

The Lidköping Accident Prevention Programme — a community approach to preventing childhood injuries in Sweden

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Abstract

Objectives—In Sweden about 100 children 0–14 years die from accidental injuries every year, roughly 40 girls and 60 boys. To reduce this burden the Safe Community concept was developed in Falköping, Sweden in 1975. Several years later a second programme was initiated in Lidköping. The objectives of this paper are to describe the programme in Lidköping and to relate it to changes in injury occurrence.

Setting—The Lidköping Accident Prevention Programme (LAPP) was compared with four bordering municipalities and to the whole of Skaraborg County.

Methods—The programme 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.

Results—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 a smaller decline in one comparison area and an increase in the other.

Conclusion—Because the yearly injury numbers are small there is a great variation from year to year. However, comparisons over the nine year study period with the four border municipalities and the whole of Skaraborg County strengthen the impression that the programme has had a positive effect. The findings support the proposition that the decrease in the incidence of childhood injuries after 1984 could be attributed to the intervention of the LAPP. Nevertheless, several difficulties in drawing firm conclusions from community based studies are acknowledged and discussed.

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Keywords: community based programme, surveillance, Safe Community.

During the 1950s as many as 400 children were fatally injured annually in Sweden. This number has since fallen to include about 100 children 0–14 years who die from accidental injuries every year — roughly 40 girls and 60 boys.¹ For every child killed there are about 100 children whose injuries are serious enough for them to receive inpatient hospital care. Among the fatalities in the preschool age group home and leisure injuries dominate, while most teenagers are killed in traffic.

In the middle of the 1970s the Safe Community concept was developed in Sweden and was first put into practice in Falköping in 1975.² Subsequently, in 1984, a similar programme was initiated in Lidköping, Sweden. As with most other safe community programmes both began by establishing a local injury surveillance system. The purpose of this surveillance was to give information that would both help shape the intervention and assist in its evaluation.

The objectives of this paper are to describe the Lidköping Accident Prevention Programme (LAPP); its possible effect on injury incidence; and to discuss how the processes might serve to reduce injuries over time.

The Lidköping Accident Prevention Programme

In the early seventies, a community health unit was established to plan and coordinate health and safety promotion for Skaraborg County, including the Falköping and Lidköping municipalities. A fall of 34% in the incidence of injuries among preschool children was attributed to the Falköping Accident Prevention Programme³ — from 48.6/1000 in 1978 to 32.2 in 1981/2. This inspired the local health authority in Lidköping to start a similar safe community programme: LAPP.⁴ To raise the initiative's profile and to draw as much as possible on local knowledge and experience, an extensive intersectoral network was created.

The interventions agreed on including five elements: surveillance of injuries, provision of information, training, supervision, and environmental measures. The intervention started in 1984 and dealt with injuries affecting children and the elderly. This paper only addresses the former — injuries involving those under age 14 years.

Methods

STUDY AREAS

Skaraborg County, the home of Lidköping, is

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situated between Gothenburg and Stockholm in southern Sweden. It is mainly an agricultural and manufacturing county with 40% arable land compared with 8% for Sweden as a whole. In 1991 the population was 278 162. For this study comparisons are made between the intervention area, the municipality of Lidköping (population 35 949), four bordering municipalities (population 42 078), and the whole of Skaraborg County. The 'border' municipalities use the same hospital as Lidköping but received no intervention.

PROCESS EVALUATION

The LAPP evaluation involved studies of both process and outcome. The process evaluation was based mainly on reports made by the health planners, combined with newspaper clippings and interviews with key informants.

OUTCOME EVALUATION

The outcome evaluation was based on data from Skaraborg County Hospital discharge register. Cases are patients discharged from hospitals with an injury diagnosis coded E807-929 according to the *International Classification of Diseases* (ICD-9). These patients are then identified by place of residence regardless of the location of the hospital in which they were treated.

STATISTICAL METHODS

Difference in annual injury rates and their 95% confidence intervals between the comparison areas of Lidköping, the four border municipalities combined, and Skaraborg County were calculated.⁵ Linear regression was then used to estimate the annual change in incidence.

Results

THE INTERVENTION PROGRAMME

In 1984 an interdisciplinary group was established to administer LAPP. Representatives from the health care services included a district nurse, a paediatrician from the emergency hospital, a head nurse from the health centre, and the health planning officer. In addition the group included several representatives of the municipal administration — from the social welfare services responsible for preschools, a road engineer, a school nurse, a physical education teacher, and a consumer safety secretary. Later, other representatives were added from the police, the Red Cross, and a housewife.

LAPP started by jointly establishing priorities for intervention and as part of that process a special surveillance of school injuries was initiated. In addition, reporting of transport injuries, began earlier, as well as surveillance of all inpatient and outpatient injuries^{6,7} continued.

Intervention activities focused mainly on providing information. Some examples included age related safety checklists, verbal information to parents from child health care staff, and an infant carseats loan programme. A campaign to make the snow ploughing system safer was also initiated, as was a special training course to prevent sports injuries.

During 1986-7 the programme became more intense. The interdisciplinary group met six times during 1986 to develop new information material. As well, a telephone 'hot line' was established to permit the public to call for advice about specific injury risks in different environments and about dangerous products. This information was disseminated to about 14 000 households through preschools, schools, and child health care units.

A campaign on bicycle safety, including helmet promotion, was also launched as a result of findings from the road injury study. The campaign included an exhibition and posters at the town hall. Another display, with a focus on all childhood injuries, was circulated to schools and health centres. Environmental changes were initiated, like improving gym floors to decrease slipping injuries.

During the next period, from 1987 to 1988, almost 250 mothers and staff in day care centres were trained in child safety and first aid, and more than 1000 parents received information on injury prevention. At the same time municipal safety rounds⁸ were initiated to increase the safety of the physical environment. These inspections were performed by those concerned with the safety of children and the elderly. Subsequently, during 1988, a steering group was established for the whole programme and the same year LAPP hosted the first National Conference on Injury Prevention.

In 1989-90 the main emphasis was on traffic safety and included the establishment of a student safety guards' organization. From 1991-3 the main elements continued, following much the same structure. The principal components of the intervention are summarized in table 1.

OUTCOMES: INJURY RATES

Data from the Skaraborg County Hospital discharge register show that in the whole of Skaraborg the injury rate remained generally stable from 1983 to 1991 (table 2). There were no statistically significant differences between the mean annual differences of the three study areas and the confidence intervals overlap.

When injury rates before and since the onset of LAPP in 1984 until 1991 were calculated

Table 1 Activities in the LAPP

Surveillance	Routine (hospital discharge register)
Information	Special (school and transport injuries)
	Child car seats
	Bicycle helmets
	Bicycle safety exhibit
	Dangerous toys exhibit
	Red Cross safety caravan
	Media
Training	Broadcasts in Skaraborg
	Local press coverage
	Coaches and athletes
	Day and child care staff
Supervision	Parents of preschool and school aged children
	Age related checklists
Environmental	Municipal safety rounds
	Safe playgrounds
	Gravel pits
	Gymnasiums
	Bicycle lanes
	Transport routes for child care

Table 2 Incidence of hospitalized injuries (rates/1000 under 14 years) in Lidköping (intervention area) and comparison areas by year and gender (n = area population)

	Intervention area		Comparison areas			
	Girls	Boys	Four border municipalities		Skaraborg	
			Girls	Boys	Girls	Boys
1983	10.5	17.6	8.3	12.0	8.7	12.7
n	3247	3356	4118	4318	26202	27464
1984	15.0	13.5	6.9	13.8	8.8	13.2
n	3200	3271	4046	4203	25818	26998
1985	10.2	12.6	8.4	11.3	8.4	13.0
n	3140	3265	4059	4175	25519	26690
1986	8.4	16.9	6.7	13.7	8.7	13.7
n	3092	3252	4018	4146	25296	26470
1987	12.4	12.2	9.5	15.9	9.5	14.2
n	3056	3208	4018	4162	25151	26325
1988	7.3	13.4	4.2	12.5	7.8	12.4
n	3016	3204	4049	4163	25079	26391
1989	13.3	19.2	10.7	14.1	8.8	12.4
n	3006	3232	4113	4163	25153	26602
1990	9.1	10.3	11.0	13.7	9.3	12.8
n	3072	3287	4179	4304	25506	27047
1991	9.5	11.0	7.1	12.2	7.9	11.4
n	3160	3378	4235	4355	25977	27552
Mean	10.6	14.1	8.1	13.2	8.7	12.9
95% CI	8.7 to 12.5	11.5 to 16.7	6.4 to 9.8	12.1 to 14.3	8.3 to 9.1	12.3 to 13.5
β_1	-0.3	-0.4	0.2	0.1	-0.1	-0.2
% Change/year	-2.1	-2.4	2.2	0.6	-0.3	-1.0

Source: Skaraborg County inpatient discharge register 1983–91.
CI = Confidence interval.

using linear regression, however, a different picture emerges. The beta values expressed as per cent changes show an average annual decrease for boys of 2.4% and 2.1% for girls in Lidköping. In comparison, in Skaraborg County there was an average annual decrease of only 1.0% for boys and 0.3% for girls. Furthermore, the four 'border' municipalities had an average annual increase of 0.6%/year for boys and 2.2% for girls during the same period.

Discussion

In theory, intervention programmes should be based on systematically researched models and should be carefully monitored and evaluated.⁹ Evaluation is intended to be an objective, rational process^{10,11} in which the effects of policies or programmes 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 practice, however, prior beliefs and paradigms of those involved colour 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 programmes 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 quasiexperiment. In this geographical areas are compared on the basis of pre-existing, unplanned, known contrasts in exposure to an intervention. Effectively, this was the strategy chosen for this evaluation of the LAPP programme.

For LAPP we used records of all injury related hospital admissions from 1983 to 1991. Although a valuable source of information, the data from this register is mainly intended for administrative and economic use and the diagnoses recorded have not been validated. Thus, the interpretation of trends using these data are complicated by possible changes in admission policies, therapeutic technology, or diagnostic coding practices.

In addition, it must be acknowledged that the intervention did not begin suddenly, nor was it narrowly defined. It build up steadily and changed its character (organisation, scope, and intensity) gradually from 1984 onwards. Moreover, Lidköping Municipality is not absolutely identical to the 'four border municipalities' or to the whole of Skaraborg County in terms of all predisposing factors. But the comparison areas do control somewhat for several possible biases, and because of the limitations above, it seems safe to assume that any differences are conservative estimates. Moreover, the county contains both intervention communities, Falköping and Lidköping, and in addition, other preventive activities occurred over the entire county — a fact that cannot be avoided in a study of this kind. Despite all these limitations, the results suggest a decrease in the incidence of childhood injuries since 1983 in Lidköping.

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 organizations 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, analyze the data, and submit their reports to external critique.

In spite of the many methodological problems there is, nevertheless, support for the conclusion that the decrease in the incidence of childhood injuries was the result of the LAPP. This conclusion is based on the fact that the four border municipalities, which had no programme, showed an increase during the same period. As stated previously, the fact that the whole of Skaraborg was also part of the intervention area makes this comparison conservative.

The fact that Schelp also showed a decrease of child home injuries in Falköping lends support to the conclusion of a relationship between the LAPP and decrease in injury incidence.³ The average decreases in Schelps study after two years of intervention was 34% among those under 14 years of age.

In view of the problems with an administrative register, like the Skaraborg County inpatient hospital discharge register, there are many reasons to support the creation of a specific surveillance system to assist future evaluations of this nature. The system established by the end of the 1970s did not function after the beginning of the 1980s, but a new surveillance system was introduced in 1989 and

will in the future provide an improved opportunity to analyze the rates in the 1990s.

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Injury prevention research wins award

The 1995 Charles C Shepard Science Award went to injury prevention scientists studying the relationship between arrests for drunk driving and the risk of dying in an alcoholic crash. Their winning study, 'The risk of dying in alcohol-related motor vehicle crashes among habitual drunk drivers', was published in the *New England Journal of Medicine* (25 August 1994). This is the first time an injury prevention topic has been the recipient of this pre-eminent award.

In accepting the award, Dr Brewer, a medical epidemiologist in CDC's Division of Unintentional Injury Prevention, said, 'This study is a clear indication that injury is being recognized as a significant public health problem and is an example of how epidemiology can be used to scientifically define an injury problem and its causes while also proposing specific interventions to prevent injuries and save lives. The study also demonstrates the importance of collaboration between CDC and public and private organizations in conducting injury prevention research'.