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Injuries in The Netherlands

A survey

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As a repeat of a survey carried out in 1986–1987, a telephone survey was conducted. More than 25,000 households, comprising over 67,000 persons, were questioned about any recent traffic, home and leisure, sports and occupational injuries. Expressed as a national number, a total of approximately three million accident victims required professional medical treatment in a 12 month period in 1992 and 1993. By far the largest categories of injuries were home and leisure injuries and sports injuries (1.6 million and 1.1 million respectively), followed by traffic injuries (340,000) and occupational injuries (230,000). Approximately 59,000 victims were admitted to hospital, 830,000 were treated in an accident and emergency department/out-patient clinic and 2 million visited a general practitioner. Based on the proportion of hospital admissions and fractures, traffic injuries are considered the most severe type of accident. Compared with the results of 1986–1987, the total number of accident victims (except occupational injuries) increased by 11%. For traffic injuries this increase was 30% and for home and leisure injuries 16%. There was no significant change for sports injuries. In spite of preventive measures, the accident problem in The Netherlands is not decreasing. This means that preventive efforts should at least be maintained at the present level.

Key words: incidence, injuries, survey

The accident prevention policy in The Netherlands is organized sectorally. Three distinct sectors – traffic safety, home and leisure safety (including sports) and occupational safety – each carry out their own research. However, it is impossible to implement this distinction in practice because of the overlap between the sectors. This makes it all the more regrettable that the field organizations concerned have relatively little contact with one another, as there are many points of correspondence in research on these areas.

A first form of cooperation was achieved in the inquiry 'Injuries in The Netherlands' in 1986–1987.[1] That survey was conducted among more than 24,000 households over a period of 12 months to see whether an accident had taken place in those households during the preceding period, with the length varying from four weeks to six months. This survey was conducted because of doubts regarding the completeness and representativeness of the available surveillance data on the numbers of accidents in The Netherlands. An important result of that survey was a complete picture of the situation regarding accidents, as well as a database from which information could be retrieved at a later date. One conclusion of that survey was that the scale of the problems connected with accidents was seriously underestimated at that time because of the lack of sufficiently complete and in-depth surveillance. It was recommended the survey should be repeated after five years.

In 1992 it was decided a similar survey should be conducted again. The participants in the survey had common objectives.

- To gain a coherent picture of the incidence of the four accident categories (traffic, home and leisure, sports and occupational accidents) for The Netherlands in terms of the accident itself, the circumstances, the socio-economic characteristics of the victim and the consequences of the accident.
- To gain insight into the developments over time in the incidence of the four accident categories for The Netherlands with regard to the aspects specified in the first general aim and their relationship to one another.
- To gain insight into the way in which information from the existing accident surveillance systems requires adjustment in order to obtain a general picture of the problem of accidents in The Netherlands.

On the basis of these insights, policy can be determined by which new measures are developed or existing measures are adjusted in the field of accident prevention. This article reports on the main results of the survey for the group of accidents as a whole.

METHOD

This survey,[2] like the previous one, consisted of a telephone questionnaire (approximately 90% of Dutch households have a telephone). Telephone calls were made to 25,284 households during the period 1 August 1992 to 31 July 1993 to inquire whether a home and leisure, traffic, sports or occupational injury had been occurred within that household during the preceding

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period. This period was determined per accident category, based on the weighing of three factors: under- and over-reporting (loss of memory and telescoping), the number of accidents expected to be reported (minimum needed for analysing) and the size of the sample (costs limitation). This led to a variation in the recall period: four weeks for a home and leisure accident or a sports injury, three months for a traffic accident and six months for an occupational accident. The above-mentioned three factors were also weighed for the decision whether or not to include non-medically treated victims. In the case of home and leisure accidents, the questions were confined to injuries which received medical treatment, but injuries which did not receive medical treatment were also included in the case of the other three accident categories. The definition of an accident used was that of a sudden, unforeseen and unintentional occurrence which resulted in physical injury. The telephone numbers were obtained by random digital dialling, so that households with an unlisted telephone number (approximately 5%) were also included in the research population. The telephone interview consisted of two parts: a preliminary screening of a household , followed by a set of questions for the accident victim. The questions in the screening were put to the head of the family (alternating between the male and female heads of the family) to determine whether any member of that household had had an accident (as defined above) within the recall period. The second set of questions were put to those members of the household who, according to the screening, had had an accident. These questions were intended to obtain more insight into the background and consequences of the accident. The list of questions kept as closely as possible to the one used in 1986–1987 to facilitate a comparison. Weighing and extrapolation procedures were used to estimate the total number of accidents in The Netherlands.

Table 1 Number of accident victims who received medical treatment by accident category in the survey and estimated for The Netherlands (including 95% CI)

Accident category	Survey	National estimate
Traffic accident	363	340,000 ± 36,000
Home and leisure accident	560	1,600,000 ± 140,000
Sports injury	379	1,100,000 ± 110,000
Occupational accident	492	230,000 ± 21,000
Total[a]	1,692	3,000,000 ± 170,000

a: As a result of the overlap of accident categories, the sum of the figures for the four categories is not equal to the total

RESULTS

Response

A total of 35,267 contacts were established in order to conduct 25,284 screening sessions, i.e. a response of 71%. Almost one-quarter of the persons approached refused to take part in the survey and 4% had an insufficient grasp of Dutch to be able to understand and/or reply to the questions properly. The response was very similar to the response of 60–70% which has been found in other telephone surveys.[3] The percentage of those who refused to participate in the present survey (25%) is much higher than the corresponding percentage in the previous survey, when 16% of the 28,720 established contacts that were established refused to take part, resulting in 24,141 screening sessions. This is a general trend in survey research. Information was obtained about a net total of 2,742 accidents which corresponded to the definitions applied and to the recall period.

Scale of the problem of accidents and type of medical treatment

Based on a total of 1,692 reported accidents requiring medical treatment, it was estimated that three million of the 15 million inhabitants of The Netherlands receive medical treatment for an accident each year (*table 1*). In other words, every year one in five of the Dutch population receives medical treatment as a result of an accident. More than half of the three million cases concern home and leisure accidents, more than one-third concern sports injuries, 11% concern traffic accidents and 8% concern occupational accidents. The sum of these percentages is higher than 100% because the accident categories overlap.

If we examine the varieties of medical treatment given to the victims of accidents (*table 2*), we see that approximately two-thirds (2 million victims) were treated by a general practitioner. More than one-quarter (830,000 victims) were treated in an accident and emergency/out-patients department, while 59,000 victims were admitted to hospital.

Table 2 Percentage of accident victims who received medical treatment by type of treatment per accident category (multiresponse)

	Traffic accident	Home and leisure accident	Sports injury	Occupational accident	Total
General practitioner	66	80	56	65	68
Accident and emergency/ out-patients department	43	31	19	36	28
Specialist	20	16	11	15	15
On the spot first aid	6	4	14	15	9
Admission to hospital	7	2	1	2	2
Other professional treatment	13	11	32	20	19
Other	16	7	18	11	12
Total	171	151	151	164	153

The percentage of victims of a home and leisure accident who go to a general practitioner is relatively high (80%). In half of these cases, only a general practitioner is consulted. A relatively large number of victims of traffic accidents attend an accident and emergency/out-patients department (43%) or are admitted to hospital (7%). A relatively large number of sports injuries (14%) receive first aid treatment on the spot. A relatively large number of sports injuries are only treated by a physiotherapist (12%). In the case of occupational accidents too, the victims relatively often receive first aid treatment on the spot (15%), but a large percentage are also treated by a first aid/out-patients department (36%). A relatively large number of victims of occupational accidents are treated by a general practitioner and then referred for further treatment by a physiotherapist.

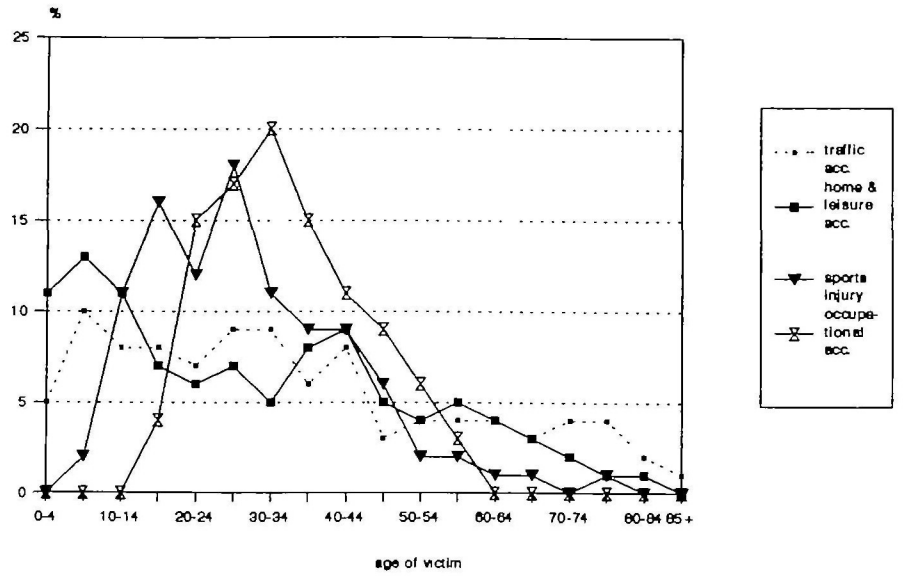

Figure 1 Percentage of victims of accidents who received medical treatment by age of the victim per accident category. F=2.6 and p=0.000

Characteristics of the victims

▪ Age of the victims

The average age of the victims who received medical treatment was 30 years (*figure 1*). It varied per accident category from 29 years for victims of a sports injury, to 30 years for victims of a home and leisure accident and 34 years for victims of an occupational accident or a traffic accident. There are two peaks in the ages of the victims of sports injuries: 15–20 years and 25–30 years. There is a single age peak for occupational accidents: 20–40 years.

▪ Sex of the victim

As far as the sex of the victim is concerned, more men than women are the victims of an accident requiring medical treatment (58% of the cases). This naturally varies considerably per accident category. More than three-quarters (77%) of the victims of occupational accidents are men and sports injuries are sustained by twice as many men as women. The number of traffic and home and leisure accidents is approximately the same for men and women.

On average, female victims of accidents are somewhat older than male victims. This difference is particularly large in the case of home and leisure and traffic accidents: the average age for female victims of traffic accidents is 40 years, as against 29 years for male victims. The average age of female victims of home and leisure accidents is 34 years, as against 25 years for male victims. There is virtually no difference in the average age of female and male victims in the case of sports injuries and occupational accidents.

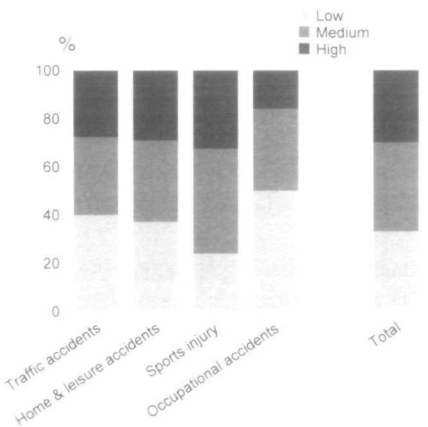

Figure 2 Percentage of victims of accidents who received medical treatment by level of education of the victim (aged 17 years and older) per accident category. χ^2 =42.5, df=6 and p=0.000

▪ Level of education

The level of education of the victims of occupational accidents is relatively low, while the level of education of the victims of sports injuries is relatively high (*figure 2*). The level of education of the victims of traffic and home and leisure accidents is approximately the same and is situated between the level of the victims of occupational accidents and that of the victims of sports injuries.

▪ Socioeconomic status

The socioeconomic status of the victims of accidents (based on the household income and the level of education attained by the breadwinner) corresponds to that of the Dutch population. On average, the victims of sports injuries had the highest socioeconomic status, followed by the victims of home and leisure accidents, the victims of traffic accidents and, finally, the victims of occupational accidents.

Injury sustained

▪ Localization of the injury

As regards the localization of the injury, 44% of the victims who received medical treatment sustained injuries in the lower limbs as a result of the accident. One-third were injured in the arm, one-fifth were injured in the head and 14% were injured in the torso. The localization of the injury varies for each accident category. In the case of traffic and home and leisure accidents, the injury is relatively often in the head. In the case of sports injuries, on the other hand, it is relatively common for the injuries to affect the lower limbs, while it is less common for them to affect the upper limbs. The situation regarding occupational injuries is the opposite: it is relatively less common for them to affect the lower limbs and relatively more common for them to affect the upper limbs.

▪ Type of injury

The type of injury is usually an open wound (26%), a contusion (25%) or a sprain or strain (20%). The breakdown of medically treated sports injuries in terms of type of injury differs significantly from that of the other accident categories (*table 3*). Open wounds are relatively less common (8% as against 36–41% for the rest) and torn ligaments (14% as against 5–7% for the rest) and sprains or strains (35% as against 11–13% for the rest) are relatively more common. Strain from physical overload is a type of injury which is relatively common in the case of sports injuries (8%) and occupational accidents (9%), as against 2% for traffic accidents and 3% for home and leisure accidents. Fractures are relatively common in the case of traffic accidents (16% as against 6–8% for the rest).

Consequences and severity of the injuries

Half of the victims were unable to carry out their daily activities for a period of time directly after the treatment. This period averaged 11 days. Inability to work is relatively common among victims of occupational accidents (70%) and lasts a relatively long time (16 days). It is relatively uncommon in the case of victims of sports injuries (36%) and is relatively shorter in duration (8 days).

▪ Permanent physical damage

Seven percent of the victims who received medical treatment stated that the accident had left them with permanent physical damage. This percentage is 4% for sports injuries, 8% for home and leisure accidents, 9% for occupational accidents and 11% for traffic accidents. The two commonest kinds of permanent damage concern restrictions in walking (26%) or in the use of a hand and/or arm (19%).

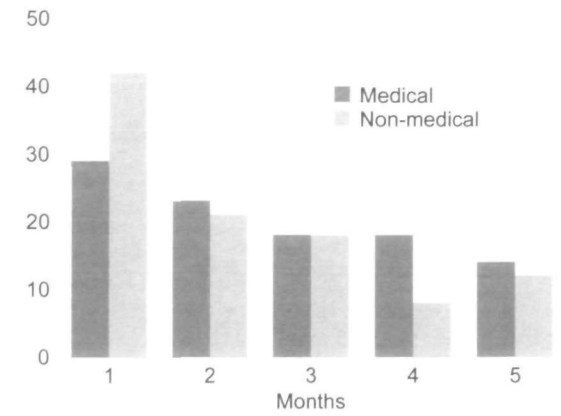

Figure 3 Percentages of the reported medically treated (n=377) and non-medically treated (n=118) victims of an occupational injury by the number of months between the month of the accident and the month of questioning. Because injuries occurring and reported in the same month and injuries for which this difference is six months, are underreported by 50%, these are omitted in this figure

▪ Severity of the injury

The survey contains a number of indicators of the severity of the injury, such as not being able to carry out one's daily activities, in combination with the length of this period and permanent physical damage as a result of the accident. The differences between the recall periods, however, make it hard to compare the four accident categories, since not every accident occurred an equal length of time before. All the same, two items can be used as indicators of the severity of the injury: the percentage of cases of admission to hospital and the percentage of fractures. On the basis of this information, we may conclude that traffic accidents result in the most severe injuries, while the severity of the injuries sustained in the other three accident categories is more or less the same.

DISCUSSION

The estimates given in *table 1* are not entirely correct. As a result of the longer recall period, loss of memory plays a larger part in the case of traffic and occupational accidents

Table 3 Percentage of victims of accidents who received medical treatment by type of injury per accident category (multiresponse)

Localization of injury	Traffic accident	Home and leisure accident	Sports injury	Occupational accident	Total
Open wound	41	37	8	36	26
Contusion	40	25	24	26	25
Strain and sprain	13	13	35	11	20
Torn ligament	5	7	14	6	9
Fracture	16	8	6	6	8
Strain from overburdening	3	2	9	8	5
Other	21	26	22	27	24
Total	139	118	118	120	117

χ^2 =253.4, df=18 and p=0.000

than in the case of home and leisure accidents and sports injuries. An indication of the role of loss of memory can be seen in *figure 3*. This figure gives the distribution of the numbers of occupational accidents over the months covered by the questions. It shows that there is an evident drop in the number of accidents reported. In the case of injuries which received medical treatment, this drop is from 108 to 51 cases – approximately one-half. As one would expect, this drop during the recall period is even larger in the case of injuries which did not receive medical treatment – from 49 to 14 cases.

The total estimate based on injuries which received medical treatment and which are reported within a recall period of four weeks, for example, is higher than the estimate based on the actual recall period, namely 3.3 million instead of 3 million. This means that the estimate of the number of traffic accidents on the basis of the actual recall period has to be increased by more than one-third and the number of occupational accidents has to be increased by more than three-quarters. However, the total estimates based on a period of four weeks are not correct either because of the effect of telescoping, i.e. when an accident is reported as having taken place more recently than is actually the case. Loss of memory and the telescoping effect thus counteract one another and are selective. Ultimately it was therefore decided to base the estimates on the actual recall period.

The sum total of the percentages in *figure 3* is 109%. This means that 9% of the accidents reported in the survey belong to more than one accident category (the overlap). For example, in terms of the definitions followed, an accident while jogging in the street is both a traffic accident and a sports injury. If we calculate the overlap on the basis of a recall period of four weeks, the percentage of overlap is approximately the same: 8%. This means that more than one-quarter of a million of the accidents which result in medical treatment can be included in more than one category.

The method followed in the previous survey in order to arrive at national estimates is not exactly the same as the method used in the present survey. The data from both surveys have therefore been adjusted to make it possible to compare the results of the 1992–1993 survey with the results of the 1986–1987 survey.

Occupational accidents must be left out of consideration here, as they were only marginally included in the previous survey.

The total number of accidents (excluding occupational accidents) has risen significantly by 11% in relation to the 1986–1987 survey. The number of traffic accidents requiring medical treatment has risen significantly by almost 30%. There is also a significant rise (16%) in the number of home and leisure accidents. The number of sports injuries that received medical treatment has not changed significantly from the 1986–1987 figure. The incidence per 100,000 of the Dutch population presents a slightly more favourable picture: an increase of 6% for the total number of victims of accidents who received medical treatment, with an increase of 24% for traffic accidents, an increase of 11% for home and leisure accidents and a decrease of 8% for sports injuries.

The results of the 1992–1993 survey differ from those of the 1986–1987 survey for a number of variables. For instance, there were relatively few victims in the 15–25 years age group in the 1992–1993 survey (19% as against 26% for the 1986–1987 survey).

There is no difference between the two surveys in relation to the percentage of victims who were using medicines at the time of the accident, but there is a difference as regards the type of medicine. In the 1992–1993 survey, more victims used medicines for the heart and circulation, sleeping pills and sedatives, while antibiotics were less common. Information from the Centraal Bureau voor de Statistiek (CBS)[4,5] reveals a different trend in the percentage of sleeping pills and sedatives and of medicines for the heart and circulation among the Dutch population where there was a slight drop. According to the CBS, the percentage of antibiotics has remained more or less constant.

As for the type of treatment received, in the 1992–1993 survey this is more commonly provided by a general practitioner and less commonly by an accident and emergency/out-patients department. These two types of treatment account for 80% of the total in both surveys. This means that a shift has taken place during the last few years from secondary to primary health care.

National Medical Registration (LMR) of SIG Care Information is a registration of admissions to hospital which can only be used for the comparison of statistics, because the LMR only records limited information on accidents. Nor does it distinguish between home and leisure, sports and occupational accidents. According to the LMR, accidents are responsible for an annual total of approximately 91,000 admissions to hospital, while our survey indicated that 59,000 accidents a year would result in admission to hospital. While the LMR system of classification makes it possible to distinguish the category of traffic accidents, this is not the case for the three separate categories of home and leisure, sports and occupational accidents. The estimate for traffic accidents on the basis of our survey corresponds more or less to the number obtained from the LMR, but there is a large difference between the two sources with regard to home and leisure, sports and occupational accidents. According to our survey only half of the number of admissions to hospital (approximately 40,000) were reported, as against the LMR figure of 77,000. A possible explanation for this discrepancy is that victims of other types of accidents may be admitted more than once in connection with the same accident; this is less often the case for the victims of traffic accidents. In such cases, the LMR may register a victim twice, while our survey only records the victim once.

Surveys like the present one have been conducted in various other countries. In order to gain an insight into the degree of incidence of accidents in The Netherlands compared with other countries, we have calculated the incidence rates of a number of surveys on the basis of these surveys (*table 4*). Since the method followed affects the

incidence rate, both the recall period and the domain have been included in the table. As different methods are often used, it is difficult to compare the various incidence rates, but all the same we may conclude that the incidence rate based on the present survey is on the high side. This is very probably due to the relatively short recall period.

CONCLUSION

The results of the survey show that accidents occur to a large number of people (one out of every five). Every member of the population belongs to one of the risk groups. Accidents often have serious consequences, particularly in the form of permanent damage and the amount of lost working time. There are no grounds for optimism, since the total number of accidents is increasing somewhat faster than the population. This means that it is advisable to continue work at least at the present level of preventive efforts.

There are many differences in the total group of accidents as regards the circumstances of the accidents and the risk groups: it is therefore difficult to carry out multisectoral preventive projects in practice. An exception to this may be the categories of traffic and home and leisure accidents. The results indicate that the characteristics of these two accident categories display many similarities with regard to the major target groups. Thus, the breakdown of the victims by age and sex and combinations of them, as well as the level of education of the victims, reveals correspondences. It is therefore advisable to examine to what extent cooperation is possible in the field of prevention of traffic and home and leisure accidents.

From the viewpoint of prevention, it is important to have a coherent picture of the situation regarding accidents in The Netherlands. The present survey has made an important contribution in this respect.

It would be a good thing to standardize internationally activities relating to research in the field of collecting basic data on accidents and the related research. In order to be able to compare the results of surveys on accidents, it is important to standardize terms and classifications concerning accidents and methods of data collection.

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Table 4 Incidence rate of accidents based on surveys for a number of countries, including a number of characteristics of the method employed

Country	Survey year	Incidence rate per 1,000 inhabitants	Recall period in months	Domain	Literature
USA	1992	230	0.5	M or L	National Centre for Health Statistics[6]
The Netherlands	1992–1993	199	1–6	M	Mulder et al.[1]
Finland	1988	160	12	M + N	Heiskanen et al.[7]
Germany	1992	144	1	M + N	Statistisches Bundesamt[8]
Australia	1989–1990	130	p	M + N	Australian Bureau of Statistics[9]
Switzerland	1992	123	12	M + N	Bundesamt für Statistiek[10]
Canada	1990	110	12	L	Chipman[11]
Denmark	1986–1987	105	12	L	Dansk Institut for Klinisk Epidemiologi[12]
Austria	1989	81	12	M + N	Friedel et al.[13]
Spain	1987	75	12	M + N	Ministerio de Sanidad y Consumo[14]
Hungary	1986	56	12	M + N	Central Statistical Office[15]
Norway	1985	36	0.5	M + N	Statistics Norway[16]

p: prevalence of injury; M: medically treated, N: non-medically treated; L: limitation of normal activity