

# Trends in lifestyle 1986–99 in a 25- to 64-year-old population of the Northern Sweden MONICA project

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**Aims:** The authors explore the time trends in lifestyle factors in the Northern Sweden MONICA population, including physical activity, intake of certain foods, coffee and alcohol consumption, smoking, and the use of smokeless tobacco. **Methods:** Four health surveys during a 14-year time span were compared (1986, 1990, 1994, and 1999). The participation rate in all surveys was high. A questionnaire with similar or comparable questions about lifestyle factors was used across all health surveys. **Results:** A large variation was demonstrated in the consumption of saturated fat in dairy products across the surveys. The use of butter on bread and of 3% fat milk clearly declined in favour of using low-fat margarine and 1–1.5% fat milk. A decline in the intake of boiled or baked potatoes together with an increase in the intake of pasta and rice was demonstrated. There were no changes in leisure-time physical activity. The proportion of the population using tobacco was unaltered. In men, smoking declined during the period but simultaneously there was an increase in the use of smokeless tobacco. The use of “boiled” or Scandinavian coffee diminished and more frequent use of alcohol was seen, especially in men. **Conclusion:** Pronounced changes were seen in food consumption with a decrease in saturated fat intake, boiled coffee, and potatoes and an increase in alcohol, rice, and pasta consumption. No clear time trends were found in physical activity or in the use of tobacco.

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## INTRODUCTION

Convincing evidence from observational and clinical studies suggest strong links between future health and lifestyle factors, such as physical activity, food intake, smoking habits, and alcohol consumption (1–5). The public health message, during the period 1986 to 1999, was more or less the same. Moderate physical activity, such as brisk walks for more than or equal to 30 minutes three to five times a week, has often been recommended. The major recommendations for food habits have been: Reduce total fat intake, especially saturated fat, and eat more vegetables, fruit, and whole-grain cereals. A special feature of food habits in Northern Sweden is the high consumption of “boiled” coffee. During the period smoking cessation has strongly been encouraged and also a lowering of alcohol consumption, especially in high consumers. Simultaneously other important changes have occurred in Sweden’s modern Westernized society that affect the lifestyle of individuals. First, workplaces in large sectors of society have been computerized, indicating an increase in sedentary working conditions.

Second, an increasing proportion of the population expresses concern about having to much to do and of being out of control in many of the situations in everyday life. This signalling of distress seems to have increased more rapidly during the second half of the 1990s (6). The aim of the present study was to explore the time trends in a number of lifestyle factors like physical activity, consumption of certain food groups, smoking and use of smokeless tobacco, and alcohol consumption.

## METHODS

The study was conducted within the framework of the Northern Sweden MONICA project. Four health surveys during a 14-year time span were accomplished, i.e. in 1986, 1990, 1994, and 1999. In each health survey, 250 individuals were randomly invited from each of four age strata (25–34, 35–44, 45–54, and 55–64) in either sex. The participation rate was high across all surveys (see “The events registration”, this supplement). A comprehensive questionnaire

containing questions about lifestyle factors was included in the health examination. Most of these questions were unaltered across the health surveys. Some questions had to be recoded in order to be comparable across the surveys, and in the case of physical activity the questions from the 1986 survey could not be adapted to the other surveys. Hence, the results in changes in physical activity are presented only for the period 1990 to 1999. One question estimated physical activity within the workplace. Four different gradations of physical working conditions from sedentary work as sitting at a desk, to heavy work as being a lumberjack, could be reported. Another question estimated leisure-time physical activity. This question contained six alternatives ranging from no physical activity at all, to practising sports at a competitive level. Changes in food habits, including alcohol consumption, were measured by a food frequency table containing 84 food items in 1994 and 1999. In 1986 we used 82 food items and in 1990 49 items. No changes were made in formulating the questions or response alternatives. The substantial decrease in the number of questions in 1990 was performed for priority reasons. The individuals could choose between eight frequency alternatives from no use at all to using the item four times or more per day. In other words, the questions estimated the frequency and not the amount of the consumption. A specific question concerning coffee-brewing methods was included in the questionnaire. Several questions examined present and former smoking habits and also the use of smokeless tobacco, a tobacco use common among men in Sweden. The trends analyses were performed by dichotomizing the response alternatives of the participants at a specified level, thereby creating a proportion of users and a proportion of non-users. The changes in these proportions of the

population across the health surveys were analysed and compared.

## STATISTICS

The Maentel-Henschel chi-squared test for linear trend was used wherever appropriate.

## RESULTS

The mean ages of men in the 1986 health survey was 45.5 years, in the 1990 survey 45.5 years, in the 1994 survey 45.4 years, and in the 1999 survey 45.5 years. The corresponding mean ages in women were 44.9 years, 45.1 years, 44.8 years, and 45.4 years.

### *Physical activity*

In men, a trend of more sedentary working conditions was seen when reported physical activity at the workplace was compared across the health surveys. This trend was especially prominent in highly educated men (more than 12 years of education), as shown by Figure 1. During the time period (1990–99) the proportion of the population classified as highly educated increased from 27% to 37% in the male population and from 29% to 37% in the female population.

In Figure 2, the proportion of the population spending more than or equal to two hours of light to moderate leisure-time physical activity, such as walking and bicycling, is shown. For both men and women the curve is slightly U-shaped with a decrease in this proportion in men from 82.7% in 1990 to 73.7% in 1994 and in women from 80.2% to 76.7%. In the 1999 survey, 77.2% of the men and 82.2% of the women reported physical activity at this level. Men in the age-group 45–54 years had a linear decrease in

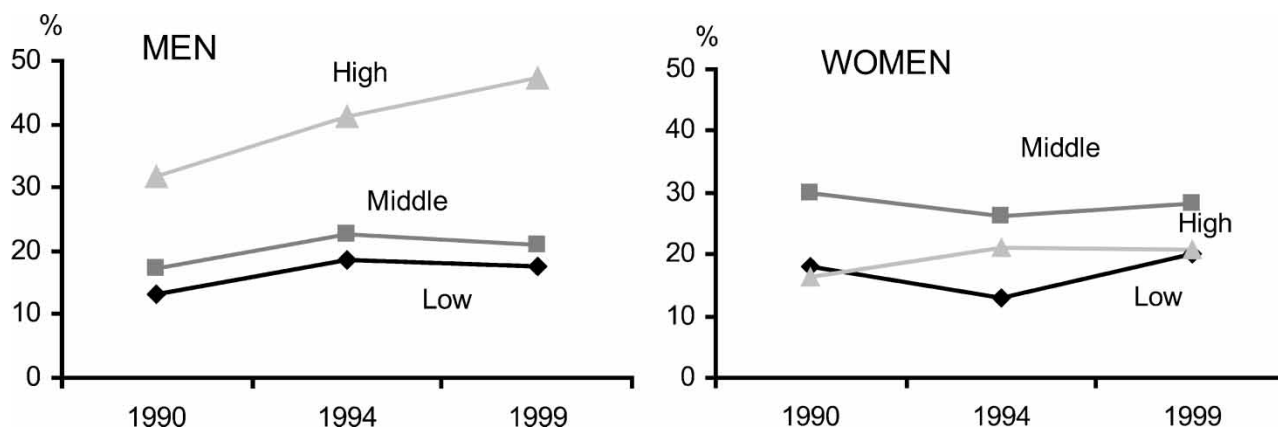


Fig. 1. Trends in work-related physical activity expressed as the proportion of the population reporting sedentary working conditions. The result from three educational subgroups (high, middle, and low) are presented.  $P < 0.001$  for linear trend in men.

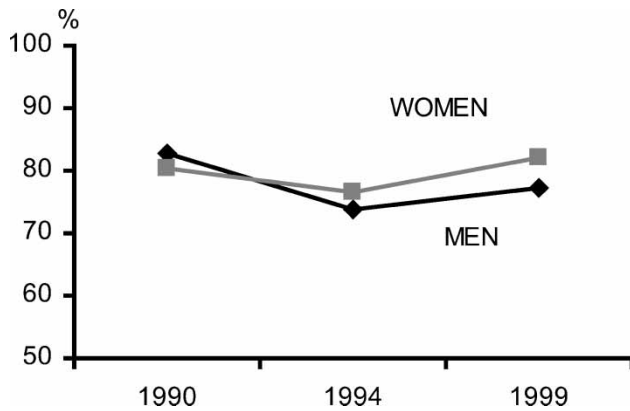


Fig. 2. Trends in physical activity expressed as the proportion of the population reporting at least two hours of light to moderate physical activity, such as walking or bicycling, per week.

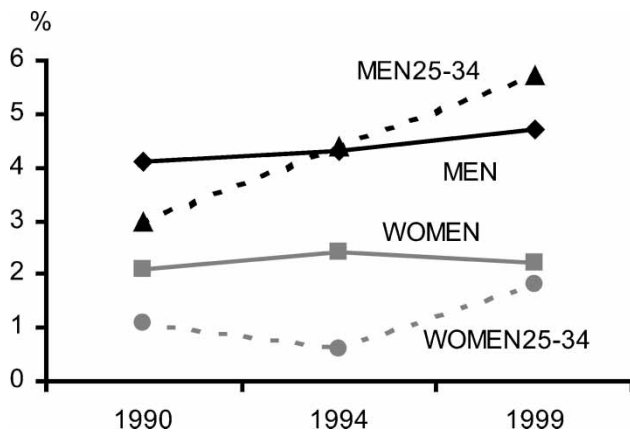
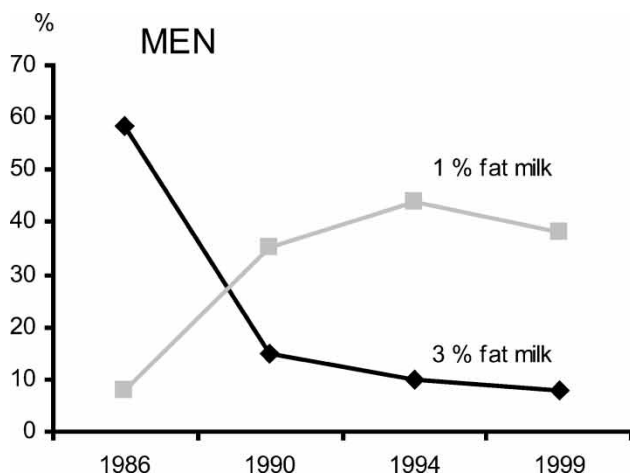


Fig. 3. Trends in physical activity expressed as the proportion of the population reporting no or almost no physical activity at all. In addition, the trend in the youngest age group is presented.



their physical activity at this level during the time period from 79.3% in 1990 down to 70.6% ( $p=0.05$  for linear trend).

A small part of the population reported undertaking no or almost no physical activity at all. As shown by Figure 3, this part of the population has been rather stable during the period from 1990 to 1999. Notably, twice as many men (4%) as women (2%) reported being physically inactive. In the youngest male age group (25–34 years), there was a nearly twofold increase in the proportion reporting being physically inactive from 3% in 1990 to 5.7% in 1999.

#### Dietary habits

A majority of men in 1986 reported daily use of 3% fat milk (58.6%). The corresponding proportion of women was 44.8%. As indicated by Figure 4, the decline in daily consumption of 3% fat milk has been rather sharp. In the 1990 health survey, 15.1% of the men and 9.1% of the women reported daily use of 3% fat milk. During the same period, the daily consumption of 1% (later 1.5%) fat milk increased from 7.7% of the men and 8.6% of the women in the 1986 survey to 35.2% of the men and 32.3% of the women in the 1990 survey. Between the period 1990 and 1999, the proportion using 3% fat milk daily continued to decrease and was in men 7.8% and in women 6.5% in the 1999 survey.

A similar fat-reducing trend was seen in the consumption of fat on bread. During the time period, butter was to a large extent replaced by low-fat margarine. There was a linear decrease in the use of butter from 16.5% in men and 12.6% in women in the 1986 survey to 5.7% in men and 3.9% in women

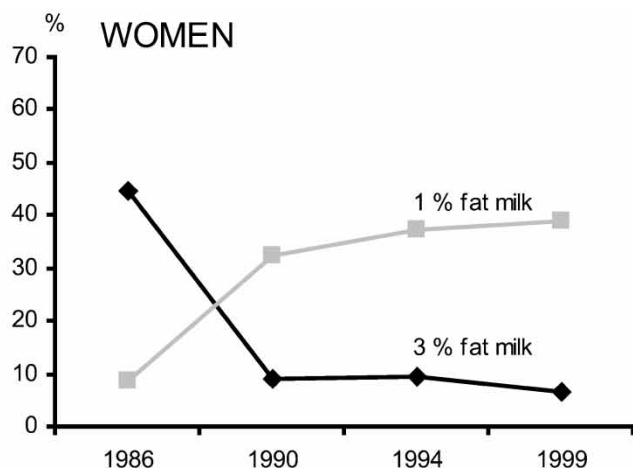


Fig. 4. Trends in milk consumption expressed as the proportion of men and women daily using 3% fat milk or 1% (1.5%) fat milk.  $P<0.001$  for linear trend for 3% fat and 1% fat milk in both men and women.

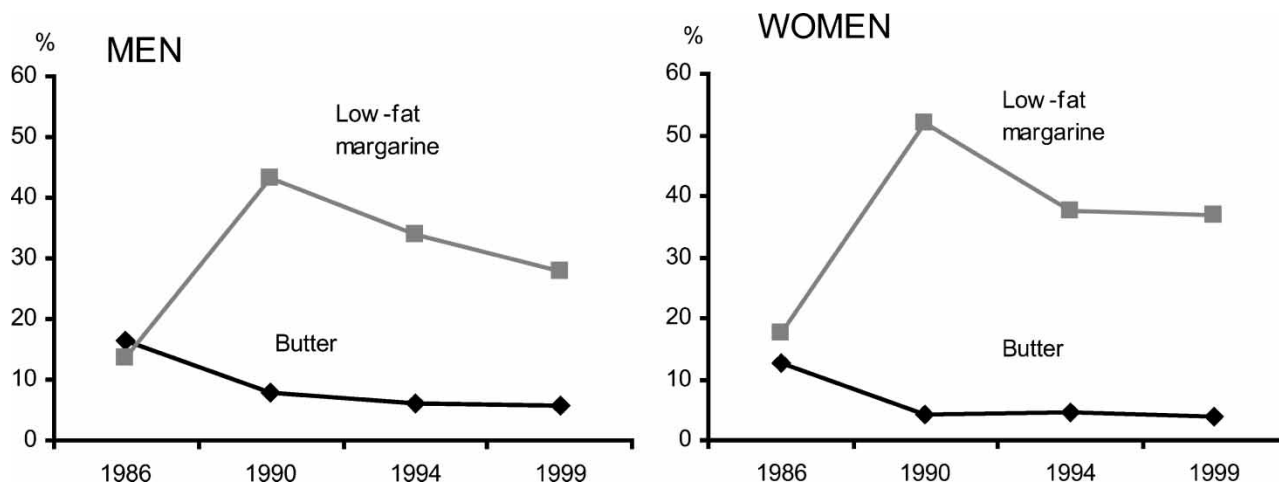


Fig. 5. Trends in use of fat on bread expressed as the proportion of men and women using butter or low-fat margarines daily.  $P < 0.001$  for linear trend for butter and low-fat margarines in both men and women.

in the 1999 survey. A particularly sharp increase in reported use of low-fat margarine, from 13.5% to 43.1% in men and from 17.6% to 52.1% in women, was found, when the 1986 survey was compared with the 1990 survey (Figure 5).

In Sweden, for many decades boiled potatoes have been the main supplement to meat or fish in the lunch and dinner meals. In the 1986 survey, about 40% of the population reported daily intake of potatoes. This proportion of the population has successively decreased to about 30% in the 1990 survey and about 20% in the 1994 survey. In 1999, 14% of the men and 15.8% of the women reported daily use of boiled or baked potatoes (Figure 6). The most pronounced decline in potato consumption was seen in the two youngest age groups (25–44 years) of men and in the youngest age group (25–34 years) of women.

During the period 1986–99, there was a sharp and linear increase in reported use of pasta and rice. In 1986, less than 40% of the population consumed pasta each week. In 1999, 76% of the male and 77% of the female population reported weekly use of pasta (Figure 6). A similar pattern was found for rice consumption with a reported increase in the proportion of the population using rice each week from 28% in 1986 to 53% in men and 59% in women in the 1999 survey (Figure 6). Generally, younger age groups as compared with older reported higher intake of both pasta and rice. However, the increased consumption of pasta and rice seen during the period 1986–99 was present in all age groups. In 1999, more than 90% of the youngest age group reported eating pasta each week compared with about 50% in the oldest age group.

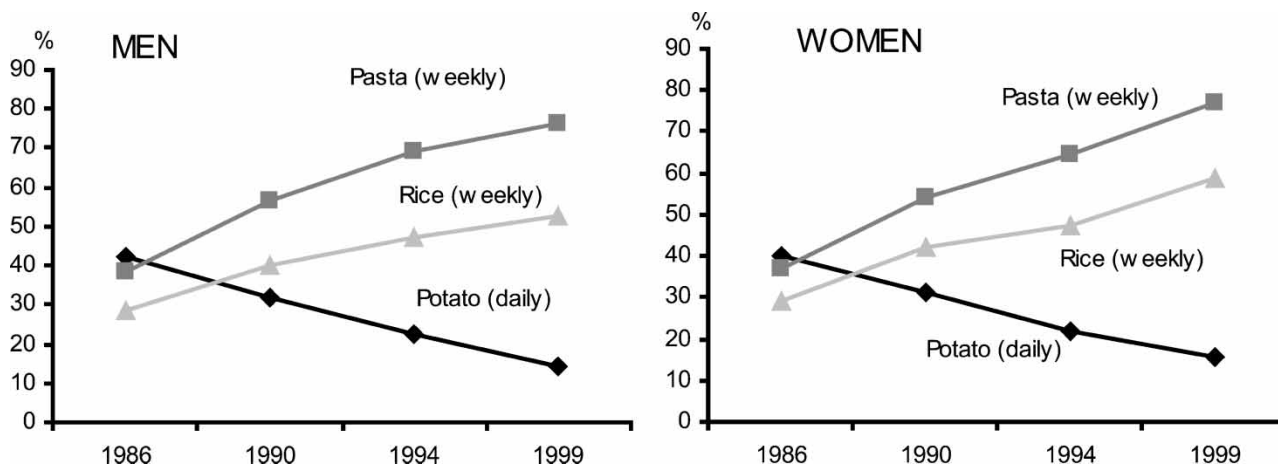


Fig. 6. Trends in the consumption of boiled or baked potatoes, pasta and rice expressed as the proportion of men and women consuming potatoes every day, and of pasta or rice each week, respectively.  $P < 0.001$  for linear trend in potatoes, pasta and rice, and in both men and women.

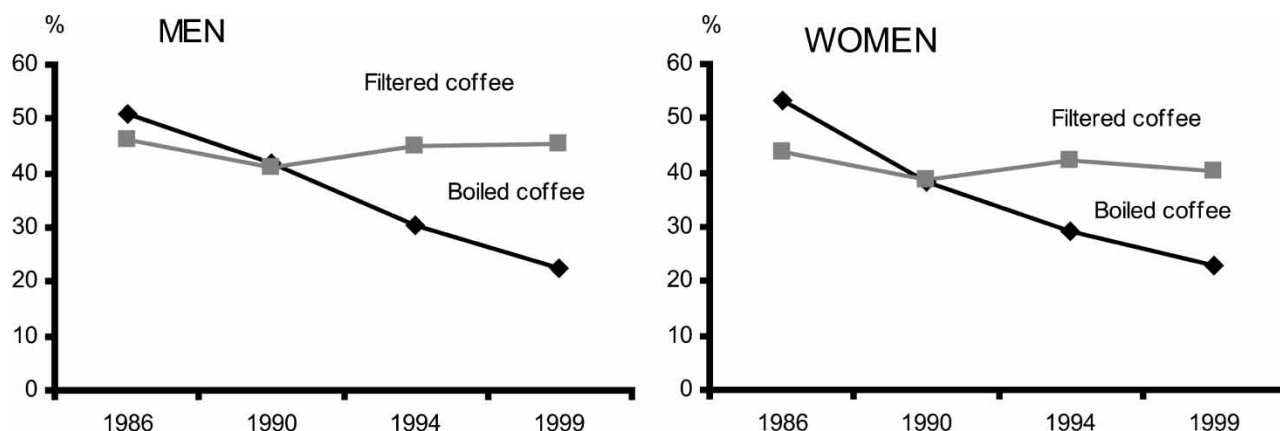


Fig. 7. Trends in coffee-brewing methods expressed as the proportion of men and women reporting the use of boiled or filtered coffee.  $P < 0.001$  for linear trend in using "boiled" coffee in both men and women.

#### Coffee consumption

During the period 1986–99 the trend in coffee-brewing methods showed a linear decrease in the use of Scandinavian "boiled" coffee. In 1986, more than half of the population reported using "boiled" coffee. In 1999, this proportion has been reduced to about 20% (Figure 7). This shift towards using filtered coffee was found in all age groups but was most prominent among 25- to 34-year-old subjects. During the time period, an increased use of instant coffee and percolated coffee was also reported, as well as not using coffee at all.

#### Alcohol consumption

During the period 1986–99, a successively larger proportion of both men and women reported weekly

use of export beer, wine, and liquor. As shown by Figure 8, this increasing trend was more pronounced in the male part of the population. In men, the proportion consuming export beer weekly nearly quadrupled from 4.3% in 1986 to 16% in 1999. Simultaneously, the consumption of wine and liquor was doubled. In women, the use of export beer increased several times but from a very low level in 1986. The consumption of wine in women, which is the main source of alcohol intake in women, has more than doubled. The consumption of liquor has also increased but to a lesser extent (Figure 8). The increase in consumption of export beer and wine in the male population followed the same pattern in all four age groups, whereas the increase in hard liquor consumption was mainly due to a fivefold increase of

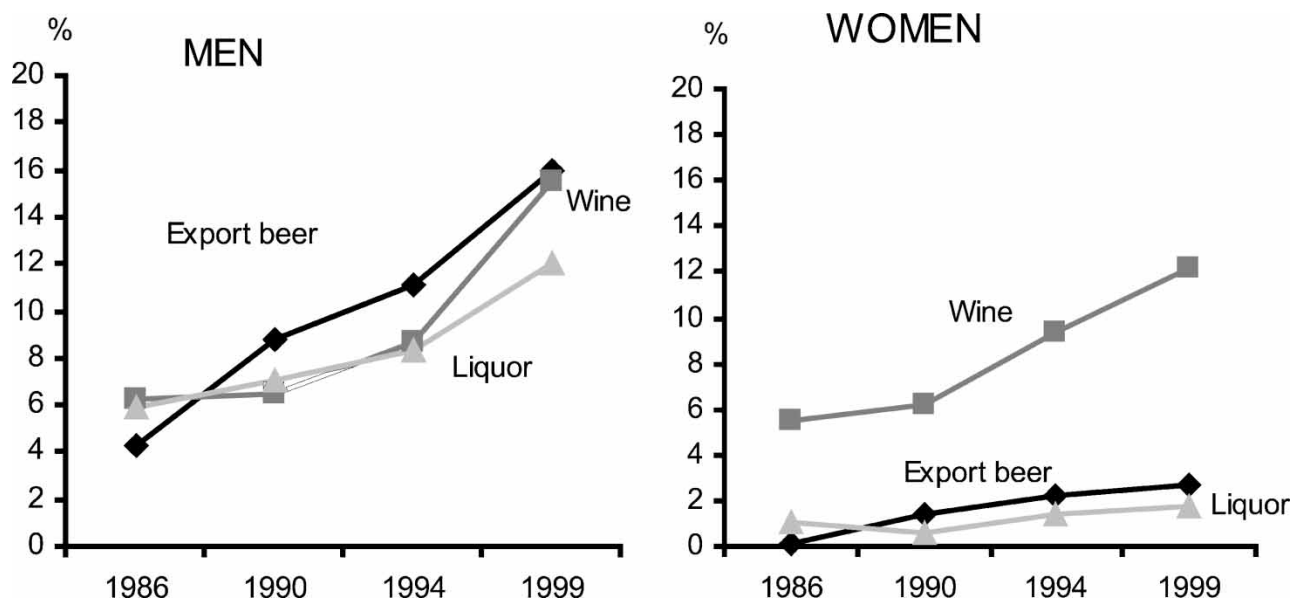


Fig. 8. Trends in alcohol consumption expressed as the proportion of the population weekly using export beer, wine, or liquor.  $P < 0.001$  for linear trend in export beer and wine in both men and women, and in liquor in men.

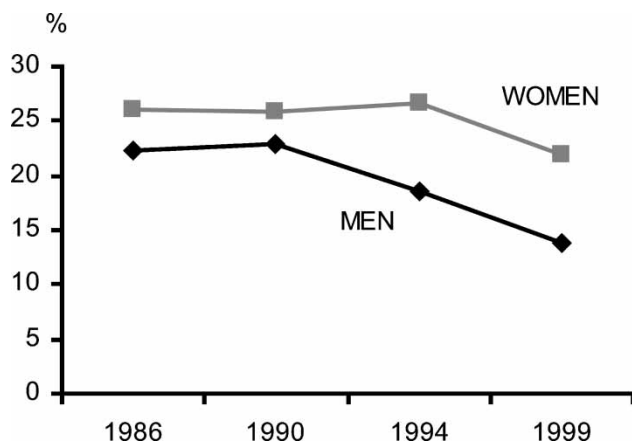


Fig. 9. Trends in smoking habits expressed as the proportion of the population reporting daily smoking.

reported weekly use of liquor in the oldest age group (55–64 years). In women, the increasing trend in wine consumption was mainly due to a higher proportion of women in the older age groups reporting weekly use of wine, especially in the time period 1994 to 1999.

#### Smoking and use of smokeless tobacco

In both men and women, a decreasing trend of daily smokers was found. This trend was already seen in the 1994 survey in the male population, but was also evident in the female population in the 1999 survey (Figure 9).

Simultaneously, the use of smokeless tobacco showed an increasing trend and constituted the main part of tobacco use in men in the 1999 survey. As a consequence of this, the daily use of tobacco remained at the same level (about 40%) in the male population during the period of 1986 to 1999

(Figure 10). Half a per cent of the female population reported daily use of smokeless tobacco in 1986 compared with 9.8% in 1999. This twenty-fold increase in snuff use was mainly due to increased consumption of snuff in the younger age groups, and resulted in a higher proportion of female tobacco users in 1999 (31.8%) compared with 1986 (26.6%).

#### DISCUSSION

The public recommendations during the observational period of this study advocated that people should eat food with lower levels of saturated fat and with high fibre content. The present study shows large variations across the health surveys in the consumption of saturated fat from dairy products. The use of butter on bread and of 3% fat milk has clearly declined in favour of using low-fat margarine and 1% fat milk. Furthermore, the intake of boiled or baked potatoes has also declined and simultaneously there has been a pronounced increase in the intake of food items as pasta and rice. Pasta products have a low glycaemic index and potatoes, especially boiled potatoes, have a high glycaemic index. The exchange of boiled potatoes for pasta products lowers the glycaemic index, which according to recent studies has beneficial effects on the glucose–insulin axis (7). Low glycaemic foods have the potential to be beneficial from a cardiovascular point of view, while saturated fat according to the cholesterol hypothesis increases the risk of getting cardiovascular disease (8).

There is no indication in this study of increasing levels of leisure-time physical activity. Instead, there is at least one observation indicating the opposite, namely the increase in the proportion of young men reporting physical inactivity. Furthermore, there are

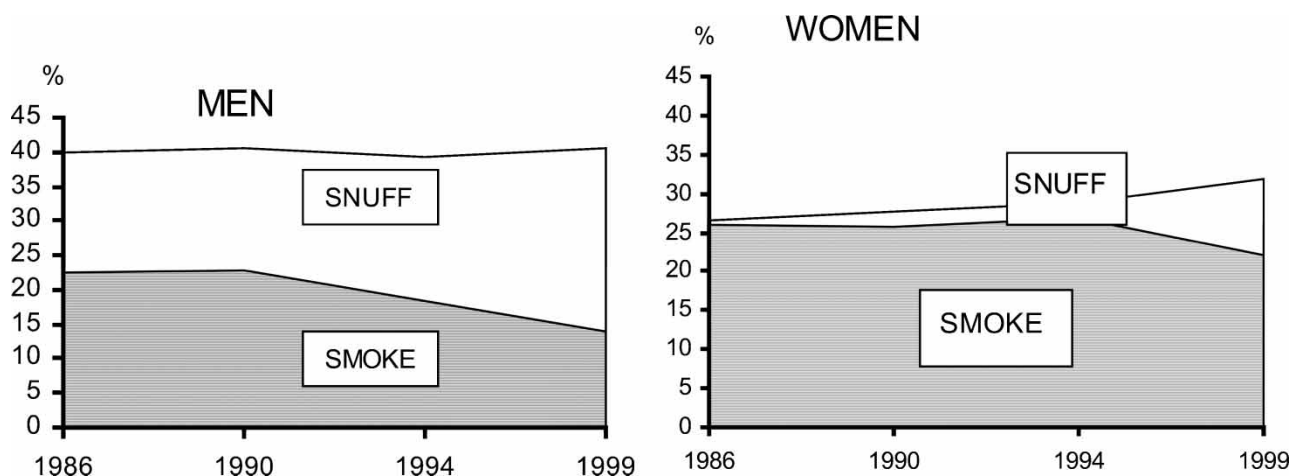


Fig. 10. Trends in use of tobacco expressed as the proportion of the population reporting to be daily smokers or daily users of smokeless tobacco.

indications of an increased frequency of sedentary workplaces, contributing to a diminishment in the overall occupational physical activity.

The proportion of the population using tobacco seems in essence to be unaltered. There is a clear trend to smoking less, especially in the second half of the 1990s but this trend is counteracted by a simultaneous increase in the use of smokeless tobacco, and in the 1999 survey a majority of male tobacco users were using smokeless tobacco. Whether this shift in tobacco use is beneficial or more correctly less adverse in relation to cardiovascular disease is still an issue for debate (9). Some evidence indicates that this could be the case. No increased risk for myocardial infarction among users of smokeless tobacco compared with never-users of tobacco was found in a recent case-referent study in the north of Sweden (10).

This study shows a large increase in reported frequency of alcohol consumption, especially in men. The frequency of intake of all kinds of alcohol has risen (export beer, wine, and liquor). This trend is the opposite of the public health message in Sweden concerning alcohol consumption. At the same time, it is important to note that several recent studies have shown the prevalence of cardiovascular disease to be lower among regular low-consumers of alcohol than among teetotalers (11).

This study also demonstrates a large decline in the use of "boiled" or Scandinavian coffee. This trend may have a beneficial effect on cardiovascular disease, mainly by lowering the blood cholesterol concentration. In the 1986 health survey, it was shown that the coffee-brewing method influenced the total cholesterol concentration in the population. Consumers of Scandinavian "boiled" coffee showed a 10% higher total cholesterol level compared with consumers of "filtered" coffee after adjusting for age and dietary fat intake (12). Experimental studies did later demonstrate that the coffee bean contains two fat fractions, cafestol and kahweol (13). These fat fractions can selectively increase the serum cholesterol level, and it appears that these fat fractions can only with great difficulty pass through a paper filter.

In summary, this study has shown increasing use of food items with lower saturated fat content, increasing frequency of using alcohol, and decreasing use of

"boiled" coffee. No clear time trends were found in physical activity and in tobacco consumption.

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