Health in the Øresund Region

Report no. 2

National Institute of Public Health

The European Union
The European Regional Development Fund
This project is co-financed by
INTERREG II-Øresund Region

Dpt of Community Medicine
Division of Social Medicine

Health in the Øresund Region

Report no. 2

Cover: Freddy Brix
Print: Nørrebros Bogtryk og Grafisk Center A/S
Number of copies issued: 400.

ISBN: 87-7899-027-0

Requests for additional reports should be addressed to:

National Institute of Public Health
25, Svanemøllevej
DK-2100 Copenhagen Ø
Denmark

Telephone +45 3920 7777
Telefax +45 3920 8010
e-mail DIKE@dike.dk - http://www.dike.dk

Division of Social Medicine,
Unit of Social Medicine
University Hospital MAS,
Malmö, Sweden

Telephone +46 4033 3224
Telefax +46 4033 6215

Table of contents

Foreword

The life expectancy at birth varies greatly among the different countries in Europe, between women and men, between different socio-economic groups and even between different regions of the same country.

Denmark has a lower life expectancy than Sweden for both women and men. International reports have also shown that in Denmark, but also to some extent in the Swedish part of the Øresund area, the development of life expectancy over the last decades has lagged behind that of other western countries.

An alarming 1993 report from the National Institute of Public Health in Copenhagen has shown that the lower life expectancy in Denmark was largely due to a higher age-specific death rate within the age group 35-64 years, i.e. persons of working age. In some age groups there had even been an increase in age-specific mortality, as compared to the 1970's.

A similar report from the Department of Community Medicine in Malmö has also shown that the age-specific death rate in the Malmö area, for both men and women, did not decrease during the period 1984-93.

It is, among other things, based on this remarkable development that collaboration between the National Institute of Public Health in Copenhagen and the Department of Community Medicine in Malmö was established in 1993/1994.

The goal of this collaboration is to study differences in mortality, illness, lifestyle and psychosocial risk factors between the two countries, between genders and between social classes through a joint research project, which also includes joint public health reporting.

The first product of the co-operation was the report "Om Sundhed och Ohälsa kring Sundet" (1995), to be followed by publication of scientific articles. The current report is an update and closer examination of the Øresund report from 1995.

The report has been written and edited by Martin Lindstrom, Division of Social Medicine, Department of Community Medicine and the Unit of Social Medicine, University Hospital MAS in Malmö and Niss Skov Nielsen, National Institute of Public Health, Copenhagen.

Juan Merlo, Division of Social Medicine, Department of Community Medicine and the Unit of Social Medicine, University Hospital MAS in Malmö has contributed a piece on multilevel analysis of ischaemic heart disease. Thor Lithman, Skåne Region and Søren Rasmussen, National Institute of Public Health, have contributed with data on life expectancy, ischaemic heart disease and lung cancer. The research group is led by Niels Kr. Rasmussen, National Institute of Public Health and Per-Olof Östergren, Division of Social Medicine, Department of Community Medicine and the Unit of Social Medicine, University Hospital MAS in Malmö.

Senior Office Clerk Lilian Pedrero and Administrative Assistant Hanne Mortensen of the National Institute of Public Health in Copenhagen have done the layout and editing, along with the assistance of Viveca Floden, Unit of Social and Preventive Medicine, University Hospital MAS, Malmö. Denise Sanderson of the National Institute of Public Health has translated and edited the present English version.

Niels Kr. Rasmussen
National Institute of Public Health
Copenhagen, Denmark

Per-Olof Östergren
Division of Social Medicine, Department of Community Medicine, Unit of Social Medicine University Hospital MAS, Malmö, Sweden

Population of the Øresund Region

The Øresund is the body of water dividing the southern part of Sweden and the eastern part of Denmark. In 2000, a bridge was constructed linking the Danish capital of Copenhagen with Sweden's 3rd largest city, Malmö. On the Danish side, the Øresund region includes the greater Copenhagen region, together with Frederiksborg and Roskilde Counties. On the Swedish side, the region comprises Skåne County. The regions in both countries are comprised of cities, suburbs and villages.

The following regions comprise the area on the Danish side of the Øresund: Roskilde County, Frederiksborg County, Copenhagen County, Frederiksberg Municipality and Copenhagen Municipality. On the Swedish side is Malmö Municipality and the areas previously known as Kristianstad County and Malmöhus County. Since 1998/1999 these areas have been combined to form the area known as Skåne County.

Materials and methods

In both Denmark and Sweden, national statistics on demographic trends have been used, together with the trends in overall and diagnostic specific mortality rates. Data for this report comes from the following sources:

Denmark

- The National Institute of Public Health's population database (life expectancy)
- Statistics Denmark's Statistical Yearbook 1998 (life expectancy)
- The National Institute of Public Health's cause of death database (lung cancer)
- The National Patient Registry (lung cancer)
- The Danish Health and Morbidity Survey 1987, 1991, 1994 (smoking)
- Nielsen, NS. Health and lifestyle among pupils in secondary schools in Frederiksborg County. 1996 & 1998 (smoking and alcohol – youth)
- National Board of Health (alcohol consumption)

Sweden

- Database of Regional Statistics, National Bureau of Statistics (life expectancy, lung cancer)
- Malmö Public Health Report, 1994, Unit of Social Medicine in Malmö (smoking)
- Borgfors N, 1997 (smoking youth)
- The Swedish Alcohol Monopoly Retailing (alcohol consumption)
- The Unit of Statistics, The National Social Insurance Board (early retirement)
- Centre for Epidemiology, National Board of Social Development (ischaemic heart disease)
- The National Corporation of Swedish Pharmacies, statistics concerning pharmaceutical retail, 1998

Data on health developments and social relationships continues to be collected. Routinely collected data offers several good possibilities to compare developments in the two countries.

Since the 1980's, the National Institute of Public Health in Copenhagen and the Division of Social Medicine, Department of Community Medicine, Unit of Social Medicine, University Hospital MAS in Malmö have regularly collected data on health

risks such as social and economic conditions, psychosocial environment and health-related lifestyle habits (e.g. use of tobacco and alcohol). The current surveys were carried out in an interview format with selected individuals in defined age groups (adults).

The Division of Social Medicine in co-operation with the Unit of Social Medicine, University Hospital MAS, carried out the questionnaire-based study "Malmö Public Health Survey" during spring 1994. The postal questionnaires went out to 5600 randomly selected residents of Malmö with a response rate of 71% (Lindstrom et al., 1995).

Data from the Danish regions comes from the National Institute of Public Health's Health and Morbidity Surveys. These surveys were carried out in 1987, 1991 and 1994. The three studies were based on personal interviews with 6000 randomly selected adult Danes with a response rate of between 70-80%. For a more detailed description of methods and materials (Rasmussen et al., 1988) and (Kjøller et al., 1995).

The investigations on both sides of the Øresund were conducted independently of each other. As a result of the collaboration between the National Institute of Public Health and the Division of Social Medicine, Unit of Social Medicine, University Hospital MAS in Malmö, studies have been carried out (Fall 1999 - Spring 2000) including Zealand on the Danish side and 33 municipalities in Skåne County on the Swedish side. The first results of this investigation will be presented later in 2001. This report is based on comparable data from previous health investigations on the respective sides of the Øresund.

Socio-demographic profile of the Øresund Region

The Øresund region covers a large area comprised of both urban and rural areas. There are very large regional differences in the degree of urbanized areas, commercial structures etc. both on the Swedish and on the Danish sides. The number of people in the different regions is included in the parentheses. The Swedish side includes the former Kristianstad County and Malmöhus County, now Skåne County (1,116,603), including Malmö Municipality (251,408). The Danish side includes Roskilde County (228,202), Frederiksborg County (359,839), Copenhagen County (610,261), Copenhagen Municipality (487,969) and Frederiksberg Municipality (89,507). The population census was conducted on December 31, 1998 on the Swedish side and on January 1, 1998 on the Danish side.

There are large regional differences as regards the employment situation in the Øresund region. This is illustrated by descriptions of the countries' and the regions' employment rate, unemployment rate and early retirement rate.

The employment rate, defined as the proportion of individuals between 16-66 years of age (16-64 in Sweden) in the labour force who are employed as salaried workers, self-employed or assisting spouse, was assessed on January 1, 1998. In Sweden, there was an overall employment rate of 70.7%. Regionally, there was an employment rate of 68.8% in Skåne County and 62.6% in Malmö Municipality.

In Denmark, there was an overall employment rate among the adult population of 73.3%. In the various regions, the employment rate was 77.9% in Roskilde County, 76.2% in Frederiksborg County, 74.9% in Copenhagen County, 71.8% in Copenhagen Municipality and 76.6% in Frederiksberg Municipality.

The proportion of unemployed includes persons who are registered as unemployed, i.e. insured unemployed and unemployed registered by the social welfare system. The overall proportion of unemployed in Sweden in January 1998 was 6.1%. In the Swedish regions, the proportion was 6.8% in Skåne County and 9.2% in Malmö Municipality. In Denmark, the total proportion of unemployed was 6.9%. In the Danish regions, there was a rate of 5.2% in Roskilde County, 5.1% in Frederiksborg County, 6.0% in Copenhagen County, 9.9% in Copenhagen Municipality and 8.1% in Frederiksberg Municipality.

In Sweden, the number of early retirement pensioners (including disability pensioners) as of January 1, 1998 was 421,624, corresponding to 7.6% of adults between the ages of 16 and 64 years. The proportions in the various regions were 7.6% in the former Kristianstad County and 6.7% in the former Malmöhus County.

In Denmark, there were 271,077 early retirement pensioners (including disability pensioners), corresponding to 7.6% of the adult population of 3,585,624 persons between 16 and 66 years. In the various regions, the proportion of early retirement pensioners was 5.8% in Roskilde County, 6.9% in Frederiksborg County, 6.4% in Copenhagen County, 7.0% in Copenhagen Municipality and 5.6% in Frederiksberg Municipality.

One conclusion is that the employment rate in 1998 was generally higher in Denmark than in Sweden and there were no systematic differences in unemployment rates between the two countries. In addition, there was no clear pattern in regional proportions of early retirement rates. In both Sweden and Denmark, the employment rate decreased and unemployment increased the nearer one comes to the development and urbanization on both sides of the Øresund (in Copenhagen and Malmö).

Life expectancy

In Denmark during the years 1993-1997, life expectancy at birth was 72.6 years for men and 77.6 years for women. Life expectancy in Sweden during the same period was 75.9 years for men and 81.1 years for women. The higher mortality in Denmark is particularly found in the age range 25-64 years for men and 35-64 years for women. In both countries, mortality for both genders increased slightly during the period 1988-1992 (Øresundsrapporten, 1995).

On the Danish side of the Øresund, life expectancy was markedly lower for both men and women in Copenhagen Municipality than in the other areas and compared to the rest of the country. In Copenhagen, Frederiksborg and Roskilde counties, life expectancy for men was somewhat higher than in the rest of Denmark. Women's life expectancy in these areas was comparable to that of women in the rest of the country. On the Swedish side, life expectancy in Malmö Municipality was lower for both men and women than in the rest of Sweden. In contrast, life expectancy for both men and women within the counties of Malmöhus and Kristianstad was higher than in the rest of the country.

In Skåne County between 1993-1997, life expectancy at birth for men varied between 74.4 years in Malmö and 78.2 years in the residential municipality of Lomma. The variation for women was somewhat less. In Hörby, women's life expectancy at birth was 82.9 years, while in Bjuv it was 79.5 years. On the Danish side of the Øresund, life expectancy was generally notably lower for both men and women than on the Swedish side. In the larger cities, including the capital Copenhagen, life expectancy during the period from 1993-1997 was 68.8 years for men and 75.8 years for women, while it was 72.9 years for men in Roskilde County and 78.2 years for women in Fyn County (which is outside the Øresund region).

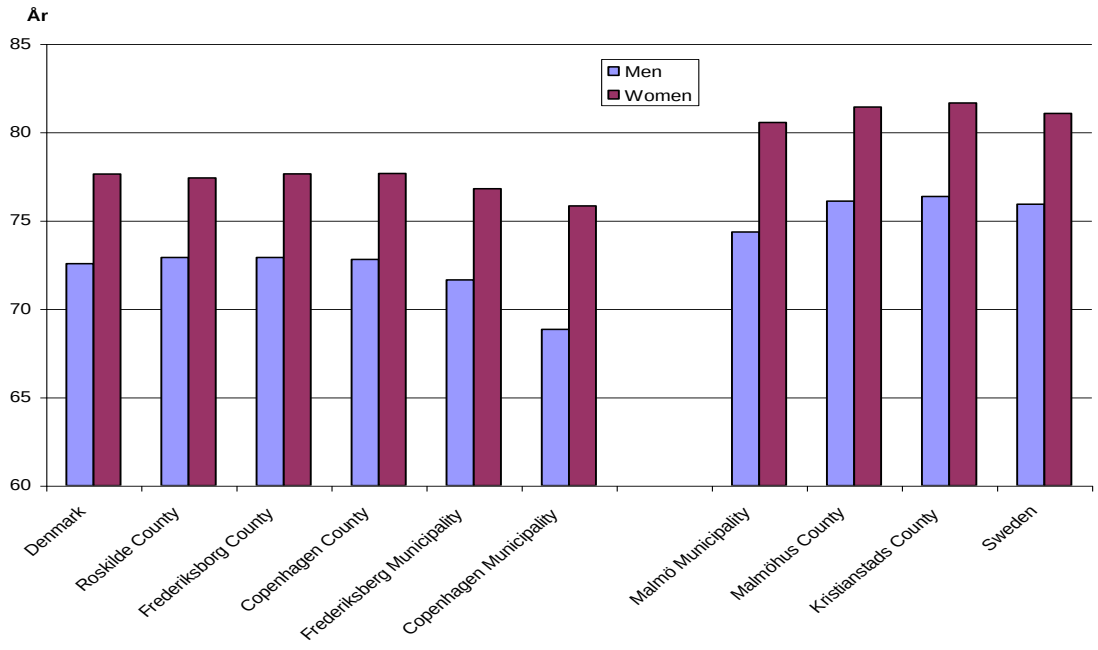


Figure 1. Life expectancy at birth for men and women by geographic region. Age standardised. (1993-1997). Source: National Institute of Public Health's Cause of Death database (Denmark) and Regional statistical database (Sweden).

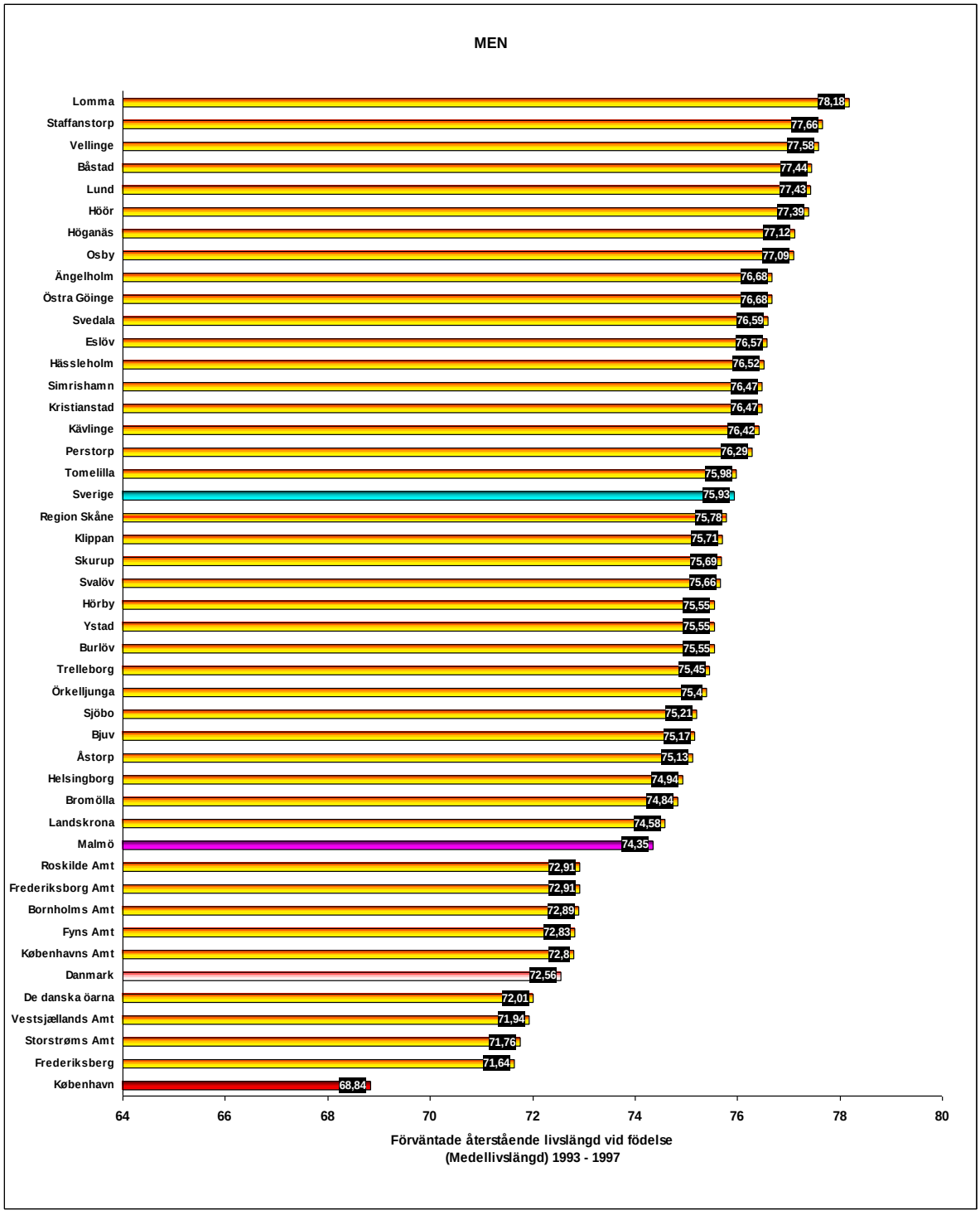


Figure 2. Life expectancy at birth for men in Skåne's municipalities and in the Danish Øresund regions. Age standardised. (1993-1997). Source: National Institute of Public Health's Cause of Death database (Denmark) and Regional statistical database (Sweden).

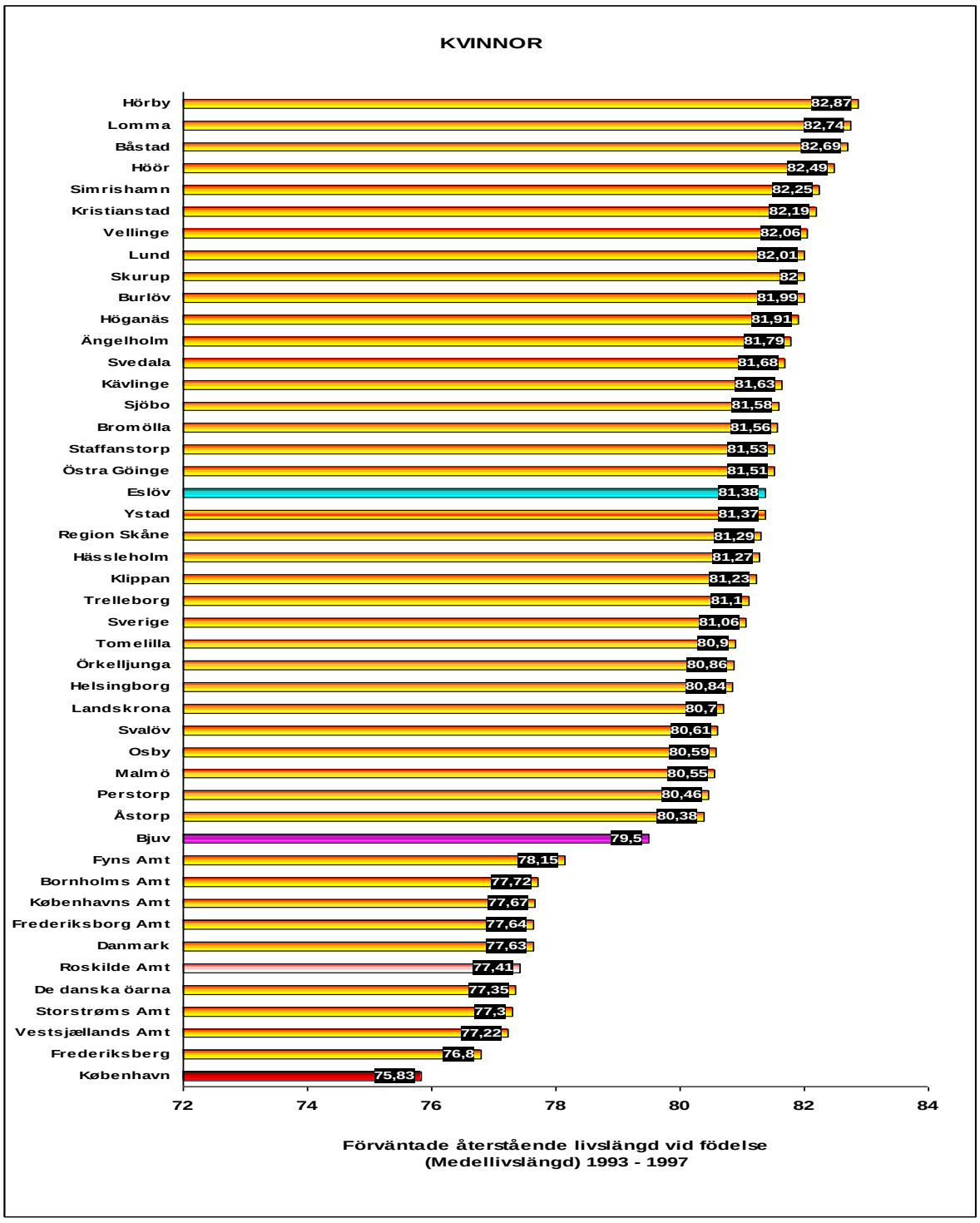


Figure 3. Life expectancy at birth for women in Skåne's municipalities and in the Danish Øresund regions. Age standardised. (1993-1997). Source: National Institute of Public Health's Cause of Death database (Denmark) and Regional statistical database (Sweden).

Smoking

The absolute number of deaths among Danes less than 75 years of age is approximately 7700 persons/year – comparable with Sweden – and more than half of these can be attributed to the Danish lifestyle. It is especially smoking that looks to be contributing to this mortality (Juel, 1998 and Sundhedsministeriet, 1998).

Lung cancer

Smoking is undoubtedly the single largest cause of disease and mortality attributed to lung cancer.

Mortality due to lung cancer is higher on the Danish side of the Øresund than it is on the Swedish side. In all areas on the Danish side, lung cancer mortality for both men and women is higher than in Sweden.

In Denmark lung cancer mortality is just over 100 deaths per 100,000 persons per year. In Copenhagen, mortality for men has fallen from 135 deaths per 100,000 persons per year in the period 1988-1992 to 111 deaths per 100,000 during the period 1993-1997.

In Malmö there has been a decrease for men during the period from 82 to 52 deaths per 100,000 persons per year, which means that lung cancer mortality among men in Malmö is now at a level with lung cancer mortality throughout the rest of Skåne.

Both Danish men and women have a lung cancer mortality rate twice as high as Swedish men and women. Furthermore, both Danish and Swedish women have an increasing lung cancer mortality rate.

In Copenhagen, lung cancer mortality for women has increased from 62 to 71 deaths per 100,000 persons per year. In Malmö, correspondingly, women's lung cancer mortality has increased from 27 to 31 deaths per 100,000 persons per year. Lung cancer mortality on the Danish side is significantly higher in Copenhagen than in the rest of the Danish regions. The same also applies to Malmö as compared to the rest of the Swedish regions. This difference in developments between women and men reflects the later developments in smoking behaviour.

While smokers have become fewer among men in both Denmark and Sweden, the number of smokers among women has decreased more slowly and within some age groups, in both countries, the number has actually increased.

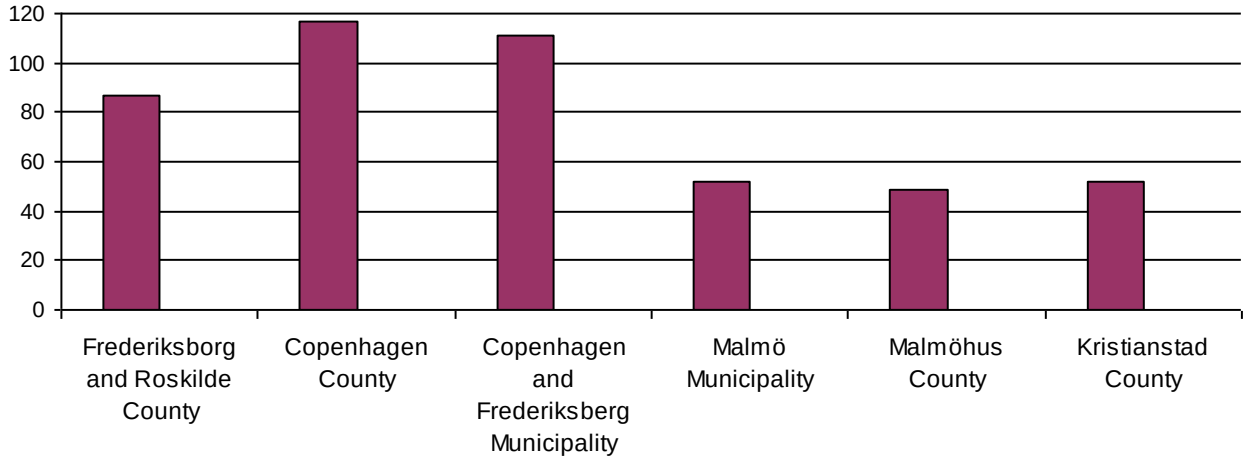


Figure 4. Number of deaths among men with lung cancer per 100,000 inhabitants by geographic region. Age standardised. (1993-1997). (Denmark ICD 8, diagnostic code 160-163, Sweden ICD 9, diagnostic code 160-165). Source: National Institute of Public Health's Cause of Death database (Denmark) and Regional statistical database, Statistical Central Office (Sweden).

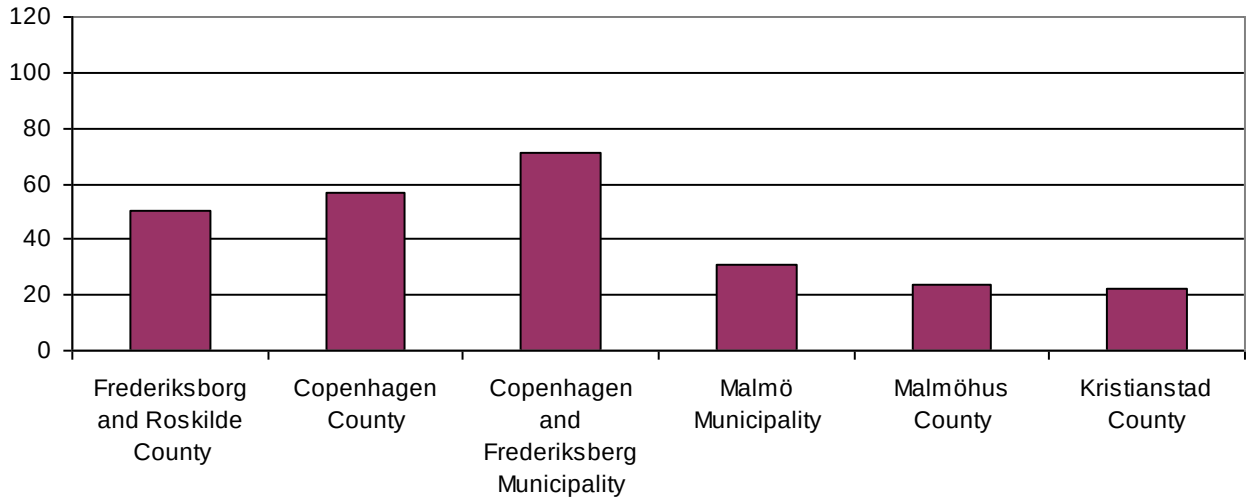


Figure 5. Number of deaths among women with lung cancer per 100,000 inhabitants by geographic region. Age standardised. (1993-1997). (Denmark ICD 8, diagnostic code 160-163, Sweden ICD 9, diagnostic code 160-165). Source: National Institute of Public Health's Cause of Death database (Denmark) and Regional statistical database, Statistical Central Office (Sweden).

Smoking in different generations

The first Øresund report in 1995 showed a twice as high prevalence of daily smoking on the Danish side as compared to Sweden. In Sweden, the number of men that smoke daily has decreased from 36% in 1980 to 22% in 1995. The number of daily smokers among women has, during the same period, decreased from 29% to 23%.

Two interesting questions arise: How extensive is the recruitment of smokers among the young? How many people in different age groups have quit smoking among those who have ever smoked? Such numbers reflect partly the recruitment that exists among adolescents (13-18 years), and partly the diminished prevalence during the rest of the lifespan.

For many years, a decrease in the number of smokers among pupils in grade 9 could be seen in Sweden. Smoking was much trendier among adolescents in the 1970's than it is today. In other words, the recruitment base for future adult smokers has decreased. Figures 6-9 show that even in 1996 and 1995, respectively, the recruitment base was greater among Danish than among Swedish male and female school pupils. Both the proportion that smoked 1-14 cigarettes per day and the proportion that smoked more than 15 cigarettes per day were twice as high for both boys and girls in Denmark as compared to Sweden.

Figure 10 shows that 53% of the youngest adult men (20-21 years) in Malmö had never smoked, 11% had quit, 21% smoked regularly and 15% were intermittent smokers. Of the young females (20-21 years), 52% had never smoked, 13% had quit, 20% smoked regularly and 15% were intermittent smokers. This implies that the proportion of those who had quit, among all those who have ever smoked, was already approximately one-fourth in the age group 20-21 years.

The largest proportion of regular smokers, 35% of both men and women, can be found in the age group between 40-41 years of age. Twenty-six percent of men and 24% of women had quit smoking, while 9% and 8%, respectively, were intermittent smokers. Just 29% of men and 34 % of women had never smoked. In the age group 40-41 years just over one-third (36%) of both sexes had quit, among those who had ever smoked.

The numbers illustrate just how important youth is regarding whether one continues to smoke regularly or decides to quit. Approximately one-fourth of those in the age group 20-21 years who had ever smoked have quit, while quitters as a proportion of all those who had ever smoked increased to about one-third among 40-41 year olds. The greatest proportion of ever-smokers between the ages of 40 to 80 years also reflects the higher rate of smokers in the population during the previous decade for men and the levelling off of new recruitment among females during the 1970's.

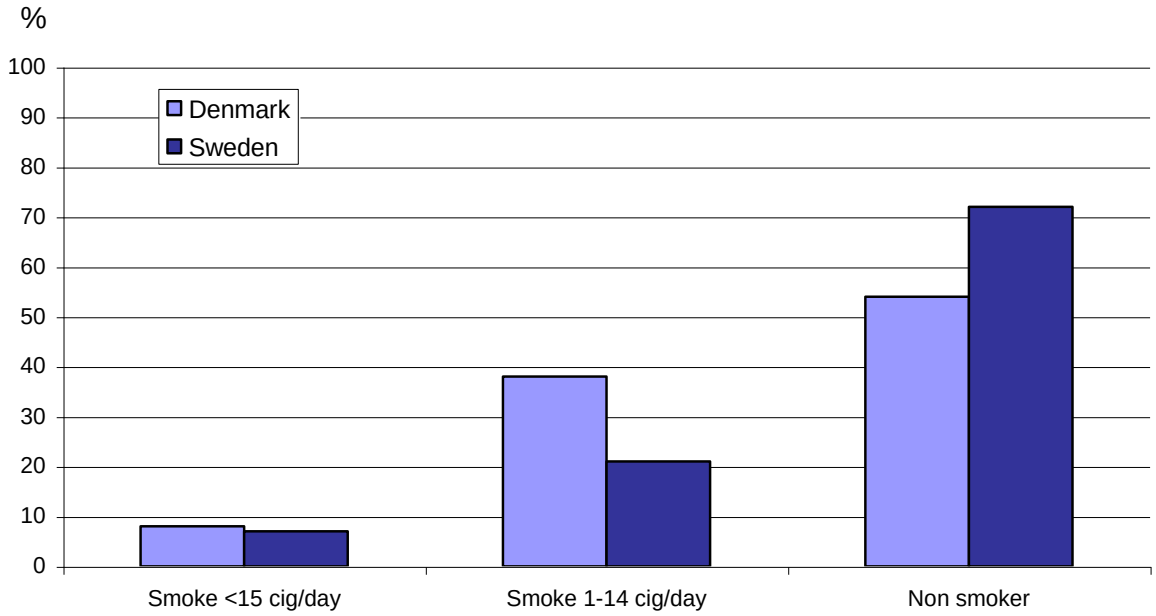


Figure 6. Proportion of smokers and non-smokers among 17-year-old Danish (1995) and Swedish (1996) male secondary school pupils. Source: Nielsen (1996) and Borgfors (1997).

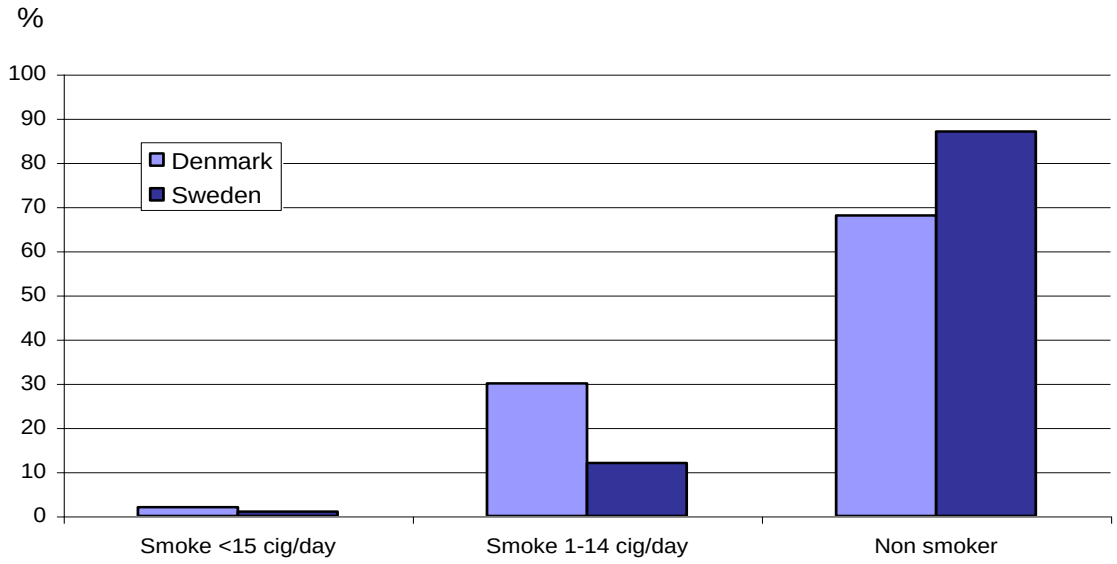


Figure 7. Proportion of smokers and non-smokers among 15-year-old Danish (1995) and Swedish (1996) male secondary school pupils. Source: Nielsen (1996) and Borgfors (1997).

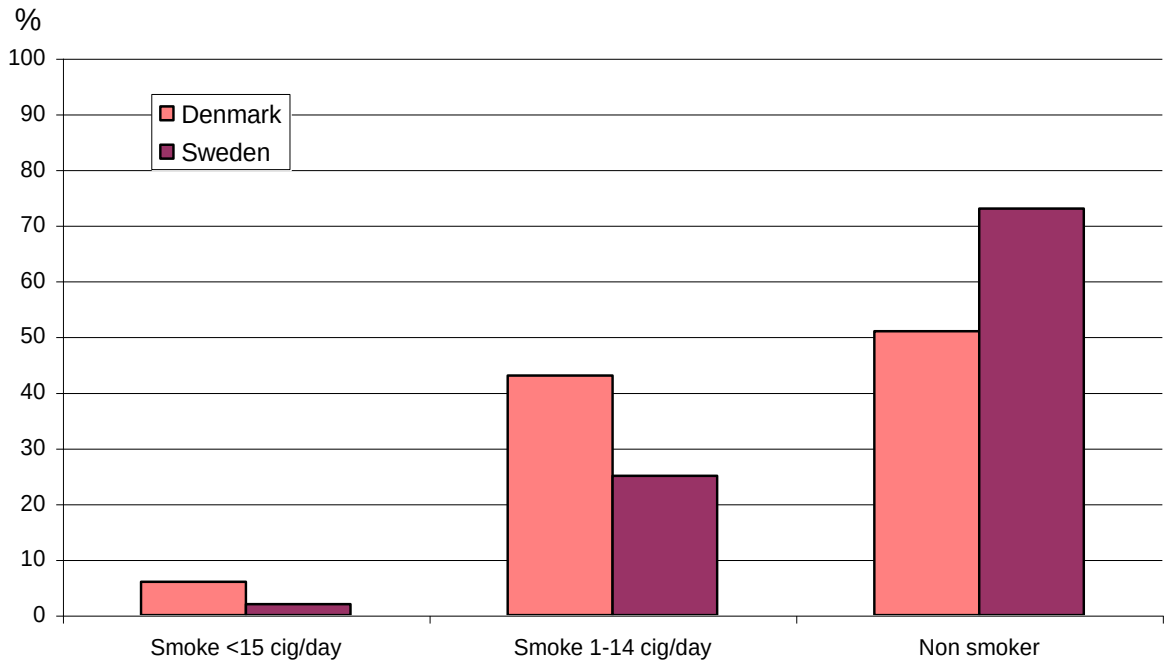


Figure 8. Proportion of smokers and non-smokers among 17-year-old Danish (1995) and Swedish (1996) female secondary school pupils. Source: Nielsen (1996) and Borgfors (1997).

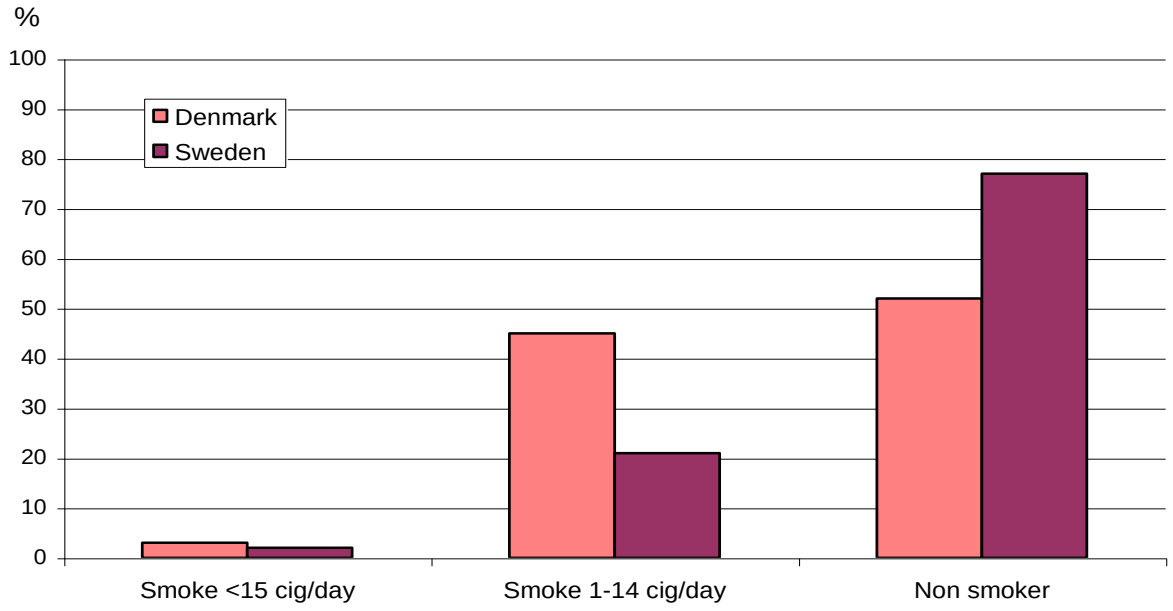


Figure 9. Proportion of smokers and non-smokers among 15-year-old Danish (1995) and Swedish (1996) female secondary school pupils. Source: Nielsen (1996) and Borgfors (1997).

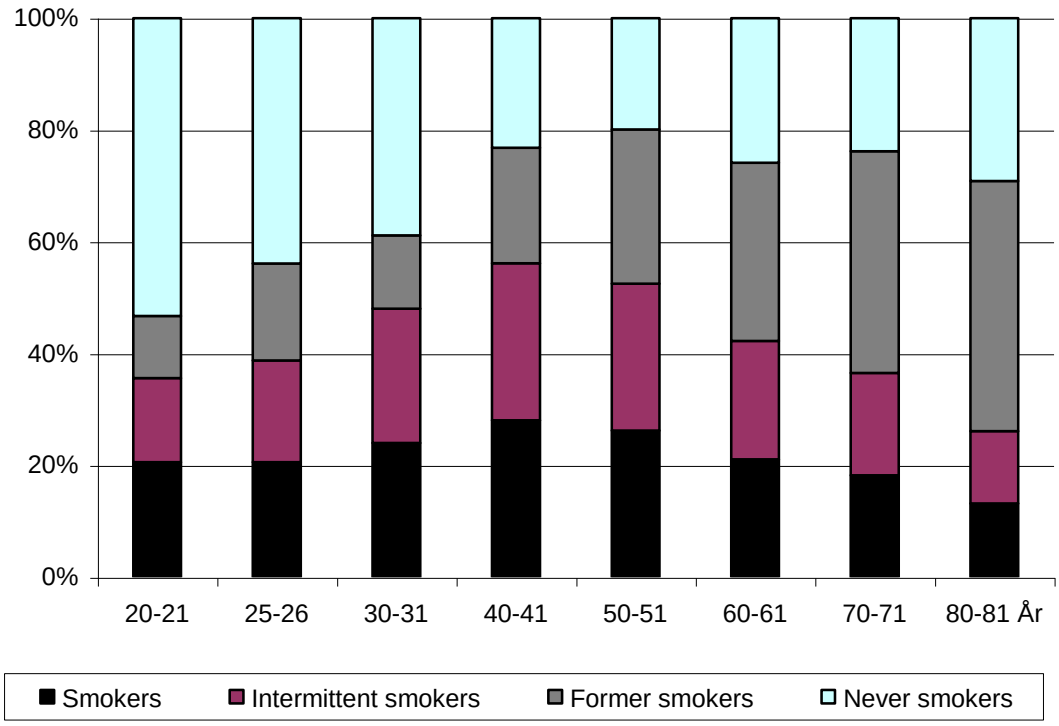
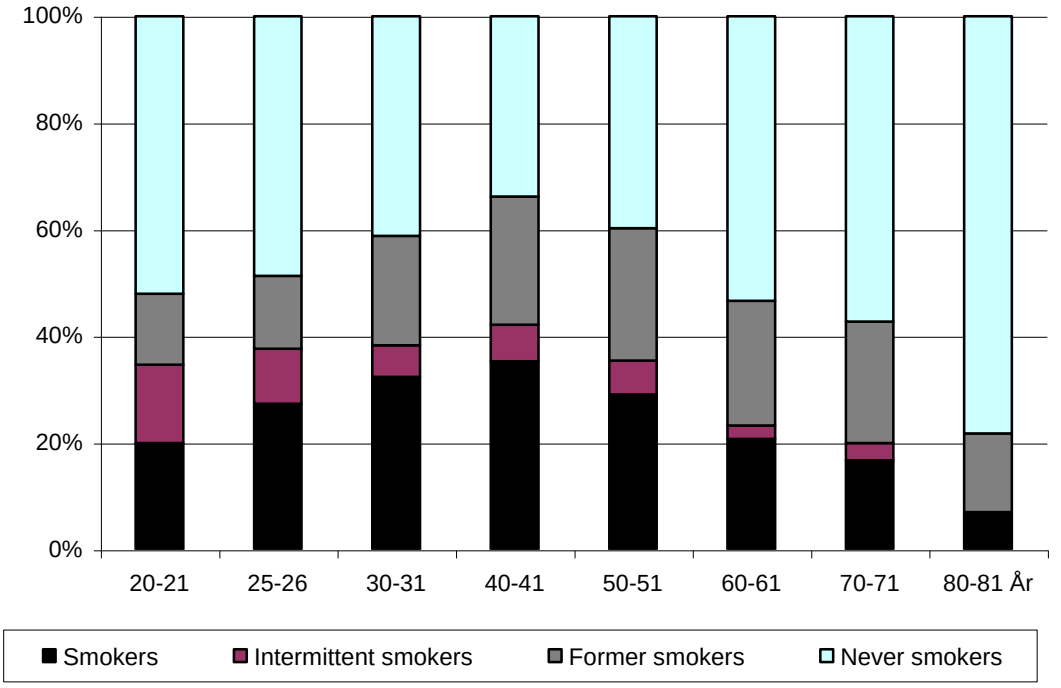
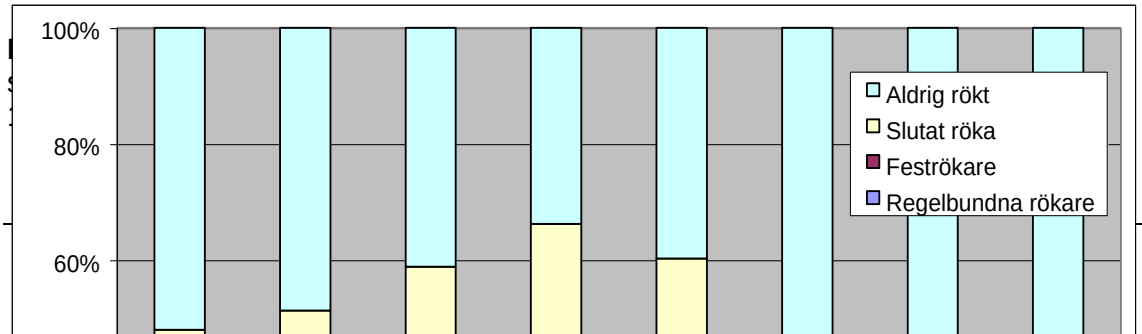


Figure 10. Proportion of regular smokers, intermittent smokers, persons who have quit smoking and persons who have never smoked among 21-81 year old men in Malmö 1994. Source: Malmö Public Health Report1994.





Smoking patterns in Denmark

Figures 12 and 13 show how smoking patterns have developed among men and women on the Danish side of the Øresund.

The figures' columns indicate the respective proportions that were ever smokers in the different birth cohorts, those who had stopped smoking before 1987, those who had stopped smoking during the period 1987-1994 and those were currently smoking. The data originates from two independent surveys in 1987 and 1994.

For the males concerned, it can be seen that among the cohorts that were born in the period 1910-1949, there were slightly more than 80% that had ever smoked.

The proportion is clearly decreasing among the younger cohorts. Among the youngest – born 1970-1979 – only 40% had ever smoked and only 32% smoked in 1994.

Among the oldest generation, it can be seen that there are large proportions that have quit smoking. In the period 1987-1994, approximately 1% per year quit smoking.

The pattern is slightly different among the women. In all cohorts, apart from the youngest, between 60% and 70% had ever smoked. Also among women, a relatively large proportion have quit smoking – either before 1987 or during the period 1987-1994, thus the actual proportion (1994) is between 30% and 50%, with the largest proportion among those born between 1950 and 1959.

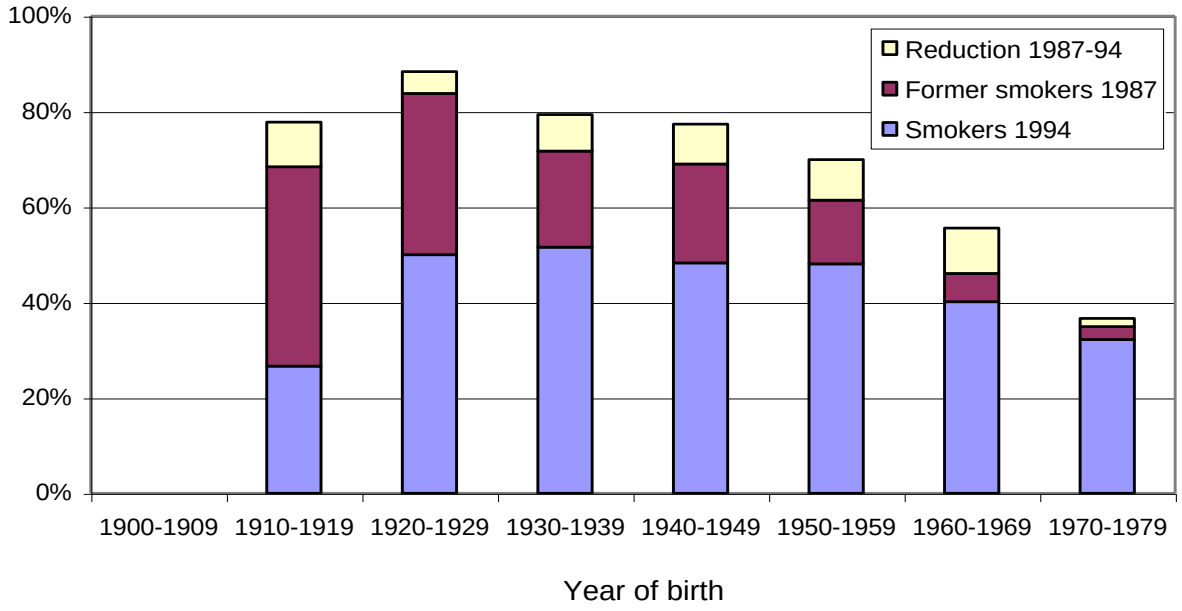


Figure 12. Smoking patterns among men in different cohorts. Source: The Danish Health and Morbidity Survey 1987 and 1994.

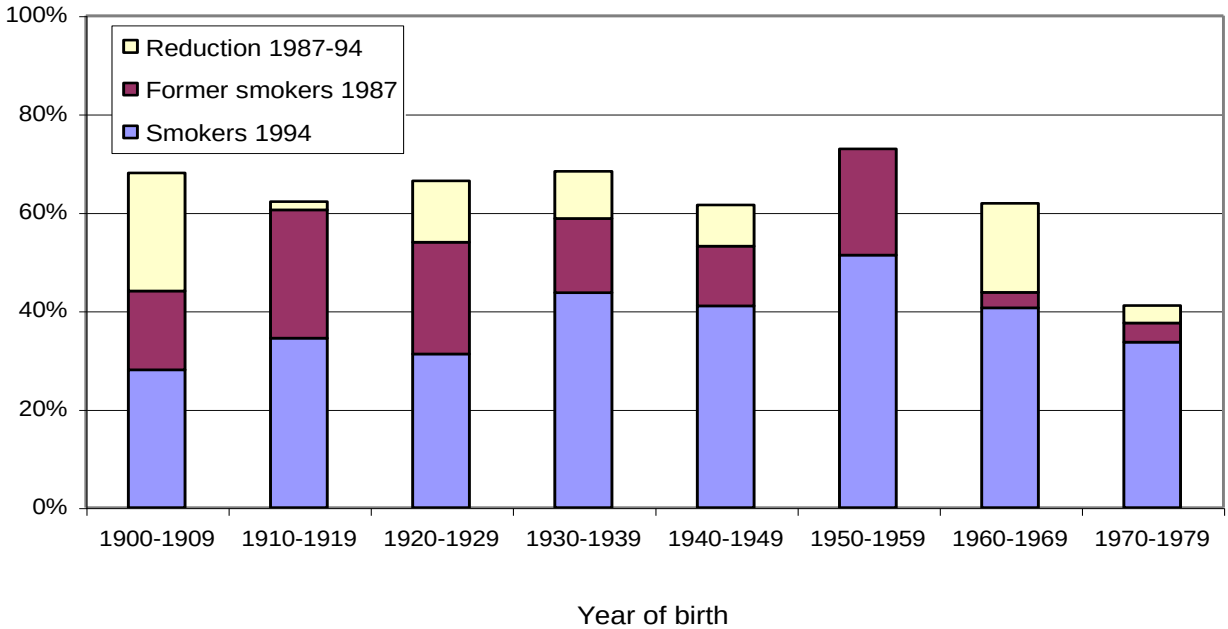


Figure 13. Smoking patterns among women in different cohorts. Source: The Danish Health and Morbidity Survey 1987 and 1994.

Smoking among pupils in secondary schools

The results below are based on smoking data from a questionnaire survey from 1994-95 on health behaviour among 6444 pupils from 331 classes in secondary schools in Frederiksborg County.

Figure 14 shows the distribution of classes grouped according to proportions of smokers in the individual classes.

The results show that there is a large difference in the proportion of smokers between the individual classes. There are classes where approximately 10% of the pupils smoke, while in other classes as many as 90% of the pupils are smokers.

The variation is so large ($p<0.01$ when analysed by multi-level technique) that it cannot be explained by statistical variation between the composition of the classes as relates to the pupils' gender, age or socio-economic background. It can also not be explained by other group related differences between the different classes, e.g. gender distribution in the classes, type of school or other differences between schools. This illustrates that the school class has a significant influence on young people's smoking habits.

The maximum rate differences between the proportions of smokers in different classes (up to 80%) are also very wide compared to other social categorisations. For example, there is ca. 3% more smokers among girls than among boys. There is a maximum of 19% more smokers between the different age groups and a maximum of 9% between different socio-economic groups.

The results further illustrate that there exists great potential to intervene at the class level against young people's use of cigarettes.

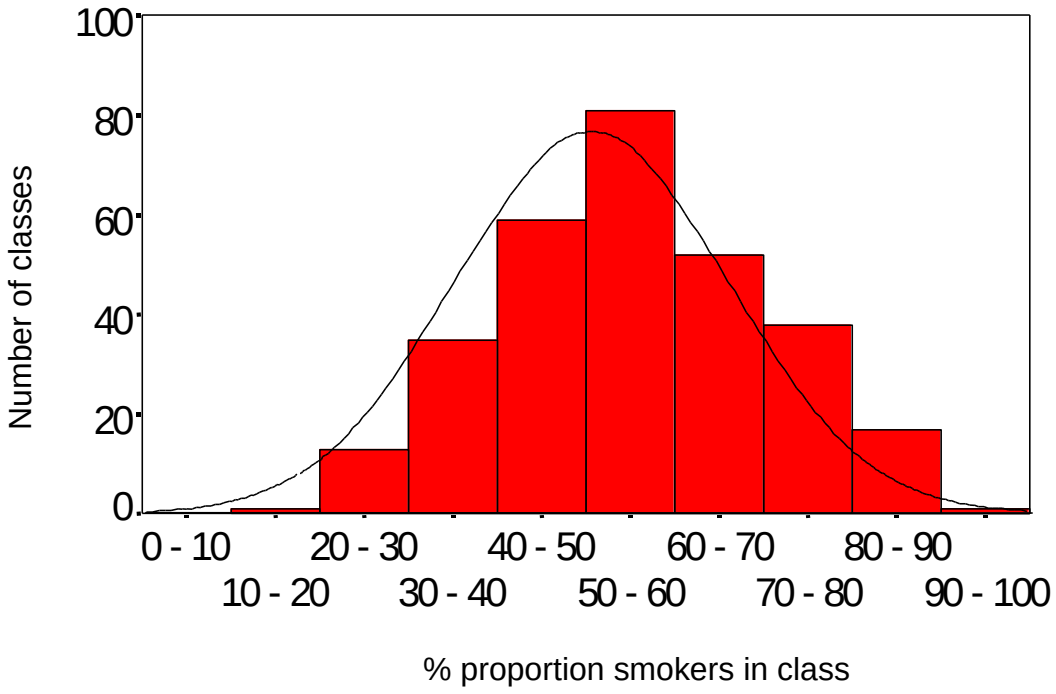


Figure 14. Distribution of the proportion of smokers in different school classes in Denmark 1994-95. Source: Nielsen (1998).

Alcohol

Another health behavioural pattern that is important in understanding the stagnating life expectancy among Danes is use of alcohol (Sundhedsministeriet, 1998). For many years, the consumption of alcohol has been higher among the Danes than among the Swedes.

Sale of alcohol and alcohol consumption

In Denmark, total alcohol consumption per person 14 years of age and older has changed little during the 1980's and 1990's. Danish men and women consume an average 12 litres of pure alcohol per year. On the Swedish side, total alcohol consumption in Malmö Municipality has decreased from 7.4 litres of pure alcohol per person 15 years and older in 1980 to 4.5 litres in 1998.

Alcohol data from the Swedish Alcohol Monopoly Retailing shows that there has been a downward trend in the total use of alcohol in Malmö and Helsingborg, as well as throughout Sweden since 1980.

This decrease corresponds to considerably more than a halving of the sale of hard liquor. This decrease is so significant that it cannot be explained by increased home brewing, illegal selling or the importing of alcohol into Sweden. The sale of wine has decreased since 1994, where it previously had increased, while the sale of strong beer and regular beer class II increased slightly during the entire period 1980-1997.

A 1997 study by the Swedish Council for Information on Alcohol and Other Drugs shows that the proportion of alcohol consumers among pupils in grade 9 in Sweden dropped from the end of the 1970's to the beginning of the 1980's, before increasing again from 1980's to the beginning of the 1990's. In 1997, 43% of boys and 46% of girls drank alcohol to the extent that they felt drunk. The proportion drinking alcohol to the extent that they feel drunk has, however, decreased since 1994 for both sexes.

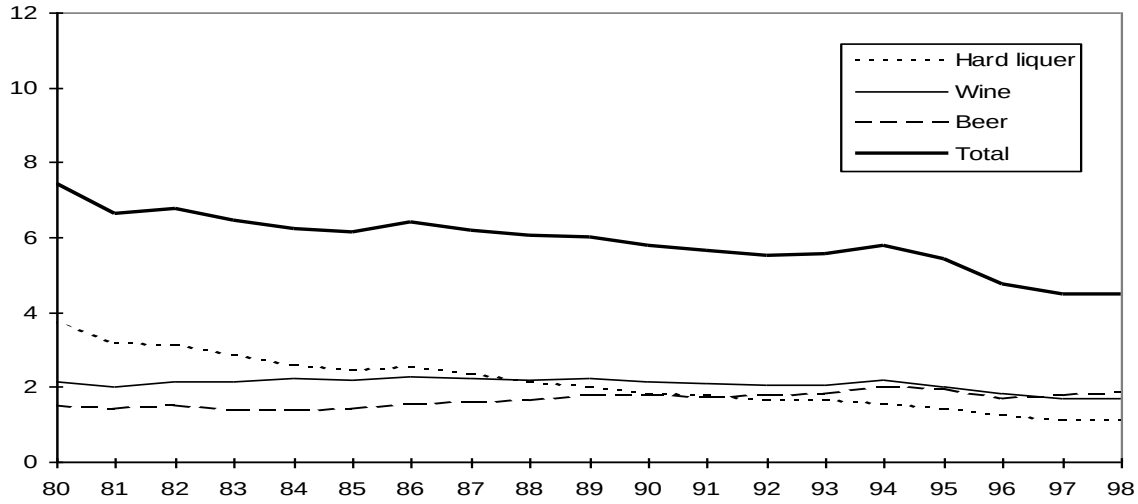


Figure 15. The sale of hard liquor, wine and beer in litres of 100% alcohol per inhabitant 15 years and older during the period 1980-1998 in Malmö Municipality. Source: Swedish Alcohol Monopoly Retailing.

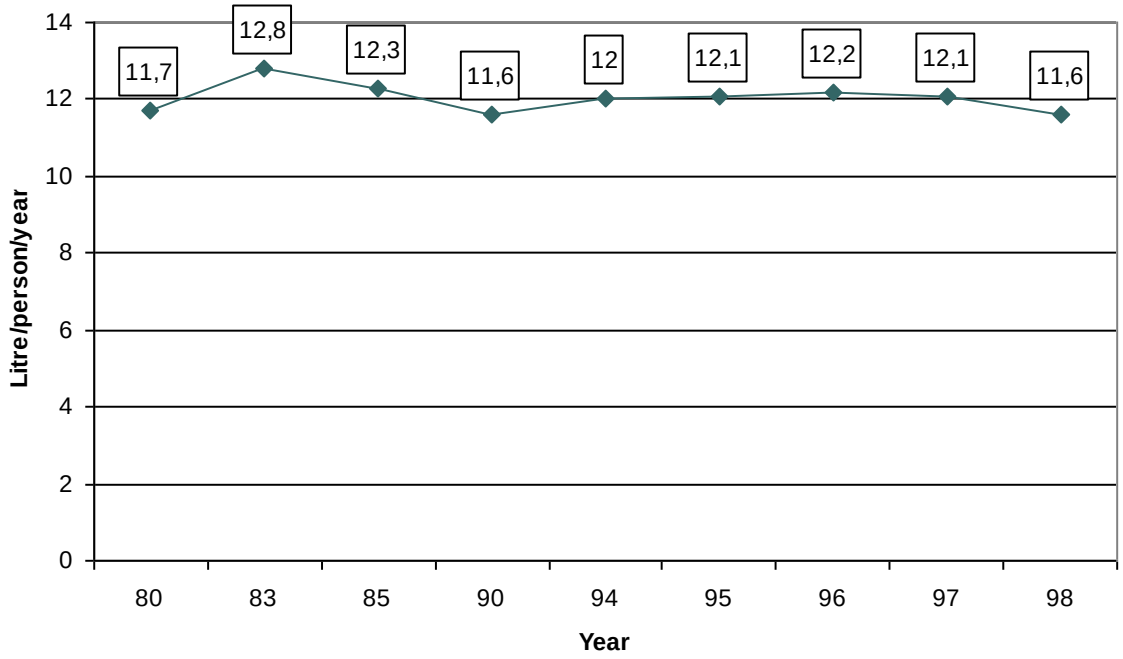


Figure 16. Yearly consumption of alcohol per inhabitant over 14 years of age, in Denmark. Source: Denmark's Statistics, 1999.

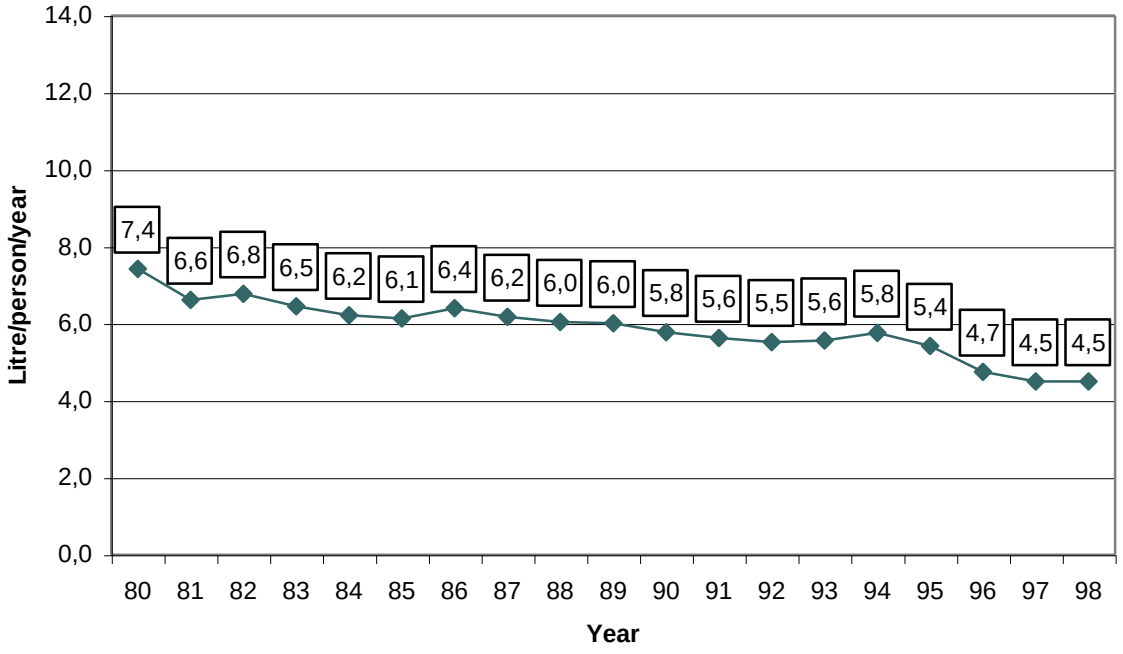


Figure 17. Total sale of hard liquor, wine and beer in litres of 100% alcohol per inhabitant 15 years and older during the period 1980-1998 in Malmö Municipality, Source: Swedish Alcohol Monopoly Retailing.

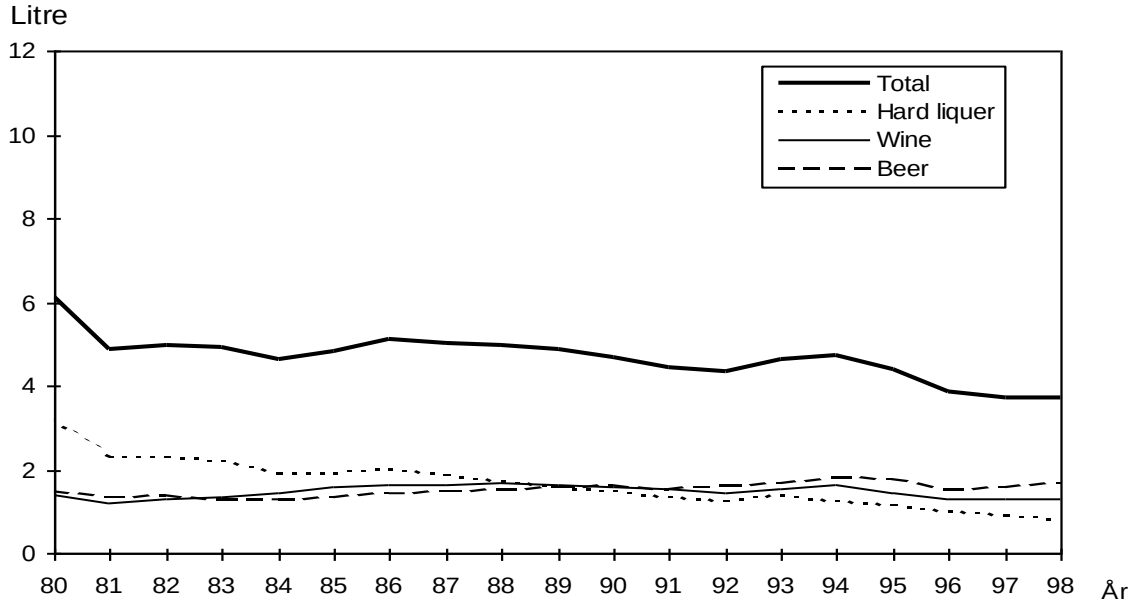


Figure 18. The sale of hard liquor, wine and beer in litres of 100% alcohol per inhabitant 15 years and older during the period 1980-1998 in Helsingborg Municipality. Source: Swedish Alcohol Monopoly Retailing.

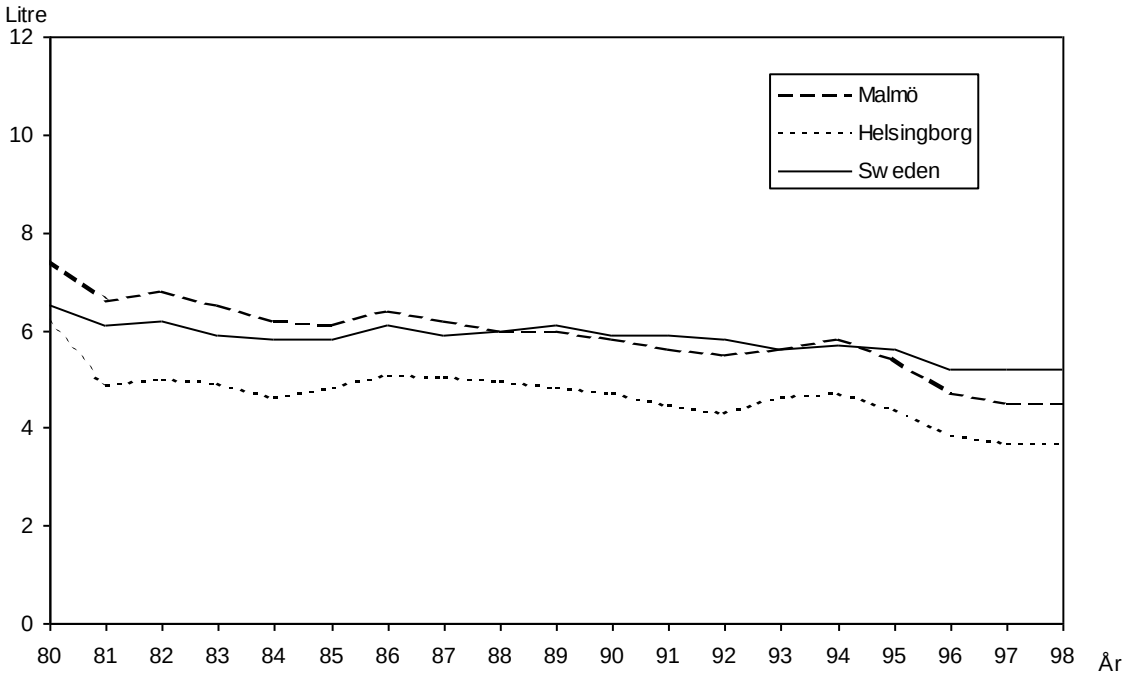


Figure 19. Total sale of hard liquor, wine and beer in litres of 100% alcohol per inhabitant 15 years and older during the period 1980-1998 in Malmö, Helsingborg and Sweden. Source: Swedish Alcohol Monopoly Retailing.

Drinking habits among pupils in secondary schools

The results are based upon alcohol data from a questionnaire-based study from 1994-95 relating to health behaviour among 6444 pupils from 331 classes in secondary schools in Frederiksborg County.

The column diagram shows the distribution of classes grouped into proportions of pupils who consume alcohol every weekend in the individual classes.

The results show that there is a large difference in the proportion of pupils in the different classes that consume alcohol every weekend. There are school classes where no pupils consume alcohol every weekend, while there are other classes where as many as 80% of pupils consume alcohol every weekend.

The variation is so large ($p<0.01$ when analysed by multi-level technique) that it cannot be explained by statistical variation between the composition of the classes as relates to the pupils' gender, age, socio-economic background, class level, type of school or by variation between the schools.

Overall, the results illustrate that the class environment has a significant influence on young people's drinking habits and that an intervention against their use of alcohol – along the same lines with smoking – should take place at the class level.

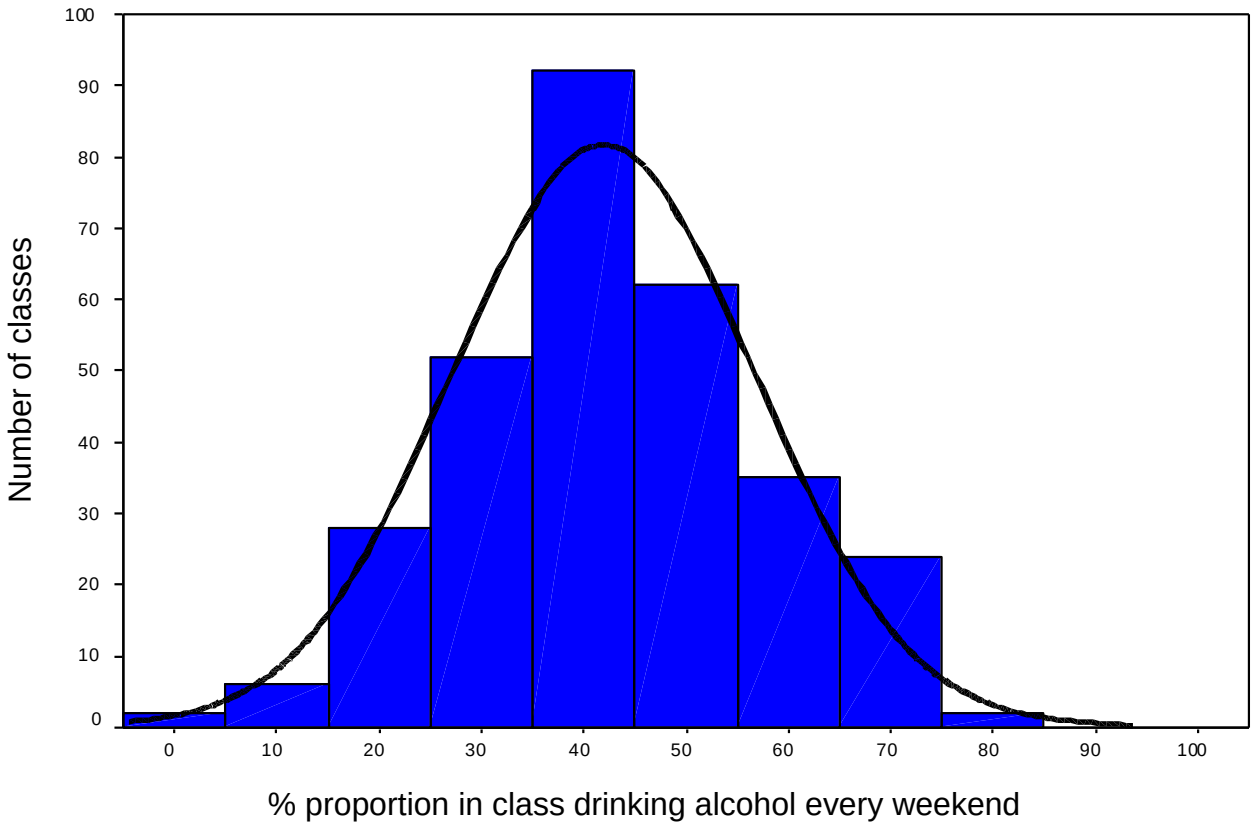


Figure 20. Distribution of the proportion consuming alcohol every weekend in different school classes in Frederiksborg County 1994-95. Source: Nielsen (1998).

Indicators of the health care system

Use of the health care system

An indicator of a population's health and illness is the local use of the health care system. As a mark for the use of the health system, the count of hospital admissions and bed days in the respective countries and regions is used.

This indicator doesn't take into consideration differences in the type and quality of treatments between the two countries, yet it still constitutes a frame of reference for the use of the public health care system in the two countries and between areas in the Øresund region.

Both the number of admissions and the number of bed days are lower in Sweden than in Denmark (number from 1996 – Source: OECD Health Data, 1998 and Sundhedsministeriet, 1999).

The count of admissions was approximately 20% lower, while the number of bed days was approximately 25% lower in Sweden than in Denmark, when adjusted for age and gender differences between the two countries.

In Denmark there has been a rise in the total number of admissions from 1987 to 1997 (from 1,051,009 to 1,114,155), but conversely there was a fall in the number of bed days during the same period (from 9,574,282 to 7,605,217). This was due to, among other things, the fact that some treatments were being referred to outpatient care (Sundhedsministeriet, 1999).

Converted to admissions and bed days per 1000 persons, the 1997 total count in Denmark was 210 admissions/1000 persons/year and 1437 bed days/1000 persons/year. In comparison, the number of admissions was 181/1000 persons/year, and the number of bed days was 1289/1000 persons/year in Sweden.

In the different regions, statistical data from 1997 shows 172 admissions per 1000 persons/year in Frederiksborg County, 193 admissions per 1000 persons/year in Roskilde County and 200 admissions per 1000 persons/year in Copenhagen County. There were 306 combined admissions per 1000 persons/year in Copenhagen Municipality and in Frederiksberg Municipality (Copenhagen's Hospital Co-operation).

In Sweden, the number of admissions was 175 per 1000 persons per year in the Skåne region, and 192 per 1000 persons per year in Malmö Municipality.

The number of bed days per 1000 persons in 1997 was 1120 in Frederiksborg County, 1170 in Roskilde County, 1410 in Copenhagen County, together with 2648 combined bed days in Copenhagen Municipality and Frederiksberg Municipality (Copenhagen's Hospital Co-operation).

In Sweden, the number of bed days in the Skåne region was 1409 per 1000 persons per year, and 1717 per 1000 persons per year in Malmö Municipality.

One conclusion from the above results is that both the number of bed days and the number of admissions (only in the Danish regions) increase the closer the region is in relation to the development and urbanization near the Øresund.

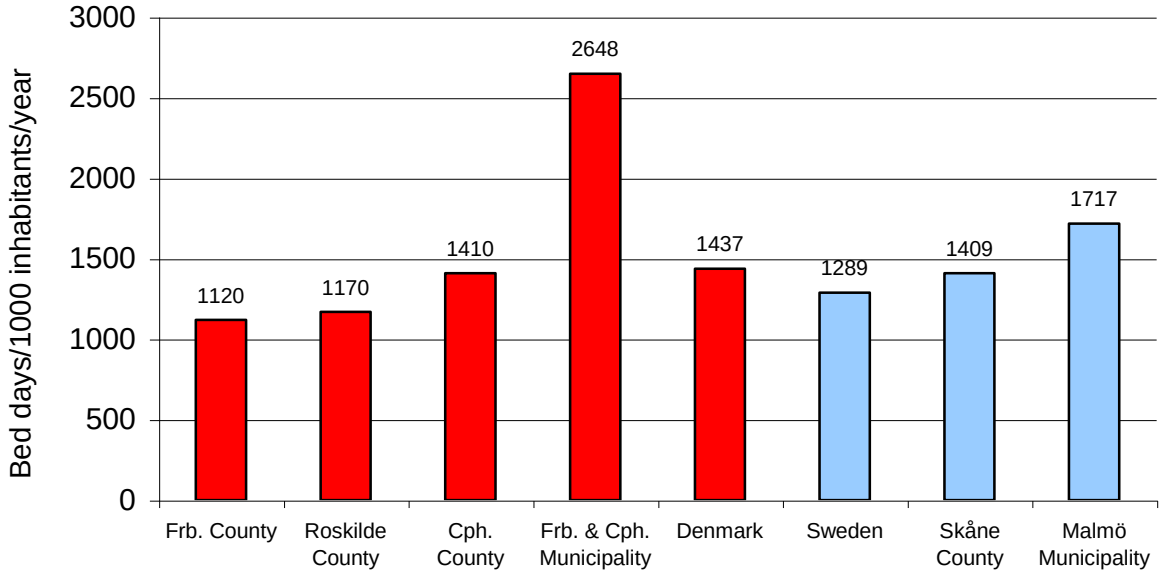


Figure 21. Number of bed days per 1000 inhabitants per year in Denmark and Sweden in 1996. Source: Association of County Councils in Denmark (1998) and Skåne Region/EpC, National Board of Health.

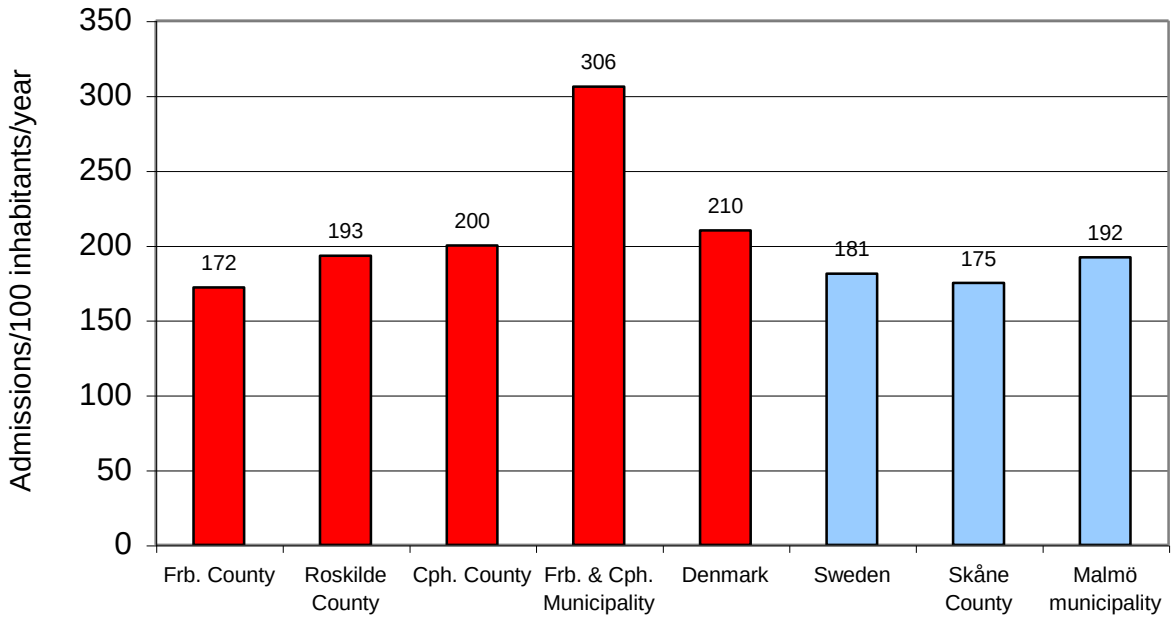


Figure 22. Number of admissions per 1000 inhabitants in 1996. Source: Association of County Councils in Denmark (1998) and Skåne Region/EpC, National Board of Health.

Socio-economic differences in the use of pharmaceutical drugs

For more information, see the report "Use of drugs in Skåne and the eastern part of Denmark" published by Skåne Region (Regional Office and Unit of Social Medicine) and Copenhagen County.

Antibiotics and female hormones

Antibiotic use in Skåne is ca. 30% higher than in the eastern part of Denmark, as measured by DDD/1000 persons/day.

Differences in antibiotic use in all age groups are found in the different regions, but they are greatest for the age group 0-14 years.

For children in the age group 0-6 years, the rate is 11.4 DDD/1000 person/day, whereas it is 13.8 DDD/1000 person/day in Skåne and 10.0 DDD/1000 person/day in the eastern part of Denmark. The lowest value for the municipalities in Skåne is in Örkelljunga Municipality (9.6 DDD/1000 person/day), while the highest value is in Vellinge Municipality (17.7 DDD/1000 person/day). Correspondingly, the lowest value for the municipalities in Copenhagen County is in Søllerød Municipality (8.0 DDD/1000 person/day), while the highest is in Ishøj Municipality (12.9 DDD/1000 person/day).

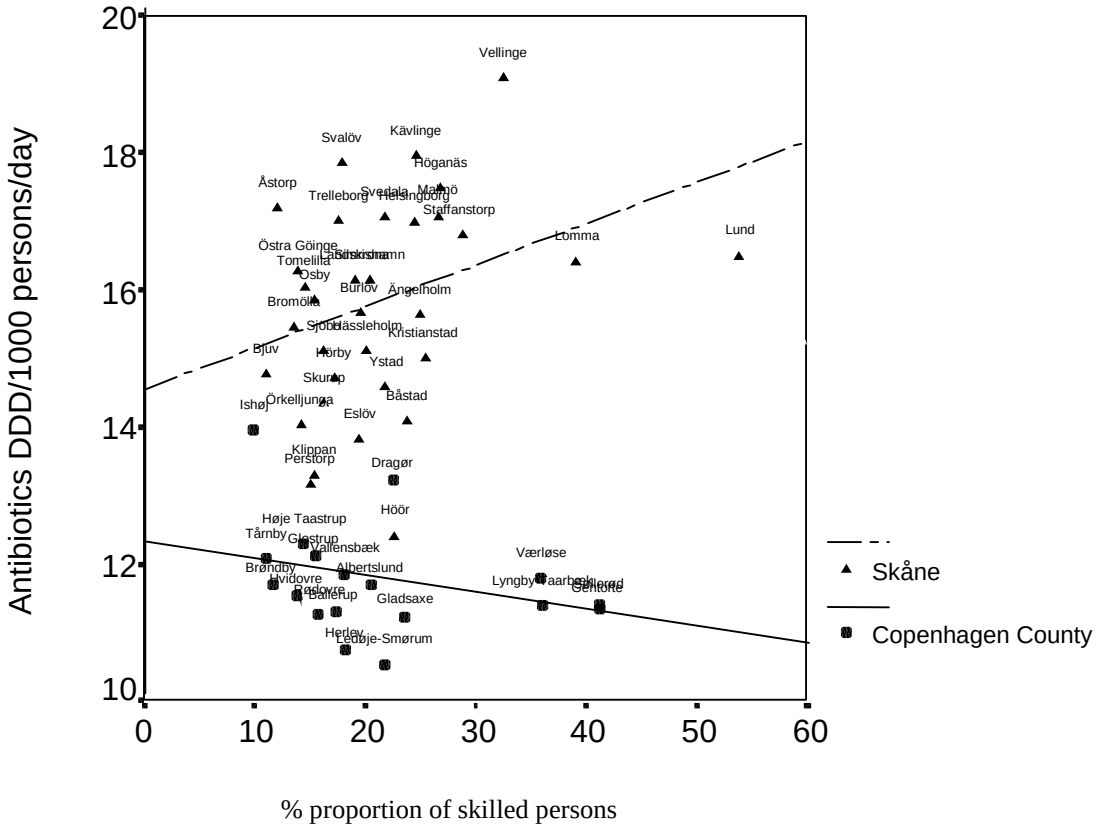


Figure 23. Use of antibiotics by educational level among the inhabitants in the municipalities of Skåne and Copenhagen County (1998). Source: Swedish National Corporation of Pharmacies. Drug sales statistics.

In the age group 0-14 years, penicillin use is more than twice as high in Skåne than in Denmark. In the age group 15-64, the rate was ca. 20%-40% higher, while in older age groups, on the other hand, the rate was approximately 20% higher in the eastern part of Denmark.

As regards use of other antibiotics, the Swedish municipality with the lowest rate (Höör) reported only a slightly lower rate than the Danish municipality with the highest rate (Ishøj).

In Skåne, the use of antibiotics was higher in municipalities with higher education levels, while the relationship between education and antibiotic use at the municipality level in Copenhagen County is the opposite (Figure 23).

A clear socio-economic gradient was found between municipalities both in Skåne and in Copenhagen County concerning the use of female hormones. Female hormones III refers to: estrogens (GO3C), progesterone (GO3D) and estrogens in combination with progesterone (GO3F). Usage of female hormones is higher in municipalities with a greater proportion of individuals with higher levels of education (Figure 24).

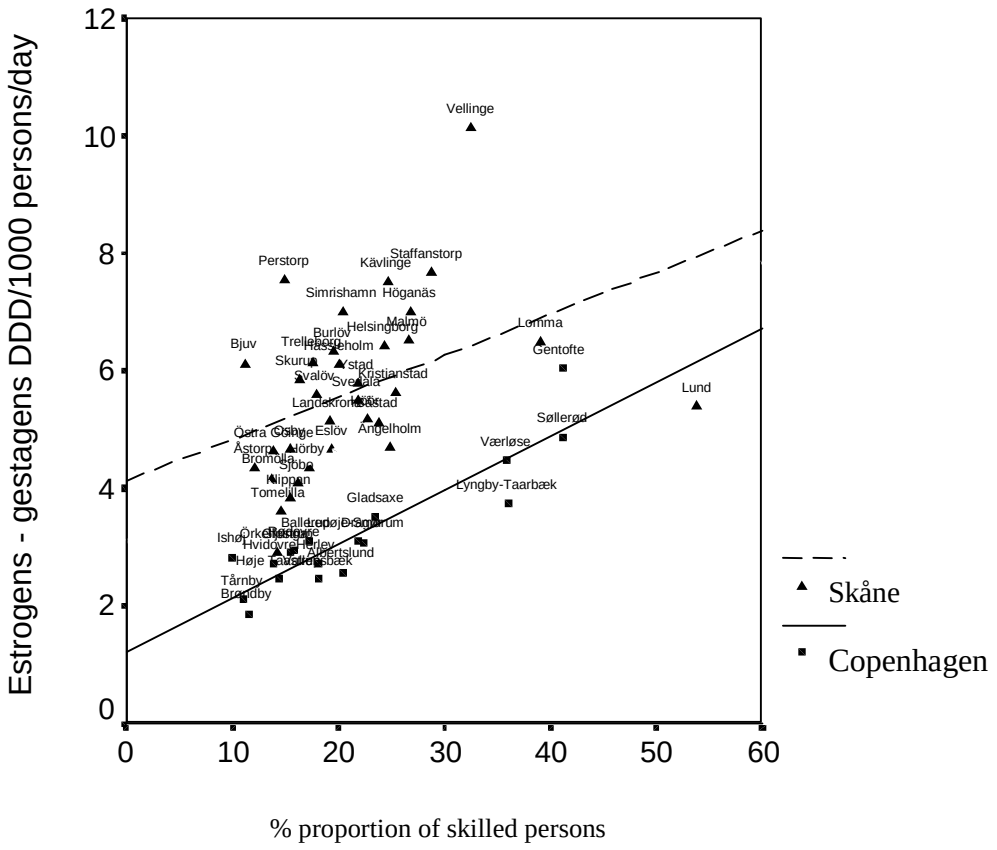


Figure 24. Use of estrogen and progestorone by educational level among the inhabitants in the municipalities of Skåne and Copenhagen County (1998). Source: Swedish National Corporation of Pharmacies. Drug sales statistics.

Survivors of ischaemic heart disease in Skåne (1992 – 1995)

In Sweden, hospital costs for patients with ischaemic heart disease are the same as for patients with acute myocardial infarction (SoS-report 1994:3). Ischaemic heart disease is a growing problem in the population, based mainly on two factors: the ageing of the population (many elderly) and a better prognosis following myocardial infarction, which leads to more developments of ischaemic heart disease.

We analysed all 38,342 patients between the ages of 65 and 85 from all Swedish counties during the period 1992-1995. The investigated patients had no previous diagnosis since 1987 when the Patient Registry at the Epidemiological Centre began.

The proportion of patients who survived at least one year after the first admission to hospital for ischaemic heart disease varied between 59% and 74% in the Swedish counties. One-year survival rate was 67% in Skåne. Comparably, the proportion was 65% for the former Malmöhus County, 67% for Malmö Municipality and 69% for Kristianstad County. Similarly, the survival in the municipalities of Skåne varied between 56% and 79%.

The regional differences in survival may depend on both characteristics among patients in the regions and on circumstances related to the regions. If we only use the aggregate data at the regional level, we cannot differentiate the influence from different factors. Therefore, in this study we have used both patient and aggregated regional data.

Effective methods of analysis (e.g. multi level models) have been used in public health studies to differentiate and quantify how much of the variation in survival depends on the patients and how much depends on the region. These methods take into consideration the fact that all patients living in the same region share a number of common factors that can influence survival. These methods of analysis require access to both patient data and regional data.

With multi level models we calculated the "regional effect" on the patient's survival as a percentage (%) of the total variation in survival that can only be attributed to the region (county or municipality), e.g.:

A= Variation in survival between regions
B= Variation in survival between patients
T= Total variation **(A+B)**
C= "Regional effect" or percent of the total variation in survival that can be attributed to the region.[1]

C=A/T*100

In our analysis the "county effect" is statistically significant but very small, C= 0.7%. Consequently, the variation in mortality depends, for the most part, on differences between patients.

Figure 25 shows the differences in survival between counties comparable to Sweden (value=1). It is within this narrow margin (e.g. 0.6% of the total variation in survival is attributed to the counties) that the relative differences between the counties must be interpreted. To live in a county with lower than average mortality in Sweden has, in other

[1] If the "regional effect" was 100%, all patients in the same region should have the same survival. In this case it should be sufficient to know a region's survival in order to know the patient's survival and comparability between the regions with aggregate data should be very informative. If the "regional effect" was only 1%, differences should still be found between the regions, but these differences should provide very little information on survival.

words, a significantly positive, but small influence on patient's survival.

Comparable to Sweden, Skåne illustrates a central position in relation to the other counties.

In the "county effect" that has been presented, consideration has been taken regarding patient's age, gender and previous illness.

A similar analysis carried out in the 33 municipalities of Skåne also showed that no such corresponding "municipality effect" was found.

On the other hand, patient's individual characteristics have great impact for survival. Table 1 illustrates that patient's age (higher risk with increasing age), previous somatic illness (e.g. infections, injury and poisoning, cancer, diseases of the endocrine system, nutritional disturbances, metabolic disturbances and disturbances of the immune system), and senile dementia are strongly associated with a lower survival rate.

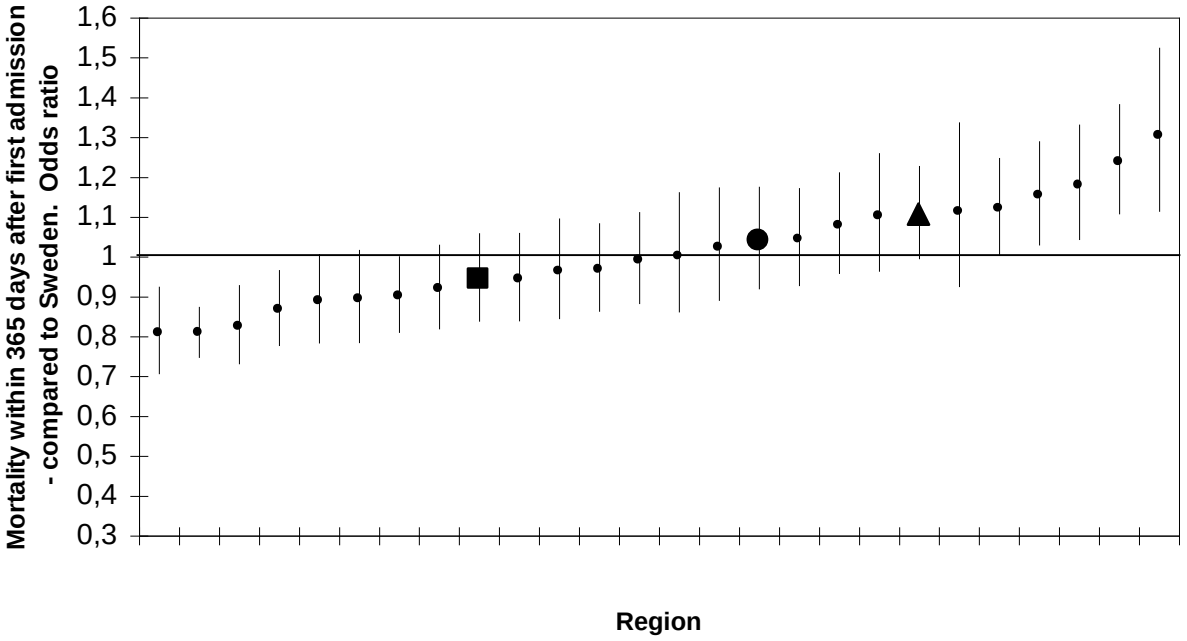


Figure 25. Mortality within 365 days after first hospital admission for ischaemic heart disease (1992-95). Source: Epidemiology Center/National Board of Health's patient registry.

Table 1. Risk factors for mortality within 365 days after first hospital admission for ischaemic heart disease (1992-95) in Sweden. Source: Epidemiology Center/Nat. Board of Health's pt. registry.

	Relative risk death (95% confidence interval)		Relative risk death (95% confidence interval)		
Age			Earlier illness (admissions to hospital)		
65 to 69 year	Reference group		Infections	1,16	(1,02 - 1,31)
70 to 79 year	1,31	(1,22 - 1,42)	Injuries/poison	1,16	(1,07 - 1,24)
80 to 85 year	2,09	(1,93 - 2,26)	Cancer	1,49	(1,37 - 1,61)
Men	1,29	(1,23 - 1,35)	Stomach/endocr. Illness *	1,59	(1,44 - 1,75)
Ischaemic heart dis.	1,23	(1,13 - 1,34)	Dementia	2,64	(2,04 - 3,41)

* Endocrine illness, nutritional disturbances, metabolic disturbances, immunesysteme disturbances

Conclusion

This report constitutes the second publication in the Swedish-Danish collaboration, which has been supported by the European Union Interreg-IIA Fund, on the monitoring of public health among population groups in the Øresund region. The report presents data from both Swedish and Danish ad hoc surveys and registries. It is partly an update of the previous report, i.e. contains the same themes, and partly an introduction of new themes on the population's use of the health care system. At the moment, a large survey is being carried out in the region, making it possible to compare new and additional data between the regions in the two countries.

In this report, as in the previous, we have illustrated significant differences in mortality, disease and lifestyle, in addition to use of the health care system between population groups in the two countries's Øresund regions. There are significant differences between the respective countries' geographic regions. In addition, it is characteristic that a proportion of many health-related problems increase in both countries, the nearer the region is to the development and urbanization on both sides of the Øresund.

Life expectancy in the period 1988-92 has increased in smaller increments in Denmark and to some degree in the Swedish part of the Øresund region, as compared to other western European countries. Life expectancy for Danish men increased from 72.0 years in 1988-92 to 72.6 years in 1993 to 1997, while Danish women's life expectancy increased from 77.0 years to 77.6 years during the same period.

In comparison, Swedish men's life expectancy increased from 75.0 years in 1988-1992 to 75.6 years in 1993-97, while Swedish women's life expectancy increased from 80.0 years to 81.1 years during the same period.

There are similarly large differences between the population groups' life expectancy in the different regions of the respective countries. Similar tendencies are revealed between the population groups' lifestyle, which probably explains the interregional differences in the population groups' life expectancy.

Life expectancy and public health are, however, not solely a question of lifestyle. Conditions and other factors that influence one's individual psychosocial well-being also are of great importance for life expectancy and, above all, for one's well-being and quality of life.

The region's surveys allow a high level of comparison of survey data and a future public health report for the Øresund region will contain data concerning these relationships.

Literature

Denmark

1. Delrapporter fra Sundhedsministeriets middellevetidsudvalg. København: Middellevetidsudvalget, 1994.

2. Om Sundhed och Ohälsa kring Sundet. København: DIKE og Samhällsmedicinska Institutionen i Malmö, 1995.

3. Statistisk årbog 1998. København: Danmarks Statistik, 1998.

4. Rasmussen NK, Groth MV, Bredkjær SR, Madsen M, Kamper-Jørgensen F. Sundhed og sygelighed i Danmark 1987. København: DIKE, 1987.

5. Kjøller M, Rasmussen NK, Keiding L, Petersen HC, Nielsen GA. Sundhed og sygelighed i Danmark 1994 – og udviklingen siden 1987. København: DIKE, 1995.

6. DIKE. Sundhedstilstand, sundhedsadfærd, forebyggelsesprogram. København: DIKE, 1991.

7. STOP samarbejdet. København: Tobaksskaderådet, Hjerteforeningen, Kræftens Bekæmpelse og Nationalforeningen til bekæmpelse af lungesygdomme, 1997.

8. Sundhedsstyrelsen. Alkohol- og narkotikamisbruget 1997. Forebyggelse og sundhedsfremme 1998/13. København: Sundhedsstyrelsen, 1998.

9. Sundhedsministeriet. Nøgletal om forebyggelse og folkesundhed 1999. Sundhedsministeriets sundhedsanalyser 1999:4. København: Sundhedsministeriet, 1999.

10. Amtsrådsforeningen. Social & sundhed – amterne i tal 1998. København: Amtsrådsforeningen, 1998.

11. Statistisk årbog 1999. København: Danmarks Statistik, 1999.

12. Nielsen NS. Sundhedsprofil af elever på ungdomsuddannelserne i Frederiksborg Amt. Hillerød: Frederiksborg Amt, 1996.

13. Nielsen NS. Sundhed og livsstil hos elever på ungdomsuddannelserne i Frederiksborg Amt. København: DIKE, 1998.

14. Juel K. Hvorfor har danskerne problemer med middellevetiden? Ugeskr Læger 1998; 160 (47): 6800-6805.

15. Sundhedsministeriet. Danskernes dødelighed i 1990'erne – 1. Delrapport fra Middellevetidsudvalget. Sundhedsministeriets sundhedsanalyser 1998:6. København: Sundhedsministeriet, 1998.

Data for this report comes from the following Danish sources:

* Landspatientregisteret
* Dødsårsagsregisteret
* DIKEs Sundheds- og sygelighedsundersøgelser 1987, 1991 og 1994.

Sweden

1. Lindström M, Bexell A, Hanson S, Isacsson S-O. Hälsoläget i Malmö. Rapport från postenkätundersökningen våren 1994. Socialmedicinska enheten, Malmö. En rapportserie om Malmöbornas hälsa nr 33.

2. Apoteksbolaget. Receptundersökningen 1998.

3. SCB. Arbetskraftsundersökningen. Års-medeltal 1997. Avd för arbetsmarknads- och utbildnings-statistik, Stockholm, 1998.

4. Systembolagets statistik, Stockholm.

5. Borgfors N, Bylund Jönsson U. Drogvanor bland Malmöelever. Resultat från undersökning i åk 6, åk 9 och i gymnasie-skolans åk 2. Rapport nr 2. Välfärds- och folkhälsoenheten, Stadskontoret i Malmö.

6. Om sundhed och ohälsa kring Sundet. Öresundskomiteen, Köpenhamn. DIKE och Samhällsmedicinska Institutionen i Malmö. København: 1995.

7. Forbrug av läkemedel i Skåne och Østdanmark. Region Skåne (Regionkontoret och Samhällsmedicinska inst, MAS) och Københavns Amt

8. Erhardt L, Caidahl K, Eriksson H et al. Heart failure (hjärtsvikt). SoS-rapport 1994:3. Stockholm: Socialstyrelsen, 1994. In Swedish (English summary).

Data for this report comes from the following Swedish sources:

* Patientregistret. Epidemiologiskt Centrum (EpC), Socialstyrelsen
* Statistikenheten, Riksförsäkringsverket, Stockholm
* Regionalstatistisk databas. Epidemiologiskt Centrum (EpC), Socialstyrelsen.
* Apoteksbolaget / Receptundersökningen