

# CHANGES IN REINDEER HERDING WORK AND THEIR EFFECT ON OCCUPATIONAL ACCIDENTS

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Received 15 March 2006; Accepted 24 July 2006

## ABSTRACT

**Objectives.** The aims of the study were to investigate the risk of occupational accidents in reindeer herding work in the long run, and to find out if the changes of work processes caused by joining the European Union in 1995 can be seen in accident statistics.

**Study design and methods.** The information on reindeer herders' occupational accidents was obtained from the Farmers' Social Insurance Institution. The development of accidents, reindeer herders and handled animals was studied in 1991-2004. The work phase and contact-mode of the compensated accidents during the periods of 1991-1994 (N = 514) and 2001-2004 (N = 411) were compared.

**Results.** About 100 accidents of reindeer herders are compensated by the Farmers' Social Insurance Institution annually. The number of accidents much better with the number of reindeer handled than with that of insured reindeer herders. The changes in work processes could be seen as trends in the classification of accidents, but the differences were not statistically significant. In feeding tasks, both on the terrain and on farms, accidents had slightly increased, whereas in slaughtering they had decreased. Reindeer-caused accidents are now a bit more frequent than earlier.

**Conclusions.** Attention should now be paid to the use of personal protective equipment when driving all-terrain vehicles and to safe working habits when in close contact with reindeer.

*(Int J Circumpolar Health 2006;65(4): 357-364.)*

**Keywords:** occupational safety, animal handling, slaughtering, feeding, accident statistics, Finland

INTRODUCTION

Reindeer farming is practised mostly in the northern taiga and tundra regions of Eurasia, from the coast of Norway to the strait of Bering and, in the south, to Lake Baikal and Mongolia. There are about three million reindeer all together: almost two million in Russia, about 800 000 in Scandinavia, and smaller numbers elsewhere (1).

The reindeer herding area in Finland consists of the district of Lapland and the north-eastern part of the district of Oulu (2-4). Herding is carried out by 56 reindeer herding districts (Fig. 1).

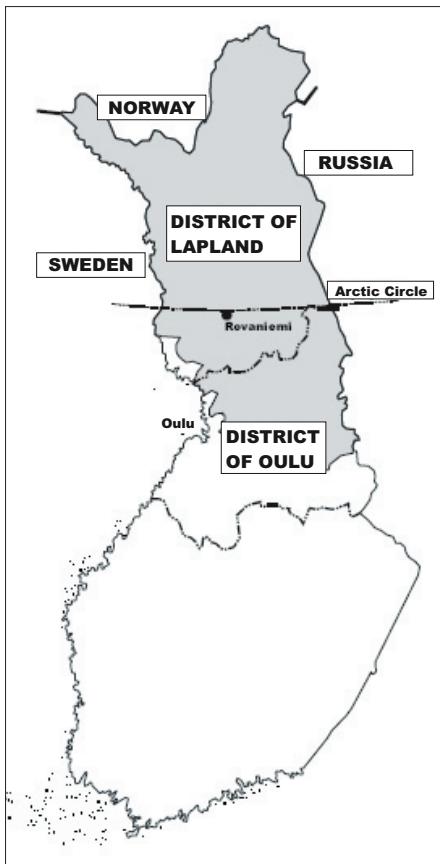


Figure 1. The reindeer herding area in Finland.

In 1993, there were about 7300 reindeer owners in Finland. Over the last ten years, their numbers have been decreasing steadily, and there are now only 5250 (Table I). About one-quarter of the reindeer owners are involved in the actual herding work. In 2003, the entire livelihood of 630 households came from reindeer, whereas 720 families practised other activities in addition to herding; traditionally, they have fished, hunted and collected berries. Nowadays, tourism is gaining more ground (4).

Changes in the working processes

The reindeer herder has always respected the natural northern rhythm in his work (3, 4). In practice, the work in the field and near fences consists of collecting, counting, marking, feeding and herding the reindeer. There are two top seasons: calf marking in June-July, and separation and slaughtering from September to January.

Slaughtering moved from the field to slaughter houses after Finland became a member of the European Union in 1995, and

Table I. Numbers of reindeer owners, insured reindeer herders, and living and slaughtered reindeer in 1991-2004.

	Reindeer owners	Insured reindeer herders	Living reindeer	Slaughtered reindeer
1991		1951	259 661	169 023
1992		1931	231 637	181 979
1993	7289	1977	215 364	129 154
1994	7095	1887	214 263	131 869
1995	7198	1785	208 140	124 799
1996	6960	1680	212 851	120 702
1997	6774	1607	202 616	88 365
1998	6488	1536	196 138	89 736
1999	6129	1455	195 434	96 270
2000	5878	1394	203 424	92 895
2001	5682	1329	185 731	87 397
2002	5485	1274	199 708	97 571
2003	5334	1230	196 727	106 355
2004	5243	1198	201 058	106 318

the environment and methods of slaughtering have improved considerably. There were fifteen slaughter houses in the whole area in 2003 (4). The reindeer herders have undergone much training and mostly carry out the slaughtering themselves. On the other hand, centralizing the slaughtering into fewer slaughter houses increases the need for transportation of the animals. The feeding of reindeer, both in the field and on farms, has increased due to more intensive care of the animals and the diminishing pasturage, especially during winter (3, 4). The use of technical equipment has increased constantly. The use of snowmobiles in reindeer herding rose rapidly between 1960-1970, and four-wheeled all-terrain vehicles became widespread at the end of the 1980s (5, 6).

### **Earlier studies on safety and accidents in reindeer herding work**

The work, health and living habits of reindeer herders were thoroughly studied at the end of the 1980s, when the Oulu Regional Institute of Occupational Health carried out a wide and comprehensive study (7). It included two postal questionnaires addressed to all reindeer herders, statistical analysis of the reported accidents (8), risk assessment of all work phases (9), as well as safety interventions between the questionnaires (10). At that time, the most dangerous work phases were slaughtering, gathering for separation, and separation itself. By disseminating information, it was possible to develop preventive measures and to influence the safety habits of reindeer herders (10).

In Sweden, fatal accidents and suicide have been studied among the reindeer-herding Sami (11). A significantly increased risk of dying from work-related accidents, such as vehicle accidents, was found among males. A comparison

between the periods of 1961-1980 and 1981-2000 showed non-significant differences in risk, although a trend towards increased risks was observed for most types of external causes of death, except suicide. This suggests, for example, that the extensive use of all-terrain vehicles has increased the risk for fatal accidents, and that commercial reindeer management is one of the most dangerous occupations in Sweden.

The current reindeer herding practices and their safety are once again the focus of discussion in Finland, since there were a lot of changes in work processes in the middle of the 1990s, due to joining the European Union. The aim of the present study was to investigate the risk of occupational accidents in reindeer herding work in the long run. The accident statistics of reindeer herders was studied before and after the changes, in order to determine if the changes can be seen in the classifications. The main objectives of the safety measures in reindeer herding work were determined on the basis of accident statistics.

### **MATERIAL AND METHODS**

The active reindeer herders are required to carry insurance against accidents at work with the Farmers' Social Insurance Institution (12). This mandatory insurance is part of their retirement plan. All-terrain vehicles have been insured since 1995 in the Finnish Motor Insurers' Centre (13). The reindeer herders themselves report the accidents and apply for compensation from these insurance institutions. The number of insured reindeer herders and the information on their accidents were obtained from the Farmers' Social Insurance Institution. The Motor Insurers' Centre published a

summary report about snowmobile accidents in 1992-2005 (14).

The number of handled (living and slaughtered) reindeer was obtained from the Reindeer Herders' Association. The evolution of the numbers of accidents, herders and reindeer were analysed from 1991 to 2004.

The Farmers' Social Insurance Institution classifies the compensated occupational accidents. From 2003, they have used the ESAW

methodology (14); earlier they used their own system. We compared the work phase and material agents (previously comprising the "cause of accident") of accidents reported both before Finland joined the EU, and five years after. The data included 411 occupational accidents in 2001-2004, and 514 accidents in 1991-1994. The Chi-Square test was carried out for any work phase and material agent, with comparison to all other accidents.

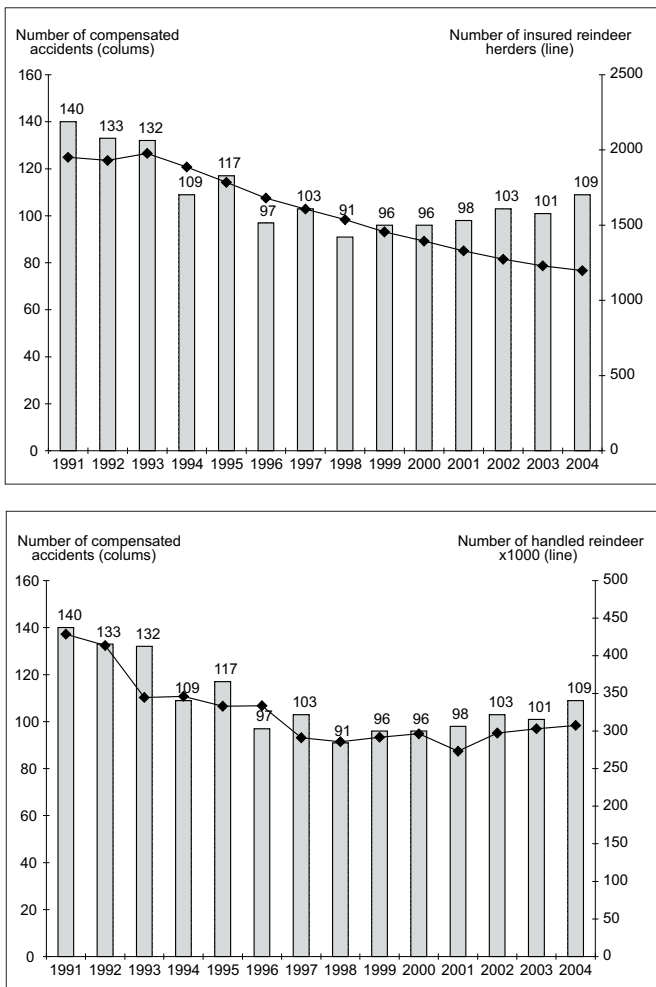


Figure 2. Comparison of the number of compensated accidents with the numbers of insured reindeer herders (top) and handled reindeer (living and slaughtered together; bottom), during the period 1991-2004.

## RESULTS

The number of reindeer herders' accidents had fallen from its peak at the beginning of the 1990s, but a slight increase can be seen from the beginning of 2000 (Fig. 2). However, the situation has been quite stable since the middle of 1990s; with about 100 accidents compensated by the Farmers' Social Insurance Institution each year.

The number of insured reindeer herders has fallen steadily since 1993, from almost 2000 to 1200, despite the fact that there has not been such a large decrease in the number of handled reindeer. The number of handled reindeer decreased, from its peak in the beginning of 1990s, to 330 000-340 000, with the lowest number (270 000 reindeer) in 2001. Nowadays, about 300 000 reindeer are handled yearly and 100 000 of these are slaughtered. As shown in

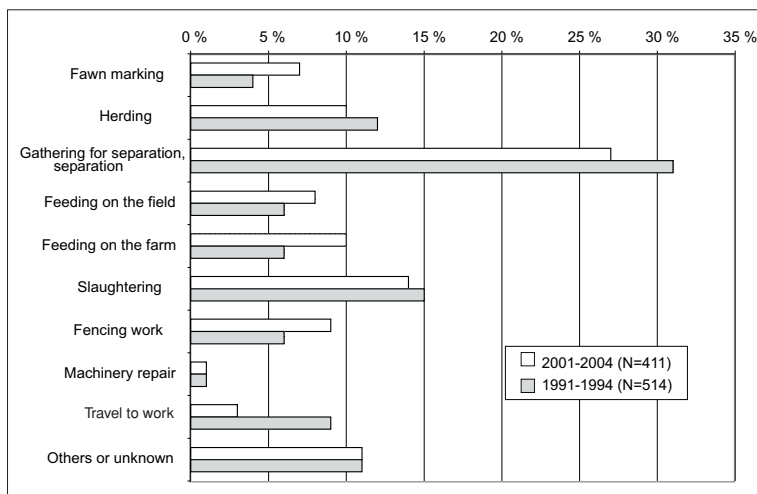


Figure 3. Reindeer herders' occupational accidents in various work phases.

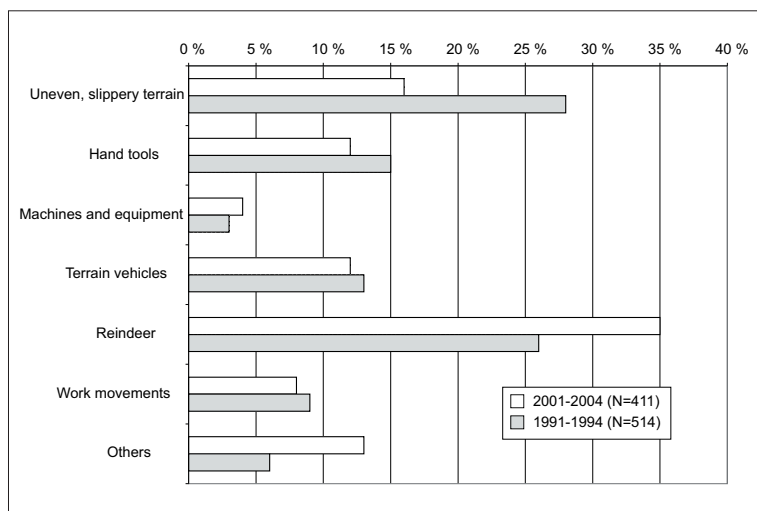


Figure 4. Reindeer herders' occupational accidents by material agent.

figure 2, the number of compensated accidents correlates much better with the number of reindeer handled, than with the number of insured reindeer herders.

The accident analysis by work phase (Fig. 3) showed that most of the accidents (27-31%) occurred during gathering for separation, and separation itself. About 15% of the accidents occurred during slaughtering work. When comparing data from the beginning of the 1990s with that of 2000s, the proportion of accidents had increased in fawn marking, fencing work and feeding tasks, both on the terrain and on farms. In gathering for separation, separation, travel to work, slaughtering and herding, the proportions of accidents had decreased. The differences were not statistically significant.

In the beginning of the 1990s, the largest group of material agents (Fig. 4) comprised accidents caused by uneven, slippery terrain (27%) and, at the beginning of 2000s, accidents caused by reindeer (35%). However, the difference was not statistically significant. The proportion of accidents caused by hand tools has decreased somewhat, and accidents caused by terrain vehicles (12-13%) and work movements (8-9%) were about the same as earlier.

## DISCUSSION

The number of compensated accidents among reindeer herders correlates much better with the number of animals handled, than with the number of insured reindeer herders. The number of animals handled describes the amount of work and is thus a useful factor for forecasting the number of accidents.

Research among Finnish dairy farmers revealed a similar relationship: injury rates increased with the number of dairy cows (16). We can conclude that there will be no big change in the number of compensated accidents, if the number of reindeer remains at the same level in the future.

The changes in work processes in the middle of the 1990s can be seen as trends in the classification of accidents, but the differences were not statistically significant. The environment and the methods of slaughtering have improved, and this is shown by the slightly decreasing number of accidents during slaughtering. The feeding of reindeer has increased, as have accidents in feeding, both on the terrain and on farms. The proportion of accidents caused by reindeer has also increased a little, because the herders are more often in close contact with the animals during feeding and separation tasks, and in loading for transportation.

The compensations related to the use of all-terrain vehicle accidents are primarily applied for from the Motor Insurers' Centre since 1995. Their summary about snowmobile accidents in 1995-2004 includes only a few occupational accidents (14). Secondly, the compensations are applied for from the Farmers' Social Insurance Institution. By the end of the 1990s, the use of snowmobiles and four-wheelers was already established among the reindeer herders (5, 6), and there was no change in the proportion of all-terrain vehicle accidents compared to the beginning of the 1990s.

The results obtained through the analysis of accidents are primarily influenced by the way the data is collected (7, 17). In this study, the information was taken from the report

forms filled in by the reindeer herders themselves and sent to the Farmers' Social Insurance Institution for compensation. When the number of reported accidents in the questionnaire was compared with the compensated accidents of reindeer herders, it was noticed that not all occupational accidents are reported to the insurance company (17). It is difficult to estimate the proportion of accidents where no compensation is sought, but the study among farmers suggests that it could be a little less than 50% (16). Among reasons for not seeking compensation are: minor nature of an injury, or a perception that it is not possible to take time off and, therefore, compensation will not be granted.

The Farmers' Social Insurance Institution had changed from their own classification of occupational accidents, to the ESAW classification (15), and this caused some problems in this study. The work phase was classified as before, and the "causes of accident" and "material agents" were similar. However, some variables (e.g. type of accident/contact mode of injury, type of injury) had changed so much that it was impossible to make any comparisons. Knowledge of the severity of the accidents would have provided useful information, if it had been possible to take them into account. Snowmobiles and four-wheelers play a much more important role in serious and fatal accidents (11).

As was shown earlier (9, 10), it is possible to increase safety in reindeer herding work, even though the work tasks are mostly performed in natural surroundings and in a harsh climate. Attention should be paid to gathering for separation, separation, feeding and slaughtering work. The use of personal protective equipment and learning

safe working habits are most important in reindeer herding. All-terrain vehicles, equipment and clothing are now improved, but the use of personal protection equipment, such as helmets, is still rare among reindeer herders; there is room for improvement. The peaceful handling of reindeer with the right grips and in pairs is important, especially in the separation and loading tasks. New slaughter houses should be planned so that work processes flow smoothly and promote safe working habits.

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