowledge in local accident and prevention work. The importance of the participation of occupational health services in accident investigations has been stressed both internationally and nationally. Unfortunately, however this takes place only to a small extent. Also near accident reporting has been used. A review of available literature produced 24 research reports in the field of near accident reporting. This had been completed between 1968 and 1982 and had been conducted at the local level. The review demonstrated that large quantities of information of near accidents, which otherwise would not have been recorded, were gathered by verbal means while written reporting provided relatively little information. No clear cut conclusions with respect to the effects on near accident reporting could be drawn, above all because of limitations to the documentation of the near accident reporting that had taken place. Some of the studies pointed to an increase in the level of safety activities following a period of near accident reporting while such an increase could not be detected with certainties in others (Carter & Menckel 1985; Menckel & Carter 1985). Field experiments involved occupational health nurses and safety engineers from occupational health services and those with local responsibility for safety and production. Improvements were detected in accident and prevention work with quicker accident investigation, an increase in the number of counter measures proposed and a certain reduction in the number of accidents in the number of days per accident.

An example of a very successful intervention has been reported by Springfieldt (1996). Serious occupational injuries caused by rollover tractors can be prevented by fitting Rollover Protection Structures (ROPS). In some countries authorities have required such protection on tractors for many years. Others have recommendations or no rules at all. In a survey of tractor rollover injuries and protective measures, the developments in twelve countries are described. Sweden and New Zealand were first to develop ROPS in the 50's. Mandatory regulations for new tractors were introduced in Sweden 1959, Denmark 1967, Finland 1969, West Germany, Great Britain and New Zealand in 1970, the United States 1972, Spain 1975, Norway 1977 and in Switzerland 1978. In Canada and Australia federal authorities have no regulations at all concerning ROPS and tractors. In Sweden the frequency of fatal rollovers by 100 000 tractors per year has been reduced from 17 to 0.3 since mandatory regulations were introduced. In Norway the frequency has decreased from 24 to 4 between the periods 1961-1969 and 1979-1986 and in Finland from 16 to 9 from 1980-1987. From 1961-1986 a West German rate has been reduced from 6.7 to 1.3. In New Zealand the risk has decreased from 37 to 30 from the period 1949-1958 to the period 1969-1974. In countries that introduced mandatory regulations long ago an evident decrease in the number of rollover injuries is reported, especially when retrofitting of ROPS on old tractors is required (Springfieldt 1993).

6. 4. Preventing Falls and Subsequent Injury in Older People

Accidents are a major health problem among older people. Falls, traffic accidents and burns are the main causes of accidental death among older people. The age group of 65 and older is in Sweden 16% of the population but constitute more than half of all deaths due to accidents. Falls is the leading cause of deaths from injury among people aged over 75 (Oakley et al 1996).

Such injuries, frequently fractures, are also a common and costly cause of hospital admission.

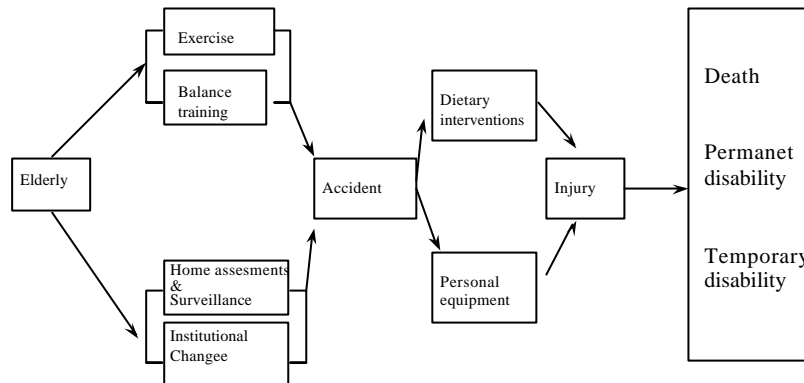
Falling is common throughout the life, but is not usually serious, except among the adventurous young who fall while trying to determine the limits of their skills, and among the elderly. The elderly are separable into the active elderly who continues their usual activities without appreciating minor changes in the speed of their reactions, their vision and their attention, which jeopardise their ability to correct and unexpected displacement; and inactive elderly, in whom inactivity itself and accompanying diseases and medications diminish strength, slow reactions, and ensure that almost any everyday displacement is potentially capable of ending in a fall.

Rates of morbidity and mortality from falls are higher among the elderly than among younger persons. Approximately 60 percent of persons who die from falls are 65 years old or older, and falls account for 87 percent of all fractures in older adults (Rivara FP et al. 1997). It has been estimated that between 5 and 10% of falls result in injury (Robertson MC and Cambell AJ 1993, Gryfe C et al. 1977) . The most common serious injuries are fractures (Hindmarsch .and Estes 1989) which account for 40% of deaths from injury, over half of injury admissions to hospital (57% in 1988) and two thirds of bed days for injury. Actually, about a third of the days of hospital care for males and more than half for females in Sweden were caused by femoral fractures (Svanström et al. 1996).

The most important risk factors for falls and fall-related injuries among the elderly are a history of one or more prior falls, cognitive impairment, chronic illness, balance and gait impairment, a low body-mass index, female sex, (Tinetti ME et al. 1995) general frailty, (Speechley and Tinetti 1991) use of diuretics, (Ray WA et al. 1989) use of psychotropic drugs, (Thapa PB et al 1995) and hazards in the home (Tinetti ME et al. 1995).

The health promotion interventions to prevent falls and subsequent injury in older people can be delivered through, firstly reducing of falling implemented by increased exercise, home assessments and surveillance, changing older peoples footwear, and through interventions in institutional settings Secondly reducing injuries from falls through dietary interventions and hip protectors (Oakley et al. 1996). Thirdly Oakley et al. (1996) looked at implications for health care. This is summarised in the figure 6:1. In the presentations that follow, we have used the matrix going from the individual level to societal levels of intervention.

Figure 6:1 *Evidence Model for Falls prevention among elderly*



6.4.1 General overview of interventions preventing injuries to the elderly

There is a recently published review on the evidence-base of this area (Effective Health Care 1996). They conclude:

1. "There is some evidence to suggest that exercise, such as balance training, is effective in reducing the risk of falls in older people. Access to such interventions should be offered and ways of promoting uptake should be investigated. New programs should be part of controlled evaluations.
2. Home visits and surveillance to assess and where appropriate, modify environmental and personal risk factors can be effective in reducing falls. Nurses, health visitors, occupational therapists or trained volunteers, can carry this out.
3. Soft hip protector pads have been shown to dramatically reduce hip fractures in frail older people in residential care. Their effect and acceptability in the community needs further research.
4. High dose Vitamin D supplementation with or without calcium appears to be effective in reducing fractures. Research is needed to identify the most cost-effective strategy."

Randomised controlled trials provide the most reliable evidence of the efficacy of interventions. By randomly allocating patients to treatment and control groups, the comparability of the groups is improved. This allows statistically significant outcomes to be more confidently attributed to the intervention (Sackett D L et al. 1991). Thirty-six trails were identified which evaluated interventions to prevent falls (exercise (23), home assessment (9), type of shoe (1), interventions in institutional

settings (3), nutritional supplementation (1) and hip protectors (1), two studies examined interventions covering more than one area. Pooling the results of these studies showed that people assigned to an exercise group had an estimated 10% lower risk of falling than controls. Pooling the results of studies evaluating a balance training only intervention showed a reduction in the risk of falling of 25%. In one trial people offered the balancing exercise Tai Chi, had 37% lower risk of falling than the non-intervention group (Wolf S L et al. 1993)

The review also covered studies involved visiting older people at home, an assessment of the safety of the home environment, and a range of interventions such as safety checks, safety modifications, referral to care, and recommendations for exercise. In a study of over 2,000 people, Hornbrook found that those offered a home intervention to remove and repair safety hazards showed a reduction in falls compared with controls (Hornbrook et al. 1994). Similarly Carpenter & Demopoulos (1990) found that older people visited at home by trained volunteers reported one-third of the number of falls, as did controls.

Six trials were identified which evaluated the effectiveness of interventions other than exercise and assessment in people who live in institutions. Frail people are at particularly high risk of falling when getting out of bed. The use of a bed alarm, which alerts an assistant when a person tries to get out of the bed, was evaluated in a small trial. This showed a reduction in falls, which was not statistically significant (Tideiksaai et al. 1993).

In another review (Gillespie et al. 1997) interventions to reduce the incidence of falling in the elderly eighteen trials and one pre-planned meta-analysis were included. The analysis of four trials which studied the effect of exercise alone did not establish protection against falling. Based on one trial, there was no evidence to support exercising in conjunction with health education classes, or of health education classes alone for the prevention of falls. In another review (Province et al. 1995) seven trials are included in a meta-analysis which all together gave 3,119 patients were for analysed. The adjusted fall incidence ratio for treatment including general exercise was 0.90 and for those including balance training was 0.83. No cost information was reported and the conclusion was that treatments including exercise for the elderly adults reduce the risk of falls.

Significant protection against falling was apparent from interventions which targeted multiple, identified, risk factors in individual patients, and from interventions which focused on behavioural interventions targeting environmental hazards plus other risk factors.

6.4.2 Dietary and pharmaceutical interventions preventing injuries for elderly

Among older adults, hip fracture is the most frequent serious consequence of falling. Much attention has been focused on preventing osteoporosis during ageing, particularly in women. For a 50-year-old white woman, the lifetime risk of an osteoporosis-associated fracture is as high as 40 percent. Many experts recommend that the prevention of osteoporosis begin early in life, even in childhood, with an adequate intake of calcium (Chapuy and Meunier 1995).

Hormone-replacement therapy during menopause has been associated with a 25 percent reduction in hip fractures, according to a meta-analysis of 11 studies involving a variety of populations, including both community and nursing home residents, and the protective effect may be greater the longer the oestrogen is taken. However, the protective effect may dissipate once the therapy is stopped (Grady et al. 1992). There are no data on the protective effect of oestrogen plus progesterone on hip fracture, but the combination is probably at least as effective as oestrogen alone.

Calcium and vitamin D supplements taken during later life to reverse hyperparathyroidism due to vitamin D and calcium deficiency can reduce the incidence of hip fracture. A three-year study of elderly ambulatory women living in a nursing home found that daily use of supplements (1.2 g of calcium and 800 IU of vitamin D(sub 3)) reduced the number of hip fractures by 23 percent and increased bone density in the proximal femur. (Meunier et al. 1994). Another study found evidence of gonadal deficiency in 71 percent of older men with hip fractures, as compared with 32 percent of control subjects matched for age and race, suggesting that fractures in men may also be preventable with hormone-replacement therapy. (Jackson et al. 1992) Although some studies suggested that thiazide diuretics may prevent hip fractures by reducing calcium excretion, one study found an increased risk of hip fracture among older adults taking furosemide. (Heidrich et al. 1991) Use of other drugs, such as calcitonin, fluoride, and etidronate, to increase bone density is still experimental but deserves further evaluation. (Gamble 1995).

Recently a systematic review of RCTS (Randomized Controlled Trials), completed within the Cochrane Collaboration looked at the effectiveness of Vitamin D and calcium supplementation in reducing fractures (Gillespie et al. 1996). This review demonstrates that there is potential to prevent fractures in older people by vitamin D and/or calcium supplementation. One possible way to implement this intervention would be to promote exposure to sunlight and increased consumption of dairy products. However, dietary supplementation in older people at high risk of fractures is likely to be a better option. There is not sufficient information to decide on the most cost-effective strategy.

However, the so far most extensive review has been made by INAHTA (Hailey et al. 1996) in a project called "Project on the effectiveness of bone density measurement and associated treatments for prevention of fractures". Many methods have been used to measure the mass of bone in relation to length. DXA is currently the most common method in several countries for routine. Fractures are an important problem because of the high incidence and associated morbidity and mortality, particularly hip fractures and particularly in women. BDM is poor at determining present fracture risk since it cannot distinguish clearly between patients with fracture and those without. "It is estimated, under realistic assumption, that a bone screening program would lead to the prevention of only 2% of fractures in menopausal women (screening uptake of 50%, sensitivity of 38%, reduced fracture risk of 30% with Hormone Replacement Therapy (HRT), lifetime compliance with HRT of 30%.)

Primary prevention and secondary prevention shows that there is good evidence to support that HRT preserves bone mass "starting early after menopause". Starting late after (more than years) has small effect: when calcium is added the effect is stronger.

In summary: "There is fair evidence that continued long-term use of Hormone Replacement Therapy has a protective effect for fractures "but" there is fair evidence that there is no decrease in risk for hip

fracture at older ages with ever use of HRT". "At old ages, when most hip fractures occur, there was no statistically significant difference in fracture risk with ever and never users of HRT". INAHTA present a scenario based on a hypothetical cohort:

"20,000 women were invited for screening,
10,000 accepted,
1,600 have a bone density of less than one Standard Deviation below the population mean and were offered HRT.
576 are true positives
173 will comply with therapy
52 fractures will be prevented
1,024 are false positives"

"Consequently 393 women would need to be invited for screening in order to avoid one fracture. Current data also suggest that use of HRT is associated with a 40 to 50% reduction in the risk of coronary heart disease among postmenopausal women and an increased risk of 30 to 70% for breast cancer, independent of levels of bone mass. The conclusion is that the current available evidence does not support use of BDM screening of menopausal women in combination with HRT or SCT (N) in the context of population or opportunistic screening for the prevention of fractures, and estimates based on what data are available are not encouraging about its potential effectiveness".

6.4.3 Technology interventions using personal equipment to prevent injuries for elderly

An entirely different approach to the prevention of hip fracture is the use of protective hip pads in undergarments. In a study from Denmark on the effect of hip protectors (Lauritzen et al. 1993) in 10 of the 28 wards in the nursing home were randomised to receive external hip protectors; thus 167 women and 80 men were given protectors and 277 and 141 men no protectors. A fall register was set up for 2 treatment wards and 2 control wards. There were 8 hip and 15 non-hip fractures in the hip-protector group and 31 hip and 27 non-hip fractures in the control group. The relative risk of hip fractures among women and men in the intervention group was 0.44. None of the 8 residents in the intervention group who had a hip fracture was wearing the device at the time of the fracture. 154 falls were registered and 20% of these falls produced a direct impact to the hip. In 25 falls direct impact to the hip was sustained at a time when hip protectors were not being worn, and 6 fractures were produced. Thus, it was found a 66 percent reduction in the risk of hip fractures among nursing home residents wearing protective pads. One in five falls resulted in a direct impact on the hip; none of the patients in the intervention group had hip fractures while wearing the pads. The study indicates that external hip protectors can prevent hip fractures in nursing home residents.

6.4.4 Organisational interventions preventing injuries to the elderly

Home assessments and surveillance

In a randomised controlled trial, Tinetti et al. (1994) evaluated the effect of a home visit by a nurse and a physical therapist to assess postural hypotension, use of sedative-hypnotic medication, use of

four or more prescription medications, difficulty transferring to the toilet or bathtub, hazards in the home, impairment in gait, and muscle strength or range of motion in the arms and legs. Interventions consisted of discontinuation of medication, elimination or modification of hazards in the home, exercise programs, gait training, and behavioural modification tailored to individual needs. The combined interventions reduced the risk of falling by 21 percent.

Interventions in institutional settings

Gillespie et al. (1997) has presented another review of RCT interventions to reduce the incidence of falling in the elderly in the community dwellings or institutions. For each included trial, quality assessment and data extraction was carried out by two reviewers. The outcomes from individual trials were analysed and results from similar groups of trials pooled together.

Eighteen trials and one pre-planned meta-analysis were included. Interventions targeting multiple risk factors after individual assessment (pooled OR 0.77; 95% CI 0.64 to 0.91), and behavioural interventions targeting environmental hazards plus any other risk factor (pooled OR 0.81; 95% CI 0.71 to 0.93) significantly reduced the incidence of falling. There was no evidence to support a single intervention e.g. exercise (pooled OR 1.05 95% CI 0.74 to 1.48) or health education classes (OR 1.25; 95% CI 0.51 to 3.03) for the prevention of falls.

A randomised controlled trial (Rubenstein et al. 1990) from a long-term residential care facility for elderly persons included an intervention group of 79 people and a control group of 81. The assessment included a detailed physical examination and environmental assessment by a nurse practitioner, laboratory tests, electrocardiogram and 24-hour Holter monitoring. Through use of the assessment, many remediable problems (for example weakness, environmental hazards, orthostatic hypertension, drug side effects, gait dysfunction), were detected. At the end of the two-year follow-up period, the intervention group had 26% fewer hospitalisations and a 52% reduction in hospital days compared with controls. Patients in the intervention group had 9% fewer falls and 17% fewer deaths than controls by two years.

At 16 senior centres, Reinsch et.al. (1992) studied the effectiveness of exercise and cognitive behavioural programs, compared with a discussion control program, in reducing falls and injuries among 230 older adults. After one year of the programs, they observed no significant difference in time to first fall. Even though a relatively high percentage (38.6%) suffered at least on fall, only 7.8% of these community residing elderly required medical attention. Secondary outcome measures such as strength, balance, fear of falling, and perceived health did not significantly change.

6.4.5 Community interventions preventing injuries to the elderly

Exercise trials

Weight-bearing exercise has been associated with a reduced risk of hip fracture. (Tinetti et al. 1993). In a large prospective study, active exercise was associated with a 40 percent reduction in the risk of fracture for women and a 50 percent reduction for men (Paganini-Hill et al. 1991).

A meta-analysis of data from seven randomized, controlled trials concluded that exercise programs alone appear to reduce the risk of falls by 10 percent; combining these programs with balance training reduced the risk by an additional 7 percent (Province et al. 1995). These seven studies make up set of linked RCTs at separate sites examining exercise alone or with other interventions carried out under the "Frailty and Injuries Cooperative Studies of Intervention Techniques" (FICSIT) (Oakley et al. 1996). All these trials measured the effect of the intervention on the rate of falls. Two took place in nursing homes and five were community-based. All the interventions included an exercise component for 10-36 weeks, sometimes combined with other interventions, mainly balance training, and follow up lasted 2-4 years. If the results of the pooled studies only included balance training the reduction in the risk of falling was 25 % (Oakley et al. 1996). In one trial offering balance training exercise Thai Chi a had 37% lower risk of falling than the non-intervention group (Wolf et al. 1993).

In a meta-analysis made by Oakley et al. (1996) they ended up with thirty-six trials with interventions to prevent falls the above FICSIT trials are included. In addition they identified 16 RCTs with exercise interventions. The outcome differed and was falls, postural stability, sway or balance, strength, and quality of life. They also vary according to the populations studied, the risk of falling, the type and duration of exercise intervention, how it was delivered and the length of follow up.

Oakley et al (1996) conclude that these studies which report intermediate outcomes contribute little in the way of direct evidence for the prevention of falls. They do however provide evidence for the acceptability of various exercise programs in this age group. Overall, despite the variable quality of these studies, the results from these and the FICSIT trials provide reasonable evidence to suggest that exercise offers potential benefits in reducing the risk of falls and some risk factors for falls. Those interventions that use balancing exercise, and low impact aerobic exercise, appear to be the most promising.

Exercise may be used as an adjunct or an alternative to medication for the prevention of osteoporosis in the elderly (Gamble 1995).

In a controlled trial (Tinetti et. al. 1994) 301 men and women living in the community who were at least 70 years of age were given either a combination of adjustment in their medications, behavioural instructions, and exercise programs aimed at modifying the risk factors or usual health care plus social visits (intervention group 153 subjects, control group 148 subjects.) During one year of follow-up, 35% of the intervention group fell as compared with 47% on the control group. The multiple-risk-factor intervention strategy thus resulted in a significant reduction in the risk of falling among elderly persons in the community.

Svanström et al. (1996) has shown similar results for a whole community in a quasi-experimental design. This was based on the fact that the current picture of fatal injuries in Sweden is dominated by falls, which account for about 40%. Furthermore, falls are by far the most dominating cause of hospital in-patient care (57%). The incidence of femoral fractures in Lidköping shows a significantly declining trend for females (-6.6% per year) and (a -5.4% decline for males during the study period of 1987-1992. The control area of Skaraborg County showed a minor decrease and Sweden as a

whole showed an increasing trend during the same period. In spite of the methodological problems of attributing effects in quasi-experiments, there is support for the claim that the declining trend in the trial area was largely the result of the intervention program.

Ray et al. (1997) gives support through a randomised controlled trial with randomisation of nursing homes. Seven pairs of middle Tennessee nursing homes with one facility in each pair randomly assigned to the intervention. Facilities had 482 (261 control, 221 intervention) residents who qualified for the study. The mean proportion of recurrent fallers and incidence rate of injurious falls in the facility in the year following the intervention was measured. The mean proportion of recurrent fallers in intervention facilities was 19.1% lower than that in control facilities. Intervention facilities had a non-significant trend toward a lower mean rate of injurious falls. Subgroup analyses suggested greatest benefits for residents for whom the recommended interventions were carried out or who had three or more falls in the preceding year.

Intervention targeted four specific safety domains: environmental and personal safety, wheelchairs, psychotropic drugs and transferring and ambulation.

Plautz et al. (1996) has reported on the trial established by the Department of Public Health, City and County of San Francisco - the Community and Home Injury Prevention Program for Seniors (CHIPPS) to reduce the rate of unintentional injuries among elderly residents. The objective was to reduce rates of falls, scalds and burns. A one group, pre-test/post-test design was used to compare self-reported falls, scalds and burns for six-month periods before and after the intervention. The intervention used 10 person hours of unskilled labour and \$93 worth of materials on average and included home safety assessments and modifications such as removing clutter; installing hand rails, grab bars, nonskid strips; and securing rugs and electrical cords.

Reported falls were reduced by 60% after the intervention, from 0.81 to 0.33 falls per person year. Scalds were reduced from 9 to 0 and burns from 7 to 0 during the six-month periods before and after the intervention.

Ploeg et al. (1994) has evaluated effects of public health nurses intervention. Public health clients age 65 years and older were randomly allocated to receive an intervention by a public health nurse during a home visit, promoting either safety behaviours or influenza immunisation. 68 clients reported making a total of 103 safety changes, with almost equal proportions making changes in the safety and influenza groups. A higher percentage of males than females (25,0% against 17,3%) reported making safety changes following the intervention.

6. 5. Interventions to prevent violence or self-inflicted injuries

DuRant et al. (1996) has compared the effectiveness of the violence prevention curriculum for adolescents to conflict resolution with a curriculum for youth providers among middle school students. Two schools were randomly assigned to one of the curricula.

Students who received either curriculum reported significant decreases in their self-reported use of violence in hypothetical conflict situations, frequency of use of violence in the previous 30 days, and frequency of physical fights in the previous 30 days. The conflict resolution curriculum was more effective in reducing the frequency of fights resulting in an injury requiring medical treatment in the previous 30 days.

In Europe, most attention to suicide prevention strategies have occurred in Scandinavia, with Finland having a very sophisticated program based on exclusive national psychological autopsy study, and both Sweden and Norway having their own programs (Hawton et al. 1997). In Belgium and the Netherlands, suicide prevention is currently not included in public health policy. However, in Belgium efforts are being made by the Minister of Health to develop a suicide prevention program. In the United Kingdom the government has established two suicide targets for the year 2000. The first target is a reduction in the overall suicide rate by 15%, the second a reduction in the suicide rate of people with severe mental illness of 33%.

Public health nurses have been organised to work with adolescent suicide prevention programs. A review over eleven programmes (Ploeg et al. 1995) included with 3 quasi-random controlled trials; 5 cohort studies: 1 retrospective matched cohort; 2 trials of Solomon Four Group Design. The studies were combined qualitatively, according to outcome measured. No statistical test of heterogeneity was conducted. Three studies examined changes in suicide risk, with two studies showing significantly greater reduction in suicide risk, specifically depression, anxiety and emotionality, than the control groups. The reviewed studies demonstrated a relatively consistent, positive impact of programs on knowledge related to suicide. Of the eight studies that evaluated changes in knowledge, six found that knowledge increased. Nine studies examined the effects of the suicide prevention programs on student's attitudes related to suicide, such as attitudes towards disclosure of suicidal intention, attitudes towards seeking help from adults and professional and attitudes towards helping suicidal peers. Four studies examined the effects of the suicide prevention programs on self-rated measures of coping.

Results were inconsistent, with two studies showing a significant positive change in coping skills. The review showed serious methodological limitations of the studies reviewed. The evidence suggests that they may be both beneficial and harmful effects of suicide prevention programs for adolescents.

One review (Mari & Streiner 1997) on family intervention for schizophrenia provides no data to suggest that family intervention either prevents, or promotes suicide.

6.6. Studies describing social interventions on injuries

Preston (1995) has considered social group issues. Most pedestrian accidents occur in built up areas, and the very young are most likely to be injured on minor roads, very near home, especially in inner-city areas. "People in the Registrar General's social classes IV and V - semiskilled and unskilled manual workers - suffer higher death rates, from most causes, than those in social classes I - professional people, but one of the highest social class gradients is seen in death due to pedestrian accidents." (Office of Population Censuses and Surveys 1978).

If the need to travel could be reduced so that more journeys could be undertaken by cycling or on foot and fewer people travelled by car the roads would be safer, but this is a very long-term target. The reduction of traffic speeds is most important in the short term. Many countries have introduced traffic calming measures and before and after studies confirmed their success. Traffic calming is intended to reduce speed to about 20 miles per hour and this would reduce the number and severity of casualties to children crossing the road. However, much lower speeds are necessary in residential areas if children are to play outdoors in safety.

In Sweden all traffic is banned in some neighbourhoods (Thulin 1986). "There is no reason to think that low death rates for children in the Netherlands and Sweden is due to some difference in national character rather than physical safety measures." Similar reductions in accidents to children were accomplished in Salford in the 1930s. When "play streets" were introduced the number of children injured was nearly halved and the number killed was reduced from 11 in 1931 to 1 in 1936 (Godfrey 1937). The possibility of accident migration must be considered seriously but the evidence, from Sweden, the Netherlands, and Salford, suggests that playing on the roads in residential safety zones does not lead to an overall increase in accidents.

Roberts (1995) show parents participating in the Auckland Child Pedestrian Injury Study, a community based case-control study, were invited to support a series of recommendations based on the study results, by signing and returning a petition that was to be delivered to the New Zealand Minister for Transport. 31% of the parents signed and returned the petition; 19% were parents of cases and 36% were parents of controls.

The socio-demographic groups whose children were at the lowest risk of pedestrian injury were the most likely to return the petition. Children in the most disadvantaged socio-economic group and children of Pacific Island parents were at greatest risk of injury but the parents of these children were the least likely to respond to the petition. The conclusion is that the frequency with which parents advocate for child safety varies inversely with the need for it. "Models of health promotion based on community ownership and empowerment alone are unlikely to address the steep socio-economic gradients in childhood injury mortality."

"Parents in the high risk groups, being disproportionately disadvantaged, undoubtedly had more pressing problems to deal with, in particular those surrounding the need to secure an income, and to feed, clothe, and house the family". There is also some suggestion that parents in the high-risk groups are more suspicious of officialdom and were, therefore, reluctant to put their names to a petition to a government minister. It also may be possible that the parents of children in the high-risk groups thought it unlikely that a petition to a minister would have any tangible benefit at the level of their locality.

Community development and empowerment are concepts that are gaining wide spread appeal in the "new" public health (Peterson 1994). The Ottawa Charter for Health Promotion equates community empowerment with a community's "ownership and control . . . of its own endeavours and destinies" (World Health Organisation 1986).

"In the present political climate community empowerment has a strong political connotation. The concept justifies, in the name of health, curtailing state responsibilities in order to increase community control. In this study, it might be reasonable to infer that parents who supported the study recommendations, by signing the study petition, felt that doing so would have some effect (Roberts 1995)." To the extent that they did, these parents felt "empowered" to effect the change. "The message behind these results is that while decentralisation of decision making will undoubtedly benefit some communities, the benefits are unlikely to be distributed equally throughout society. There are steep socio-economic gradients in child pedestrian injury mortality." In Britain, children in social class V are over four times more likely to die in a pedestrian motor vehicle collision than are children in social class I (Woodroffe " et al. 1993). If the responsibility for implementing strategies for child pedestrian safety rests solely with parents these gradients are likely to persist, at least in part, because the ability to advocate for child safety varies inversely with the need for it.

6.6. Safety promotion at the local level - safe community interventions

Although injury control could be undertaken on all levels, the community-based model, adapting interventions to the local cultural, social and organisational environment and emphasising broad community participation, has emerged as one of the most promising models for injury prevention, but so far few studies on effectiveness have been internationally published (Towner 1994).

Community interventions may be distinguished by their shift away from the focus on individual responsibility and towards multi-faceted community wide interventions that ensure that everyone in a community is aware or involved. Popay & Young (1993) have reviewed community wide injury interventions. They identified two dominant approaches: the health planning approach that emphasises behaviour change and safety education and the community participation approach that emphasises changing the physical environment where local people shape the intervention.

Most of the evaluations of these community-based programs use a simple before-after design with no control group and are not considered further. The remainder use non-randomised controlled trials comparing an area that received the intervention with one that did not. However, in several cases the control area was insufficiently comparable with the study area, so introducing the possibility of significant bias. Only one evaluation used several intervention and control communities (Guyer et al. 1989).

As far as we know The Falköping Accident Prevention Program (FAPP) is the first evaluated comprehensive programme aiming at promoting safety and preventing injuries at the local community level. The notion behind is to address all kinds of safety and prevent injuries in all areas, addressing all ages, environments and situation and involving non-governmental as well as governmental community sectors. FAPP is based in Skaraborg County, Sweden. An injury register was started in 1978 and intervention began in 1979. Three years later the total rate of injuries had fallen by 23%. In Falköping home injuries decreased by 26.7%, occupational injuries by 27.6%, traffic injuries by 27.7% and other injuries by 0.8% (Schelp 1987). The injury incidence amounted during study period I (1978) to 113 accidents per 1,000 per year, while the corresponding incidence number for study period II (1981/82) amounted to 98 per 1,000 per year, and for 1983 to 95 per 1,000 per year.

In a pioneering study, Schelp (1988) developed a community intervention model for accident prevention using a broad co-operation between local authorities, organisations, associations and individuals. This program combined an initial organisation-oriented perspective with an increasing citizen-oriented perspective, thus combining top-down with bottom-up strategies in a consensus-building model. The program was developed in eight steps: 1) Epidemiological mapping, 2) Selection of risk groups/ -environments, 3) Forming multidisciplinary working and reference groups, 4) Joint planning of action program, 5) Implementation, 6) Evaluation, 7) Modification, and 8) Transfer of experience to the rest of the county. The preventive program consisted of a) information/advice through local media, child health centres and other public locations; b) education and instruction for groups who had contact with the target groups (children, elderly and selected occupational groups); c) supervision through checklists and safety-visits; and d) environmental changes.

A corresponding decrease in the number of other emergency visits, i. e. non-accident related, has not been noticeable during the same period of time. The incidence of home injuries in the study area decreased from 26 per 1,000 per year in 1978 to 17 per 1,000 per year in 1981/2 (Schelp & Svanström 1986). In 1978 there were 49 occupational injuries per 1,000 gainfully employed persons/per year whereas the corresponding figure for 1981/2 was 34 occupational accidents per 1,000 gainfully employed persons/year (Schelp & Svanström 1986).

The program has then been followed over the period from 1978-1991 (Svanström et al. 1996), using indicators of processes as well as outcome. Since 1983 the outpatient injury rate has levelled off and the inpatient rate shows an average annual increase of 8.7% for females and 4.9% for males, which is significantly higher than the increase for Sweden, which is 2.3% for females and 0.5% for males.

For injuries seen in either ambulatory or hospital settings, it seems that the effect of the early phase of the program was the lasting one, but for injuries admitted to hospital the effect was temporary. The onset of the increase by the end of 1982 coincides with the break-up of the cross-sectoral organisation originally set up to run FAPP.

In 1991, the local authorities in Falköping again established a cross-sectoral organisation and revitalised the program. The organisational changes that followed, and the improved surveillance system introduced in 1992, have re-established the Falköping Accident Prevention Program. In the beginning of 1980's the programme was followed by others in Norway like Vaeroy and Harstad and Sweden, like Lidköping and Motala.

In the program implemented in Motala municipality in the western part of Östergötland County in Sweden. The incidence on non-trivial injuries treated in health care decreased by 41%, while the trivial injuries increased by 16% (Timpka et al. 1998). The theoretical framework for the program was based on general health promotion concepts and a participation strategy for community involvement. Program goals, which are synonymous with the Safe Community criteria (Svanström 1992), include organisation of a local cross-sectoral reference group, reliance on existing local community networks, coverage of all ages, environments and situations, empowerment of the socially weak; and continuous tracking of high risk environments and groups.

The incidence of injuries in an intervention municipality (population 41,000) was compared to the injury incidence in a control municipality (population 26,000) immediately before and one year after the program implementation from registrations made during all first-contact health care visits and from examination of hospital discharge registers. The incidence of health care treated injuries had decreased by 13% from 119 (per 1,000 population years) to 104. In the control area, corresponding injury incidences were 104 and 106. The hospital-treated injuries decreased by 15% from 19 per 1,000 population years to 16, while in the control area the incidences remained at 13 per 1,000 population years (Lindqvist et al. 1998). The larger decrease of non-trivial injuries was observed in all ages and injury event environments. The total number of bed days at emergency hospitals due to injuries decreased by 39% from 1983-84 to 1989, while the hospital bed utilisation for other reasons decreased by 9%.

Implementation of a WHO Safe Community program led to that the harm from unintentional injuries within the community being considerably more reduced than the injury incidence.

In both Norway and Sweden, several community-based accident prevention studies have been undertaken over the last 20 years, allowing for some accumulation of experiences and results. In Table 6:1, these studies are summarised

Table 6:1 Summary of results in accidental injury prevention programmes

Project/reference	Study design	Targets for intervention	Duration	Results
Værøy (Tellness, 1985)	Pre and post	All accidental injuries	2 years	29%
Falkøping (Schelp 1987)	Quasi-experimental	Home accidents	3 years	27%
		Occupational accidents	3 years	28%
		Traffic accidents	3 years	28%
Motala (Lindqvist 1993)	Quasi-experimental	Environmetnal change	2 year	37%
Harstad (Ytterstad 1995)	Quasi-experimental	Burns in children	7 years	53%
		Traffic injuries	5 years	27%
		Fall-fractures elderly	5 years	26%
		Skiing injuries	3 years	15%

The best evaluated programme in Norway is in Harstad (Ytterstad 1995). In a quasi experimental study (Ytterstad & Wasmuth 1995), hospital-treated traffic accident injuries were recorded prospectively for seven and a half years in two Norwegian cities, Harstad and Trondheim. Traffic safety was promoted in a comprehensive community program in Harstad, with Trondheim as a control. A 27% overall reduction of traffic injury rates was found in Harstad from period 1 to period 3 (each period 30 months duration), whereas a correspondent significant increase was found in the comparison city. Promotion of bicyclist helmet use and pedestrian safe behaviour was implemented by activating public and voluntary organisations and media (Ytterstad 1995). A traffic safety pamphlet containing local traffic injury data was distributed. Changes were made in the physical traffic environment. Significant rate reductions were observed below the age of 16 for both bicyclists (37%) and pedestrians (54%). For bicyclists this reduction was larger among males (43% than females 23%). Head injury rates decreased for bicyclist children below 10 years of age but increased for those 10-15 years old.

Accident analyses based on the local database revealed coffee to be the most frequent liquid causing scalds, which mostly occurred in the kitchen (Ytterstad & Sögaard 1995). Sixty-six per cent of the injured were boys and two-thirds were below two years of age. From the first to the second of the three periods the mean burn injury rate decreased 53%, from 53 to 25 per 10,000 person years. In the Reference City located 1,000 km away, the rates increased from 62% to 68 per 10,000 person years.

Fall- fracture rates did not decline in nursing homes but decreased 26% in private homes (Ytterstad 1995). For 65-79 year olds a 49% reduction was observed for males in traffic areas in winter. The data from the reference city Trondheim suggested a significant rise in fall-fractures. From private homes a 17% reduction of hospital admission rates was observed, indicating a substantial saving in short term hospital cost. The observed fall fracture rate reductions in private homes and traffic areas suggest that major parts of the interventions were effective.

Sports injuries account for considerable morbidity and expenditure of resources (Ytterstad 1995). It accounted for 17% of recorded unintentional injuries in Harstad. Two out of three injuries occurred in team sports. Soccer accounted for 45% of all sports injuries. Downhill skiing injuries had higher mean score on the abbreviated injury scale than all other sports analysed combined. A prevention program targeting downhill skiing injuries was evaluated. Post- intervention injury rates for downhill skiing was reduced by 15% when adjusting for exposure.

A big trial was conducted in Denmark (Frimodt-Möller 1994, 1996). Since 1989/90 prospective injury registration has taken place in the emergency departments of five Danish hospitals with defined catchment areas covering 38 municipalities with a total population of 740,000 (14% of the Danish population). Five municipalities were engaged in a quasi-experimental study in 1990-92 to demonstrate a community-based intervention model. After intervention and compared with control areas the relative risk of injuries in different study areas was significantly reduced regarding home and play accidents among children 0-5 years (8%), accidental falls among persons 60 years and above (22%), bicycle accidents among children 6-16 years (54%), occupational accidents among persons 16-69 years (15%) and risk of eye injuries in occupational accidents was reduced by 19%.

Outside the Nordic countries the Safe Community Model has been especially popular in Australia. Jeffs et al. (1993) reports on the Illawarra area of New South Wales. Data from local hospital emergency departments have been used as the basis for a "community information" strategy, in "an attempt to replicate this overseas experience in an Australian setting". Reductions of 17% in attendances by children for injuries and a 14% fall in accident-related hospital admissions of children have been observed over the course of the four year period, 1987-1991 before and after the intervention.

In a study aiming to evaluate the Latrobe Valley Better Health Injury Prevention Program, a community-based intervention in south east Victoria, Australia (Day et al. 1997) the evaluation design included pre- and post-intervention observations in a population of approximately 75,000. There was no single comparison community, rather comparative data was used where possible. Process measures included key informant of interviews with local organisation representatives. Impact evaluation relied mainly on self-reported changes in injury risk and protective factors, gathered by a random telephone survey. Outcome evaluation was based on five years of emergency department injury surveillance data for the Latrobe Valley. Promotional and educational activities were implemented in the targeted areas of home, sport, and playground injuries, and alcohol misuse among the youth. Some 51,000 educational contacts were made with the community and 7470 resource items distributed. There was a 7.3% increase in the proportion of households purchasing home safety items. Unsafe equipment was replaced and under-surfacing upgraded in municipal playgrounds. The demand for and availability of protective equipment for sport increased.

The age standardised rate per 100,000 persons for emergency department presentations for all targeted injury fell from 6594 in the first program year to 4821 in 1995/96. There were significant decreases in the presentation rates for home injuries among all age groups except for those 65 years and over, playground injuries among 5-14, 15-24 and 25-64 years old and sport injury among 15-24 year olds only. The direct program cost per injury prevented was \$ 272. Significant reductions were observed for assaults among 10-24 year olds compared to those over 25 years. The conclusion is that the reductions were associated to some extent with changes in injury risk and protective factors and were greatest for the injury issues subjected to the most intense activity.

The Safe Community Model has in the USA been applied mostly to the Traffic Safety Sector - Officially adopted by the NIHTSA. Support for that can be found for example in a community study published by Hingson et al. (1996). The purpose was to assess whether a community program began in that organised multiple city departments and private citizens could reduce alcohol impaired driving, related driving risks, and traffic death and injuries. Trends in fatal crashes and injuries per 100 crashes were compared in Saving Lives Program cities and the rest of Massachusetts from March 1984 through February 1993.

In program cities relative to the rest of Massachusetts during the five program years in comparison with the previous five years, fatal crashes declined 25%, from 178 to 120, and fatal crashes involving alcohol decreased 42%, from 69 to 36. The proportions of vehicles observed speeding and teenagers who drove after drinking were cut in half. The conclusions are that interventions organised by multiple city departments and private citizens can reduce driving after drinking, related driving risks, and traffic deaths and injuries.

Safe communities

Based on research and the developmental work in Falköping and other early community prevention projects, a Safe Community model for injury prevention has been developed by WHO (WHO 1989). The idea of 'safe community' is rapidly catching on among Nordic municipalities as a program for improving safety and health and thereby the quality of life for the population. The symbolic attractiveness of being recognised as a WHO Safe Community has obviously been a strong motivating factor for some politicians and decision-makers.

References

- Agran P, Dunkle D, Winn D.* Effects of legislation on motor vehicle injuries to children. *Am J Dis Child* 1987;141:959–64).
- Andersson R & Svanström L.* Critical Factors Required for the Successful Mobilisation of Communities to Enhance Safety. Manuscript prepared for Seminar on Safety and Safety Promotion: Conceptual and Operational Aspects. Château Frontenac, City of Quebec, Canada. February 5 and 6, 1998. Karolinska Institutet, Department of Public Health Sciences, Division of Social Medicine. 1998.
- Bablouzian L, Freedman ES, Wolski KE, Fried L E.* Evaluation of a community based childhood injury prevention program. *Injury Prevention* 1997;3:14–6.
- Bass JL, Christoffel KK, Widome M, Boyle W, Scheidt P, Stanwick R, Roberts K.* Childhood injury prevention counselling in primary care settings: A critical review of the literature. *Paediatrics*; 1993;92:544–50.
- Bergman AB, Rivara FP, Richards DD, o a.* The Seattle Children's Bicycle Helmet Campaign. *Am J Dis Child* 1990;144: 727–31.
- Bryan-Brown K.* The effects of children's traffic club. In: Department of Transport: Road accidents in Great Britain, 1995.
- Cameron MH, Vulcan AP, Finch CF, o a.* Mandatory bicycle helmet use following a decade of helmet promotion in Victoria, Australia – an evaluation. *Accid Anal Prev* 1994;26:325–37.
- Carpenter GI, Demopoulos GR.* Screening the elderly in the community: Controlled trial of dependency surveillance using a questionnaire administered by volunteers. *British Medical Journal* 1990; 300:1253–6.
- Carter N, Menckel E.* Near accident reporting: A review of Swedish Research. *Journal of Occupational Accidents* 1985;7:41–64.
- Chapuy MC, Meunier PJ.* Prevention and treatment of osteoporosis. *Aging* 1995; 7: 164–73.
- Christian MS, Bullimore DW.* Reduction in accident injuries severity in rear seat passengers using restraints. *Injury* 1989; 20:262–4.
- Clarke A, Walton WW.* Effect of safety packaging on aspirin ingestion by children. *Paediatrics* 1979;63:687–93.

Coleman P, Harper R, Kent G, Munro J, Nicholl JP, Wild D. The effectiveness of interventions to prevent accidental injury to adolescents and young adults aged 15–24 years: A review of the evidence. Report to the Department of Health. June 1985. Sheffield Centre for Health and Related Research.

Coleman P, Munro J, Nicholl J, Harper R, Kent G, Wild D. The effectiveness of interventions to prevent accidental injury to young persons aged 15–24 years: a review of the evidence. Medical Care Research Unit, Sheffield Centre for Health and Related Research, University of Sheffield, 1996.

Colver A, Hutchinson P, Judson E. Promoting Children's Home Safety. *BMJ* 1982; 285:1177–80.

Day L M, Ozanne-Smith J, Cassell E, McGrath A. Latrobe Valley Better Health Project. Evaluation of the injury prevention program 1992–1996. VicHealth. Accident Research Centre. Report No 114. July 1997.

Dawson-Hughes. *The New England Journal of Medicine*, no september 4, vol 337, 1997.

Department of Trade and Industry. Child safety equipment for use in the home. London: DTI, Home and Leisure Accident Research, 1991.

Downing C. Evaluation of the impact and penetration of a children's traffic club. Second International Conference on Road Safety. Groningen, 1987.

Dowswell T, Towner EML, Simpson G, Jarvis SN. Preventing childhood unintentional injuries – what works: A literature review. *Injury Prevention* 1996;2:140–9.

DuRant RH, Treiber F, Getts A, McCloud K, Linder CW, Woods ER. Comparison of two violence prevention curricula for middle school adolescents. *Journal of Adolescent Health* 1996;19:111–7.

Effective Health Care. Nuffield Institute for Health, University of Leeds. NHS Centre for Review and Dissemination, University of York Effective Health Care. Preventing falls and subsequent Injury in older people. *Effective Health Care*. April 1996 Vol. 2 No. 4.

Effective Health Care. June 1996, Vol 2, No 5. Nuffield Institute for Health, University of Leeds, NHS Centre for Reviews and Dissemination, University of York

Ekman R, Schelp L, Welander G, Svanström L. Can a combination of local, regional and national information substantially increase bicycle-helmet wearing and reduce injuries? Experiences from Sweden. *Accid Anal and Prev.* 1997;29:321–8.

Erdmann TC, Feldman KW, Rivara FP, Heimbach DM, Wall HA. Tap water burn prevention: The effect of legislation. *Paediatrics* 1991;88:572–7.

Foxcroft DR, Lister-Sharp D, Lowe G. Alcohol misuse prevention for young people: a systematic review reveals methodological concerns and lack of reliable evidence of effectiveness. *Addiction* 1992; 5:531–7.

Frimodt-Möller, B. Ulykker kan forebygges. Model for ulykkesforebyggelse i lokalsamfundet. (Accidents can be prevented. Model for Accident Prevention in the Local Community. Report on the Five-Cities-Project) Sundhedsstyrelsen. Sek-teriatet for Ulykkesregistret. København, Denmark 1994. (In Danish).

Frimodt-Möller B. Community-based in-jury prevention – success or failure? Results from the 5 Community Projects in Denmark. Abstract. The 3rd International Conference on Injury Prevention and Control. Melbourne 1996.

Gamble CL. Osteoporosis: drug and nondrug therapies for the patient at risk. *Geriatrics* 1995;50:39–43.

Gillespie WJ, Henry DA, O’Connell DL, Robertson J. Vitamin D, Vitamin D analogues and calcium in prevention of fractures involuntal and post-menopausal osteoporosis. *Cochrane Database of Systematic Reviews* 1996; Issue 3.

Gillespie LD, Gillespie WJ, Cuming R, Lamb SE, Rowe BH. Interventions to reduce the incidence of falling in the elderly. NHS Centre for Review and Dissemination. The University of York. 1997.

Gillespie LD, Gillespie WJ, Cumming RG, Lamb SE, Rowe BH, Interventions to reduce the incidence of falling in the elderly. *Cochrane database*, Date of most recent substantive amendment 26/08/1997

Godfrey CV. Road sense for children. Oxford: Oxford University Press, 1937.

Gorman R, Charney E, Holtzman N, Roberts KA successful citywide smoke detector giveaway program. *Paediatrics* 1985;75:14–8.

Grady D, Rubin SM, Petitti DB, et al. Hormone therapy to prevent disease and prolong life in postmenopausal women. *Ann Intern Med* 1992;117:1016–37.

Graitcer PL, Kellerman AL & Christoffel T. A review of educational and legislative strategies to promote bicycle helmets. *Injury Prevention* 1995; 1:122–9.

Gryfe C, Amies A, Ashley M. A longitudinal study of falls in an elderly population; Incidence and morbidity. *Age and Aging* 1977;6:201–20

Guyer B, Gallagher S, Chang B, Azzara C, Cupples L, Colton T. Prevention of child-hood injuries: Evaluation of the State-wide Childhood Injury Prevention Program (SCIPP) *Am J Public Health* 1989;79:5121–7.

Haglund B, Svanström L. Effects and effectiveness of prevention of accidents, injuries and violence. Karolinska Institutet, Dept Public Health Sciences, Div Social Medicine. Stockholm 1998.

Hailey D, Sampietro-Colom L, Marshall D, Rico R, Granados A, Asua J, Sheldon T. INAHTA project on the effectiveness of bone density measurement and associated treatments for prevention of fractures. Statement of findings. Published on behalf of the International network of Agencies for Health Technology Assessment by: Alberta Heritage Foundation for Medical Research, Canada. 1996.

Hanley J, Choi S. Commentary: Statistical perspectives on the Lidköping papers. *Injury Prevention* 1996;2:133–4.

Hawton K, Arensman E, Townsend E. Treatment of suicide attempters. Systematic review of treatment studies of patients who have attempted suicide. Review 1997.

Heidrich FE, Stergachis A, Gross KM. Diuretic drug use and the risk for hip fracture. *Ann Intern Med* 1991;115:1–6.

Hindmarch JJ, Estes EJ. Falls in older persons. Causes and interventions. *Archives of Internal Medicine* 1989;149: 2217–22.

Hingson R, McGovern T, Howland J, Heeren T, Winter M, Zakocs R. Reducing alcohol-impaired driving in Massachusetts: the Saving Lives Program. *American Journal of Public Health* 1996;86: 791–7.

Hornbrook MC, Stevens VJ, Wingfield DJ, Hollis JF, Greenlick MR, Ory MG. Preventing falls among community dwelling older persons: Results from a randomised trial. *The Gerontologist* 1994;34:16–23.

Injury Prevention. Editorial. Perspectives on evaluating community programs. *Injury Prevention* 1996;2:81–3.

Jackson JA, Riggs MW, Spiekerman AM. Testosterone deficiency as a risk factor for hip fractures in men: a case-control study. *Am J Med Sci* 1992;304:4–8.

Jansson B. Samhällets utgifter för personskador – en förstudie. Folkhälsinstitutet 1994:9. Stockholm 1994. (In Swedish).

Jeffs D, Booth D, Calvert E. Local injury information, community participation and injury reduction. *Australian Journal of Public Health* 1993;17:365–72.

Kahn R, Mann F. Developing research partnerships. In: MacCall GJ, Simmon, JL, eds. Issues in participant observation: a text and reader. Reading, M A: Addison-Wesley, 1969:45–52.

Katcher M, Landry G, Shapiro M. Liquid crystal thermometer use in paediatric office counselling about tap water burn prevention. *Paediatrics* 1989;83:766–71.

Laflamme L. Social Inequality in Injury Risks. Knowledge Accumulated and Plans for the Future. Karolinska Institutet, Department of Public Health Sciences, Division of Social Medicine & National Institute of Public Health. Stockholm 1998.

Langley J & Alsop JC. Lidköping Accident Prevention Program: What was the impact? *Injury Prevention* 1996;2:131–4.

Lauritzen JB, Petersen MM, Lund B. Effect of external hip protectors on hip fractures. *The Lancet* 1993;341:11–3.

Lindqvist K, Timpka T, Schelp L, Åhlgren M. The WHO Safe Community program for injury prevention: evaluation of the impact on injury severity. Accepted. *Public Health*. 1998.

Lynam D, Mackie A, Davies C. Urban Safety Project: 1. Design and Implementation of Schemes. Department of Transport, Transport and Road Research Laboratory, 1988.

Mari JJ & Streiner D. Family intervention for schizophrenia. NHS Centre for Reviews and Dissemination. The University of York. 1997. The Cochrane Library.

McLoughlin E, Marchone M, Hanger L, German P, Baker S. Smoke detector legislation: its effect on owner occupied homes. *Am J Public Health* 1985;75:852–62.

Menckel E. Intervention and Cooperation. Occupational Health Services and Prevention of Occupational Injuries in Sweden. *Arbete och hälsa. Vetenskaplig skriftserie*. 1990:31.

Menckel E, Carter N. The development and evaluation of accident prevention routines: A case study. *Journal of Safety Research* 1985;16:73–82.

Meunier PJ, Chapuy MC, Arlot ME, Delmas PD, Duboeuf F. Can we stop bone loss and prevent hip fractures in the elderly? *Osteoporos Int* 1994;4:Suppl 1:71–6.

Miller TR, Galbraith M. Injury prevention counselling by paediatricians: A benefit- cost comparison. *Paediatrics* 1995;96:1–4.

MMWR. United States, 1982–1990. MMWR 1991; vol 40:sid 600–2.

Munro J, Coleman P, Nicholl J, Harper R, Kent G, Wild D. Can we prevent accidental injury to adolescents: A systematic review of the evidence. *Injury Prevention* 1995;1:249–55.

- Murphy DJ, Kiernan NE, Chapman LJ.* An occupational health and safety intervention research agenda for production agriculture: does safety education work? *Am J Ind Med* 1996 Apr;29(4):392–6.
- Oakley A, France-Dawson M, Fullerton D et al.* Preventing Falls and Subsequent Injury in Older People. *Effective Health Care* 1996;2(no 4): 1–16.
- Office of Population Censuses and Surveys. Occupation mortality, decennial supplement, 1970–72. London: HMSO, 1978.
- Olds DI, Henderson CR, Kitzman H.* Does prenatal and infancy nurse home visitation have enduring effects on qualities of parental caregiving and child health at 25 to 50 months of life? *Paediatrics* 1994;93:89–98.
- Paganini-Hill A, Chao A, Ross RK, Henderson BE.* Exercise and other risk factors in the prevention of hip fracture: the Leisure World study. *Epidemiology* 1991;2: 16–25.
- Peterson AR.* Community development in health promotion: empowerment or regulation: *Aust J Publ Health* 1994;18: 213–7.
- Plautz B, Beck DE, Selmar C, Radetsky M.* Modifying the environment: A community based injury reduction program for elderly residents. *American Journal of Preventive Medicine* 1996;12:33–8.
- Ploeg J, Black ME, Hutchinson BG, Walter SD, Scott EA, Chambers LW.* Personal, home and community safety promotion with community-dwelling elderly persons: response to a public health nurse intervention. *Canadian Journal of Public Health* 1994;85:188–91.
- Ploeg J, Ciliska D, Dobbins M, Hayward S, Thomas H, Underwood J.* A systematic overview of the effectiveness of public health nursing interventions: An overview of adolescent suicide prevention programs. 1995, pp 48.
- Popay J, Young. A.* Reducing accidental death and injury in children. A report produced for NWRHA, University of Salford, 1993.
- Preston B.* Cost-effective ways to make walking safer for children and adolescents. *Injury Prevention* 1995;1:187–90.
- Province MA, Hadley EC, Hornbrook MC, Lipsitz LA, Miller JP, Mulrow CD, Ory MG, Sattin RW, Tinetti ME, Wolf SL.* The effects of exercise on falls in elderly patients: a preplanned meta-analysis of the FICSIT trials. *Journal of the American Medical Association* 1995;273(17):1341–7.
- Ramsberg AL & Sjöberg L.* The cost-Effectiveness of Life Saving Interventions in Sweden. *Risk Analysis*,1997;Vol. 17, No.4:467–78.

Ray WA, Taylor JA, Meador KG, Thapa PB, Brown AK, Kajihara HK, Davie C, Gideon P, Griffin MR. A randomised trial of a consultation service to reduce falls in nursing homes. *JAMA* 1997;278:557–62.

Ray WA, Griffin MR, Downey W, Melton LJ III. Long-term use of thiazide diuretics and risk of hip fracture. *Lancet* 1989;1:687–90.

Reinsch S, MacRey P, Lachenbruch PA, Tobis JS. Attempts to prevent falls and injuries: a prospective community study. *Gerontologist* 1992;32:450–6.

Renaud L, Suissa S. Evaluation of the efficacy of simulation games in traffic safety education of kindergarten children. *American Journal of Public Health* 1989;79:307–9.

Rivara FP, Thompson DC, Thompson RS, *o a.* The Seattle children's bicycle helmet campaign; changes in helmet use and head injury admissions. *Paediatrics* 1994;93:567–9.

Rivara FP, Grossman DC, Cummings P. Medical Progress: Injury Prevention (Second of Two Parts) (Review Article) *The New England Journal of Medicine* 1997;337(9):613–8.

Roberts I. Who's prepared for advocacy? Another inverse law. *Injury Prevention* 1995;1:152–4.

Robertson MC, Campbell AJ. Preventing falls and fall-related Injuries in the Elderly. A literature review. Dunedin, New Zealand: Fall Prevention Research Group, 1993.

Rubenstein LZ, Robbins AS, Josephson KR, Schulman BL, Osterweil D. The value of assessing falls in an elderly population. A randomised clinical trial. *Annals of Internal Medicine* 1990;113:308–16.

Sackett DL, Haynes RB, Guyatt GH, Tugwell P. *Clinical Epidemiology: a basic science for clinical medicine*. 2nd Edition. Boston: Little Brown & Co, 1991.

Schelp L, Svanström L. One year incidence of home accidents in a rural Swedish municipality. *Scandinavian Journal of Social Medicine* 1986;14:75–82.

Schelp L, Svanström L. One year incidence of occupational accidents in a rural Swedish municipality. *Scandinavian Journal of Social Medicine* 1986;14:197–204.

Schelp L. Community intervention and changes in accident pattern in a rural Swedish municipality. *Health Promotion* 1987;2:109–25.

Schwarz DF, Grisso JA, Miles C, Holmes JH, Sutton RL. An injury prevention program in an urban African-American community. *Am J Public Health* 1993;83:675–80.

Schwarz DF, Grisso JA, Miles C, Holmes JH, Sutton RL. An injury prevention program in an urban African-American community. *Am J Public Health* 1993;83:675–80.

Speechley M, Tinetti ME. Falls and injuries in frail and vigorous community elderly persons. *J Am Geriatr Soc* 1991;39:46–52.

Springfeldt B. Effects of occupational and safety rules and measures with special regards to injuries. Advantages of automatically working solutions. The Royal Institute of Technology. Department of Work Science. Doctoral dissertation 1993.

Springfeldt B. Rollover of tractors – international experiences. *Safety Science*.1996;24:95–110.

Stachenko S, Jenicek M. Conceptual differences between prevention and health promotion: Research implications for community health programs. *Canadian Journal of Public Health* 990;81: 53–9.

Svanström L. Criteria for the Safe Community Network. Karolinska Institute, Department of Social Medicine, Kronan Health Centre, 1992.

Svanström L, Ekman R, Schelp L, Lindström Å. The Lidköping Accident Prevention Program – A community approach to preventing childhood injuries in Sweden. *Injury Prevention* 1995;1:169–72.

Svanström L, Ader M, Schelp L, Lindström Å. Preventing femoral fractures among elderly: The community safety approach. *Safety Science* 1996;21:239–46.

Svanström L, Schelp L, Ekman R, Lindström Å. Falköping, Sweden, ten years after: still a safe community? *International Journal for Consumer Safety* 1996;3:1–7.

Thapa PB, Gideon P, Fought RL, Ray WA. Psychotropic drugs and risk of recurrent falls in ambulatory nursing home residents. *Am J Epidemiol* 1995;142:202–11.

Thulin H. Safety in neighborhoods in Sweden. *Road Safety: What next? Occasional paper 86/3* London: Policy Studies Institute, 1986.

Tideiksaai R, Feiner CF, Maby J. Falls prevention: The efficacy of a bed alarm system in an acute-care setting. *Mount Sinai Journal of Medicine* 1993;60:522–7.

Timpka T, Lindqvist K, Schelp L, Åhlgren M. Community-based injury prevention: effects on health care utilisation. Submitted 1998. *Journal of Epidemiology*.

Tinetti ME, Baker DI, Garrett PA, Gottschalk M, Koch ML, Horwitz RI. Yale FICSIT: risk factor abatement strategy for fall prevention. *J Am Geriatr Soc* 1993;41:315–20.

Tinetti ME, Doucette J, Claus E, Marottoli R. Risk factors for serious injury during falls by older persons in the community. *J Am Geriatr Soc* 1995;43:1214–21.

Tinetti ME, Baker DI, MacAvay G, Claus EB, Garrett P, Gottschalk M, Kock ML, Trainor K, Horwitz RI. A multifactorial intervention to reduce the risk of falling among elderly people living in the community. *The New England Journal of Medicine.* 1994;331:821–7.

Walton WW. An evaluation of the poison prevention packaging act. *Paediatrics* 1982;69:363–70.

Wolf SL, Kutner NG, Green RC, McNeelly E. The Atlanta FICSIT study: Two exercise interventions to reduce frailty in elders. *Journal of the American Geriatrics Society* 1993;41:329–32.

Woodroffe C, Glickman M, Barker M, Power C. Children, teenagers and health: the key data. Bury St Edmunds, Suffolk, UK: St Edmundsbury Press, 1993.

World Health Organisation. Ottawa Charter for Health Promotion. First International Conference on Health Promotion, Ottawa, Canada, 17–21 November 1986.

Ytterstad B. The Harstad Injury Prevention Study: Hospital-based injury recording and community based intervention. ISM Skriftserie nr 33. 1995. Institute of Community Medicine, University of Tromsø, Norway: Troms County, Harstad Hospital.

Ytterstad B, Wasmuth HH. The Harstad Injury Prevention Study: Evaluation of hospital-based injury recording and community-based intervention for traffic injury prevention. *Accid Anal and Prev* 1995;27:111–23.

Ytterstad B. The Harstad injury prevention study: Hospital-based injury recording used for outcome evaluation of community-based prevention of bicyclist and pedestrian injury. *Scand J Prim Health Care* 1995;13:141–9.

Ytterstad B, Sögaard AJ. Harstad injury prevention study: prevention of burns in small children by a community-based intervention. *Burns* 1995;21:259–66.

7.

significantly; on the roads, legislation on the wearing of cyclists' safety helmets has led to massive decreases in injuries.

4. Visiting older people and preventing falls through exercise and balance training is effective.

5. Local "Safe Community Programmes" have reported injury reductions of up to 30%.

The first published community safety promotion study (FAPP) was community-/ population- oriented and is of quasi-experimental design (Schelp 1987). Such a design sets out partly from one treated and one untreated group in the population, partly from pre- and post-treatment measurement occasions as well as an explanatory model showing the differences over time between the treated and untreated group. The limitations prevalent in analysing quasi-experimental studies apply primarily to causal conclusions.

In theory, intervention programs should be based on systematically researched models and should be carefully monitored and evaluated (Kahn & Mann 1969). Evaluation is intended to be an objective, rational process in which the effects of policies or programs on their targets (individuals, groups, institutions, or communities) are revealed, undistorted by prejudice or preconception. It is assumed that the findings of such evaluations will help decision-makers to make wiser choices about future courses of action than they would otherwise. In practise, however, prior beliefs and paradigms of those involved colours everything, from how the intervention is conceived, to the language and scope of the evaluation, and the interpretation of the findings.

Consequently, the designs available for evaluating community intervention programs are, in general, rather weak. One such design involves before and after test comparisons in one area. This can sometimes be strengthened by using a series of observations before, during, and after the intervention. Another approach is the quasi-experiment. In this geographical areas are compared on the bases of pre-existing, unplanned, known contrasts in exposure to an intervention.

Evaluations based on processes alone also present challenges. Above all, there is the risk of bias - for example, recording what is hoped for or what seems socially desirable. One way to limit this is to set up a team of evaluators that is independent of the organisations involved in the intervention. The burden of ensuring validity then falls not only on the interviewer and the respondent, but also on the researchers. The latter must devise measures, provide protocols, analyse the data, and submit their reports to external critique.

In summary:

This book aimed at presenting a more extensive synopsis on studies of effects and effectiveness of accident, violence and injury prevention. A number of studies come from the Nordic countries since they have internationally been in the forefront of accident and injury prevention.

A conceptual framework of intervention evaluation and some of its key concepts is presented.

As an outcome of a discussion on injury prevention and safety promotion models and theories our model "a safety promotion matrix" is presented. The Safety Promotion Matrix includes two dimensions; intervention areas and intervention levels.

Our hope for the future is that the database we have created soon will be available as interactive Internet WebPages.

References

- EU report 1999. The Evidence of Health Promotion Effectiveness. Shaping Public Health in a New Europe. A Report for the European Commission by the International Union for Health Promotion and Education. Brussels: European Commission, 1999
- Baum F. Measuring effectiveness in community-based health promotion. In: Davies J K, Macdonald G (Eds.). Quality evidence and effectiveness in health promotion . Striving for certainties. London: Routledge, 1998 pp 68-89.
- Green J, Tones K.* Towards a secure evidence base for health promotion. *Journal of Public Health Medicine* 1999; 21: 133-9
- Kahn R, Mann F.* Developing research partnerships. In: MacCall G J, Simmon, J L, Eds. Issues in participant observation: a text and reader. Reading, M A: Addison-Wesley, 1969:45-52.
- Macdonald G, Veen C, Tones K.* Evidence for success in health promotion: suggestions for improvement. *Health Educ Res* 1996;**11**:367-76.
- Nutbeam D. Health Promotion Effectiveness - the Questions to be Answered. In: EU report 1999. The Evidence of Health Promotion Effectiveness. Shaping Public Health in a New Europe. A Report for the European Commission by the International Union for Health Promotion and Education. Brussels: European Commission, 1999 pp 1-11.
- Peersman G, Harden A, Oliver S, Oakley A.* Effectiveness Reviews in Health Promotion. London: Centre for Evaluation of Health Promotion and Social Interventions, 1999.
- Perkins E R, Simnett I, Wright L (Eds.).* Evidence-Based Health Promotion. London: John Wiley & Sons, 1999.
- Rootman I, Goodstadt M, Potvin L, Springett J.* Toward a framework for Health Promotion Evaluation. Copenhagen: World Health Organization, Europe, 1997.
- Schelp L.* Community intervention and changes in accident pattern in a rural Swedish municipality. *Health Promotion* 1987;2:109-25
- Springett J.* Practical Guidance on Evaluating Health Promotion. Copenhagen: World Health Organization, Europe, 1998.
- Svanström L. Keeping Safe. Effective Injury Prevention & Safety Promotion. In: EU report 1999. The Evidence of Health Promotion Effectiveness. Shaping Public Health in a New Europe. A Report for the European Commission by the International Union for Health Promotion and Education. Brussels: European Commission, 1999. pp 91-7.
- Ziglio E, Levin L S, Bertinato L. Social and economic determinants of health: implications for promoting the health of the public. In: Harrison D, Ziglio E (Eds.). Social determinants of health: implications for

the health professions. Copenhagen: World Health Organisation, 1998. Also at <http://www.accmed.net/hpi>

The authors

Leif Svanström M.D., Ph.D., Professor, is professor of Social Medicine and currently Chair of the Department of Public Health Sciences at KI. During his career, he addressed a large variety of matters crucial for injury prevention and safety promotion. Because of his "outstanding dedication and leadership in injury control", he received in 1998 an "International Distinguished Career Award" from the American Public Health Association. He is also internationally known for introducing the community approach to safety promotion and for developing evaluation models on process and outcome of 'Safe Community' programs. He is involved in WHO's Global Program on Injury Control and is the Head of the WHO Collaborating Center on Community Safety Promotion. He chaired the First World Conference of Accident and Injury Prevention (Stockholm, 1989) and is a permanent member of the International Organization Committee of Conferences. Among other assignments, he is member of the Scientific Council of the National Board of Health and Welfare, of the Board of the National Institute of Public Health, and of the World Health Organization Expert Advisory Panel on Accident Prevention.

e-mail address: leif.svanstrom@phs.ki.se

Bo JA Haglund, MD, PhD, professor in Public Health Sciences, especially Health Promotion at Karolinska Institutet, currently Course Director of Research Education at the Department of Public Health Sciences. Since 1994 also appointed Director of the World Health Organization Collaborating Centre on Supportive Environments for Health at the Department of Public Health Sciences. He is devoted to the development of methods for community intervention. R&D is underway in three areas: (1) method development in community intervention, including planning, implementation, evaluation and quality assurance, (2) community-based health promotion for disadvantaged groups; (3) development and management of WWW infrastructure, including the Health Promotion Research International Network (HPRIN) and the Inventory of Health Promotion Research Projects in Progress in the Nordic Countries.

e-mail address: bo.haglund@phs.ki.se