

Prevalence of exposure to environmental tobacco smoke at work and at home — 15-year trends in Finland

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Objectives This study describes the 15-year trends of exposure to environmental tobacco smoke at work and at home in Finland.

Methods A postal survey was made annually from 1985 to 2000. It included a random sample of 58 721 Finnish men and women aged 15 to 64 years.

Results In the middle of the 1980s, about a quarter of employed nonsmoking men and 15% of nonsmoking women were exposed at least 1 hour daily to environmental tobacco smoke at work. In 2000, the proportions were 7.9% and 4.4%, respectively. Exposure to environmental tobacco smoke at home decreased also slightly. In 2000, 14.3% of the nonsmoking men and 13% of the nonsmoking women aged 15 to 64 years were exposed to environmental tobacco smoke either at work or at home. Exposure at work was about three times more common among smokers than among nonsmokers, but a decreasing trend was also found among smokers. In 2000, in 85% of workplaces smoking was permitted only in separate smoking rooms, or no one was smoking within the work environment. On the other hand, in 7.3% of workplaces smoking was permitted also in common areas.

Conclusions In the past 15 years, exposure to environmental tobacco smoke at work decreased significantly in Finland. Both legislative actions and the general decrease in smoking prevalence have contributed to this decline. However, despite the marked decrease, nearly 14% of nonsmokers aged 15 to 64 years are still exposed to environmental tobacco smoke, either at home or in the workplace.

Key terms legislation, passive smoking, prevalence, smoking, tobacco, workplace.

Disease risk due to smoking is not limited to smokers only. Passive smoking, or exposure to environmental tobacco smoke, is linked with adverse health effects, and it increases the risk of several diseases, such as cardiovascular disease, lung cancer, other respiratory diseases, and low birthweight (1–11).

Environmental tobacco smoke originates from the smoldering of a cigarette or other tobacco product. The smoke dilutes in the ambient air and diffuses and spreads through it. The composition of the smoke inhaled by a smoker, generally referred to as mainstream smoke, differs from the smoke inhaled by others, generally referred to as the sidestream smoke (12). Sidestream smoke may be even more harmful for health than mainstream smoke (13, 14). In addition to nonsmokers,

also smokers themselves are exposed to environmental tobacco smoke.

Even though many countries have restricted smoking in workplaces, millions of people are still exposed to environmental tobacco smoke at work. Even more nonsmoking people, especially women and children, breathe tobacco smoke at home (10, 11). During leisure time, at least occasional exposure to environmental tobacco smoke is also common, particularly in bars and restaurants.

In this paper we present the 15-year trends of exposure to environmental tobacco smoke at work and at home in Finland. In addition, changes in smoking arrangements in workplaces during the past 5 years are presented.

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Materials and methods

The National Public Health Institute has annually conducted the Adult Health Behavior Survey in Finland since 1978. The primary purpose of the survey is to obtain information on health behavior such as smoking and changes in it. Every year a self-administered postal questionnaire has been sent to a random sample of the Finnish population aged 15 to 64 years. Questions related to exposure to environmental tobacco smoke at work and home were included in the survey in 1985. The sample sizes and participation rates are given in table 1. Since 1985, 27 496 men and 31 225 women have participated in the surveys. Of them, 27 382 (99.6%) men and 31 107 (99.6%) women had complete data on environmental tobacco smoke at home. Complete data for work was available for 22 320 (97.7%) men and 23 595 (98.3%) women who worked outside the home.

To assess the exposure to environmental tobacco smoke at work, the participants were asked how many hours during a workday they stayed in rooms where tobacco smoke was in the air. Among the smokers, the smoke in the workplace could have been generated also by the smoker him- or herself. From 1995 on, a question about smoking arrangements at the workplace was also included. The participants who did not work outside the home were excluded from this analysis. Exposure at home was assessed by asking whether somebody smoked at home. From 1998 on, the question was formulated in more detail, asking also the relation of the smoker to the respondent. Active smoking was assessed using a set of structured questions. On the basis of the responses, the participants were classified as daily smokers, occasional smokers, and nonsmokers. In this study, exposure to environmental tobacco smoke has been presented separately for nonsmokers and daily smokers. About 7% of the participants were occasional smokers. Generally, their exposure to environmental tobacco smoke was lower than that of daily smokers but higher than that of nonsmokers. However, because the number of occasional smokers was fairly small each year, occasional smokers were excluded from the analyses. Log-linear models were used to test the significance of the trends.

Results

Total exposure to environmental tobacco smoke at work decreased markedly in Finland in the 15-year period (figure 1). In 1985, 38.7% of the employed men and 22.4% of the employed women were exposed to environmental tobacco smoke. In 2000, the figures were 15% and 6.4%, respectively.

When the data were analyzed by the smoking status of the respondent, in 1985, about a quarter of the non-smoking men and 15% of the nonsmoking women who worked outside the home were exposed to environmental tobacco smoke at work at least 1 hour daily (figure 2). In 1994, the proportions were 14.4% and 7.1%, respectively. A marked drop was seen in 1995, and a decreasing trend continued also thereafter. In 2000, 7.9%

Table 1. Sample sizes and participation rates in the Adult Health Behaviour Survey in Finland in 1985–2000.

Year	Men		Women		Total	
	N	%	N	%	N	%
1985	1637	65	1781	72	3418	68
1986	1902	78	2187	85	4089	82
1987	1873	76	2170	85	4043	81
1988	1884	74	2001	82	3885	78
1989	1853	73	2024	82	3877	78
1990	1811	73	2001	80	3812	76
1991	1783	72	2026	81	3809	76
1992	1733	69	1981	80	3714	74
1993	1610	64	1863	75	3473	69
1994	1669	66	1831	75	3500	70
1995	1688	67	1956	79	3644	73
1996	1669	66	1928	78	3597	72
1997	1588	64	1928	76	3516	70
1998	1689	66	1816	82	3505	70
1999	1538	60	1833	75	3371	68
2000	1569	64	1899	75	3468	70
Total	27 496	68	31 225	79	58 721	73

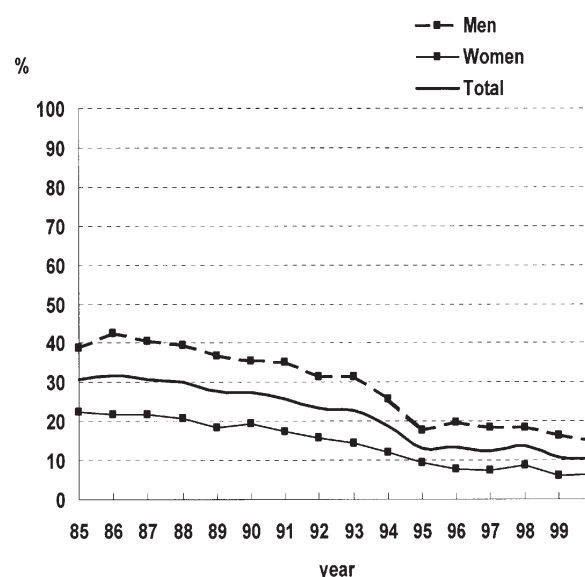


Figure 1. Proportion of persons exposed to environmental tobacco smoke at work for at least 1 hour daily in Finland in 1985–2000 by gender. (log-linear models: year: men $P < 0.001$, women $P < 0.001$, total $P < 0.001$; gender: $P < 0.001$; year $\times$ gender: $P = 0.292$)

of the nonsmoking men and 4.4% of the nonsmoking women reported daily exposure to environmental tobacco smoke at work. Among the smoking men and women exposure was markedly, about three times, more common than among the nonsmoking men and women.

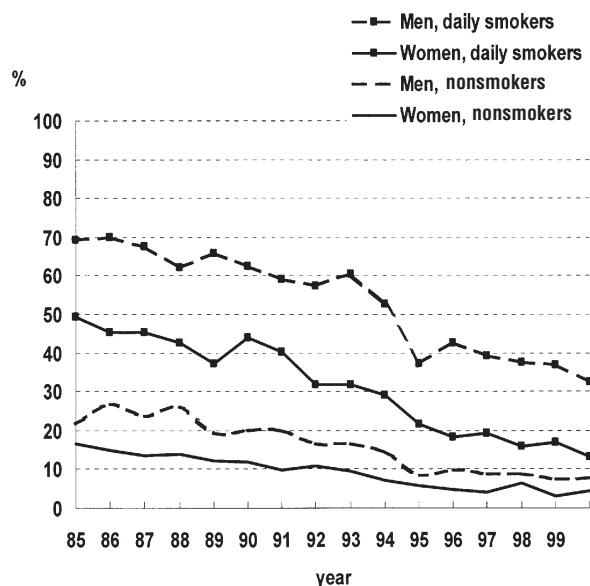


Figure 2. Proportion of persons exposed to environmental tobacco smoke at work for at least 1 hour daily in Finland in 1985–2000 by smoking status and gender. (log-linear models: year: nonsmoking men $P<0.001$, nonsmoking women $P<0.001$, smoking men $P<0.001$, smoking women $P<0.001$; gender: nonsmokers $P<0.001$, smokers $P<0.001$; year $\times$ gender: nonsmokers $P=0.468$, smokers $P=0.206$)

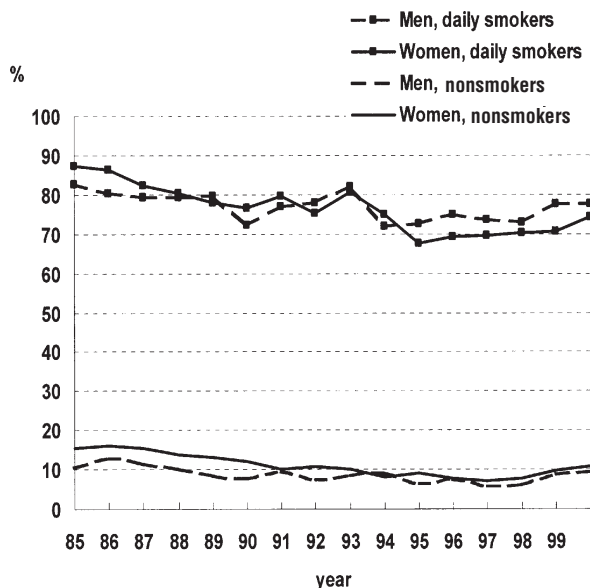


Figure 3. Proportion of persons exposed to environmental tobacco smoke at home in Finland in 1985–2000 by smoking status and gender. (log-linear models: year: nonsmoking men $P<0.001$, nonsmoking women $P<0.001$, smoking men $P<0.001$, smoking women $P<0.001$; gender: nonsmokers $P<0.001$, smokers $P=0.607$; year $\times$ gender: nonsmokers $P=0.097$, smokers $P<0.001$)

However, also among the smokers a decreasing trend was found. In 1985, 70% of the smoking men and 50% of the smoking women were exposed also to environmental tobacco smoke at work. In 2000, the proportions were 32.4% and 13.2%, respectively.

In the middle of the 1980s, about 11% of the nonsmoking men and 15% of the nonsmoking women were living in the same household with a smoker who smoked also at home (figure 3). A decreasing trend was seen until 1997, when the proportions were 5.8% and 7.1%, respectively. A mild increase was observed in the late 1990s, which, however, may have at least partly been due to small changes in the survey questionnaire.

At the beginning of the study period, over a quarter of the nonsmoking men and over 20% of the nonsmoking women were exposed to environmental tobacco smoke either at the workplace or at home or at both places (figure 4). In 2000, the proportions were 14.3% for the men and 13.0% for the women. Even lower exposure prevalences were recorded in the late 1990s.

In 1995, when a major change in tobacco legislation was introduced, 36% of the participants who worked outside the home reported that no one smoked in their workplace (figure 5). Smoking was permitted in separate smoking rooms in 45% of the workplaces. In 12.4% of the workplaces smoking was permitted also in private rooms, and in 6.8% it was permitted elsewhere than in smoking and private rooms. Between 1995 and 2000 the proportion of workplaces where smoking was allowed only in a separate smoking room increased to

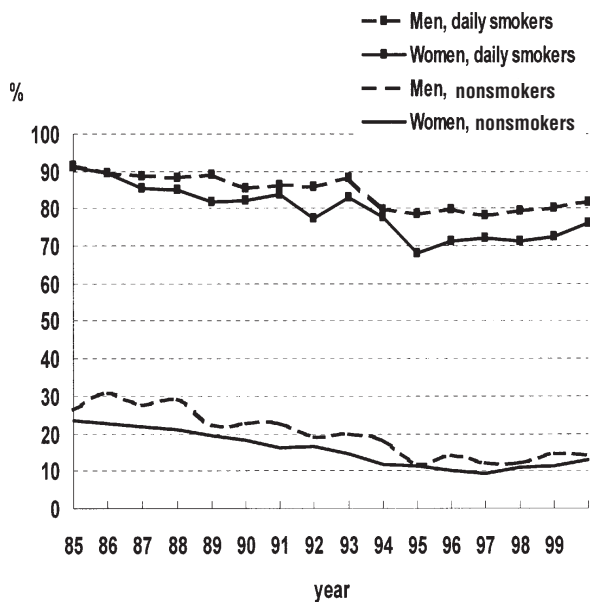


Figure 4. Proportion of persons exposed to environmental tobacco smoke at work or at home in Finland in 1985–2000 by smoking status and gender. (log-linear models: year: nonsmoking men $P<0.001$, nonsmoking women $P<0.001$, smoking men $P<0.001$, smoking women $P<0.001$; gender: nonsmokers $P<0.001$, smokers $P<0.001$; year $\times$ gender: nonsmokers $P=0.107$, smokers $P=0.191$)

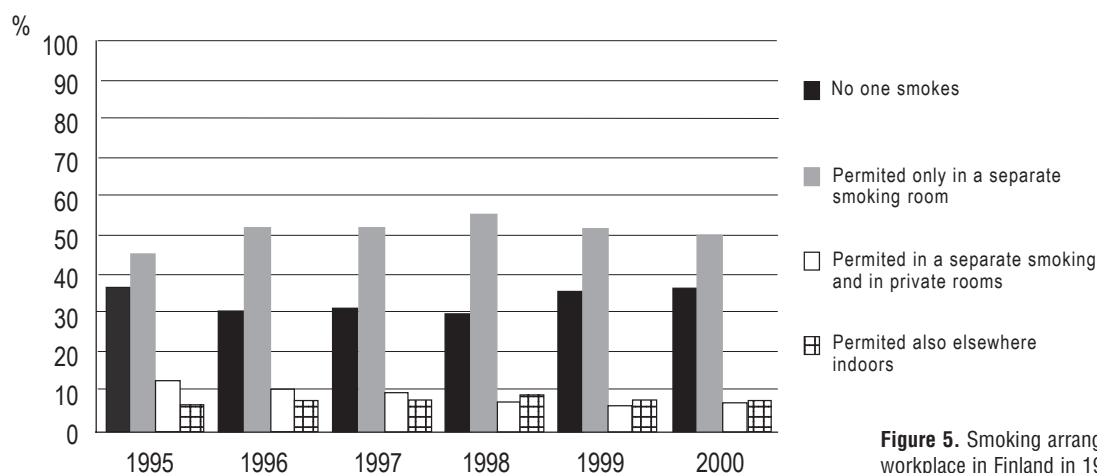


Figure 5. Smoking arrangements in the workplace in Finland in 1995–2000.

50%, and the proportion of workplaces where smoking was permitted also in private rooms decreased to 6.6%. However, the proportion of workplaces where smoking was permitted also elsewhere did not change markedly between 1995 and 2000.

Discussion

During the 15-year period of this study, exposure to environmental tobacco smoke decreased markedly in Finland. Among nonsmokers, the exposure at work decreased to one-third between 1985 and 2000. Exposure at work was about three times more common among smokers than among nonsmokers, but a decreasing trend was seen also among them. Exposure at home decreased only slightly. In 2000, about 14% of the nonsmoking men and 13% of the nonsmoking women were still exposed to environmental tobacco smoke either at the workplace or at home, or at both places.

Both the generally decreasing smoking prevalence and legislative actions have contributed to the observed decrease in exposure to environmental tobacco smoke. Since the 1960s, the smoking prevalence of Finnish men has decreased by half, from about 60% to about 30% (15). A drastic decrease was observed already in the 1960s and 1970s, but a slower decrease has continued also since then. However, during the same time period, smoking among women increased somewhat. In our sample, 31.9% of the men and 14.3% of the women were daily smokers in 1985 as compared with 27.3% and 20.3% in 2000.

The Tobacco Control Act of 1976 created a basis for a smoke-free environment in Finland. The act prohibited smoking in most public places and public transportation vehicles [Act on Measures to Reduce Tobacco

Smoking (English translation of the Finnish tobacco act); see www.tupakka.org]. However, the act did not cover workplaces and restaurants. In 1994 the act was amended to include workplaces as well. In 2000, it was expanded further to include also restaurants. In 2001, at least half of the area of a restaurant should be completely smoke-free.

In 2000, no one was smoking inside in one-third of workplaces, in half of the workplaces smoking was permitted only in a separate smoking room, and in 7% it was also permitted in private rooms. However, in 7.3% of the workplaces, smoking was permitted also in common areas. In Finland, smoking in common work areas has been legally permitted in bars and restaurants, where the first smoking restrictions were introduced by law only in 2000. In addition to bars and restaurants, workers are exposed to environmental tobacco smoke also in a small proportion of other workplaces, in which smoking in common areas has been prohibited since 1995. These workplaces are usually small companies with 2–10 workers (16).

Recent results of the European Community Respiratory Health Survey show a very large variation between countries with respect to exposure to environmental tobacco smoke at work (11). The exposure was the most common in southern Europe. In Spain and Italy, 30% to 50% of workers are exposed to environmental tobacco smoke in their workplaces. Low exposure rates, 2.5% to 10%, were found in Sweden, New Zealand, Australia, and the United States. Thus our results show that, in comparison to circumstances at the international level, exposure to environmental tobacco smoke at work in Finland is relatively rare.

In conclusion, exposure to environmental tobacco smoke, particularly at work, decreased markedly in Finland between 1985 and 2000. Both legislative actions and the general decrease in smoking prevalence have

contributed to this decrease. However, in 2000 over 14% of nonsmoking men and 13% of nonsmoking women were still exposed to environmental tobacco smoke either at work or at home.

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