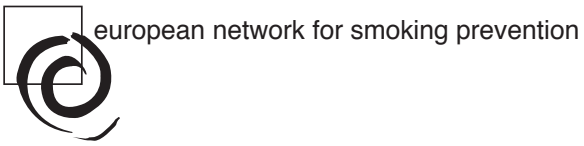
ENSP Status Report on Oral Tobacco



This report has been peer reviewed (see acknowledgements).

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This project received financial support from the National Institute of Public Health in Sweden, from Stivoro in the Netherlands and from the European Commission in the framework of the 'Europe Against Cancer' programme. Neither the 'afore mentioned institutions, nor the ENSP, nor any persons acting in their name can be held responsible for any use that may be made of the information contained in this document.

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We would also like to acknowledge the following individuals and organizations for their contribu-tions, their patience and kindness andwhom, along with the authors, made this report possible.

JOSEP M.BORRAS
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Massachusetts Dept. of Public Health, USA.

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Contents

1 Introduction

1.1 Background

This status report is aimed at gathering information and research to date on the issue of oral tobacco and more particularly, snuff. In doing so, we will consider the EU-wide ban on all forms of smokeless tobacco (with the exception of chewing tobacco) under Directive 2001/37/EC . An exception was made for Sweden where the consumption of snuff (a form of oral tobacco) is widespread, and for the EFTA country Norway. A subsequent aim of the report, therefore, is to explore the possible effects and implications of lifting the ban. This issue is one of great debate. While producers of oral tobacco products claim that the current ban violates the free market policies of the European Union, some public health advocates claim that lifting the ban could have a positive impact on public health. The main argument is that in Sweden, where oral tobacco is available on the market, smoking prevalence is lower and fewer people die from smoking-related disease, notably lung cancer. Another school of thought, within the public health community, is that saying that some tobacco products are less harmful than others could damage public health professionals' credibility and to do so, or not, would sway and perhaps mislead the public.

This report does not aim to answer any of these questions, or address the issue of 'harm reduction', which has stretched way beyond public health into the realm of ethics. But instead, using the debate on oral tobacco and the legal challenge to its ban as a backdrop, this status report, as its name would suggest, aims to evaluate the status or discussion as it currently stands, in order to clarify as clearly as possible and following best practice (all chapters have been peer reviewed) the issue of oral tobacco from a public health standpoint.

The EU ban on oral tobacco and the legal challenges

Article 8 of Directive 2001/37/EC prohibits Member States from placing 'tobacco for oral use' on the market. This means all products for oral use, except those intended to be smoked or chewed, made wholly or partly from tobacco, in powder or in particulate form or in any combination of those forms, particularly those presented in sachet portions or porous sachets, or in a form resembling a food product. This ban was already in effect under Directive 92/41/EEC. In its accession treaty, Sweden was exempted from the ban because it claimed a long tradition of snuff use.

The Swedish firm Swedish Match, who produces snuff, is currently attempting to make the case in the European Court of Justice that a ban on snuff is violating free market policy and that snuff should therefore be legalized throughout the European Union.

Swedish Match argues the ban is unlawful, unreasonable, unfair, unjustified, disproportionate and arbitrary, mainly because chewing tobacco is not included and the EU did not consider new scientific evidence.

In 2004, the EU tobacco policy is to be reviewed.

The discussion in the public health community

Following the case in the European court and preceeding the upcoming EU policy review, the issue of oral tobacco has started a debate within the public health community. A group of scientists and tobacco control advocates wrote a report (commonly known as the 'Bates report', named after its initiator and Action on Smoking and Health (ASH UK) Director, Clive Bates) on the public health effects of oral tobacco[1]. Their argument is that oral tobacco, espe-

cially the Swedish brand known as 'snus', is less harmful than smoking. The composition of snus is defined by the so-called Gothiatek standard, which sets maximum amounts for certain ingredients[2]. The argumentation is that the introduction of snus or some other form of oral tobacco on the European market might reduce the amount of smokers. In Sweden, where there is no ban on oral tobacco, the smoking prevalence among the male population is lower than in the rest of the EU. The number of smoking-related disease (such as lung cancer or cardiovascular disease) is also lower than in the rest of the EU. Hence, the Bates report claims, oral tobacco could therefore be effective in reducing the number of smokers and may thus be beneficial for public health. It could also have possible positive side effects, for instance by reducing secondhand smoke. For the purpose of this report, we have chosen, however, to focus more precisely on the issue of oral tobacco as an entity in itself and not directly in comparison to cigarettes or other products and their effects.

As a result of this report, an 'online' and 'off-line' discussion began within the public health community around a few central issues:

- What are the direct health effects of oral tobacco?
- What is the impact of the availability of oral tobacco on smoking behaviour?
- What are the possible reactions of consumers and producers in other countries than Sweden?

The discussion on the virtual Globalink network and elsewhere remained inconclusive, partly because there was not enough convincing evidence and partly because the distinction between facts and speculation was not clearly or formally drawn.
In 2003 an advisory committee appointed by the WHO made a recommendation on oral tobacco[3] . The WHO argued that there is potential for harm but that the benefits have not been demonstrated. Therefore the WHO recommended that the legalisation of oral tobacco should not be supported from a public health point of view.

1.2 This report

Research questions

The central issue is the evidence surrounding oral tobacco and whether it should be supported from a public health point of view. This depends on both the direct health effect on the human body and on other factors, such as the effects of oral tobacco on smoking behaviour and the reaction of the industry.
The research questions for this report can therefore be formulated as follows:

1. What are the health effects of oral tobacco, especially the Swedish variety?
2. What is the effect of oral tobacco use on population mortality rates?
3. What is the effect of oral tobacco use on smoking prevalence?
4. What marketing strategies will most likely be adopted by the industry to place oral tobacco on the European market?

1.Bates et al., European Union policy on smokeless tobacco : a statement in favour of evidence-based regulation for public health, February 2003.
2.For more details, see Chapter Two.
3.Scientific Advisory Committee on Tobacco Products Regulation, Recommendation on Smokeless Tobacco Products. WHO 2003.

Definitions

In this report the general term smokeless tobacco is used for tobacco products without combustion or burning at the time of use. This includes various tobacco products that are used in many countries of the world. The most common form of smokeless tobacco is oral tobacco (nasal use is rare). Well known examples are betel quid, chewing tobacco and snuff. This report focuses on snuff use. Snuff is moist oral tobacco which can be bought loose and in small, ready-to-use, portions and involves taking a pinch of 1 – 2 g of loose snuff or a portion-bag pouch and placing it between the lip and cheek or gum. 'Snus' is snuff produced by only one Swedish manufacturer (Swedish Match).

Procedure

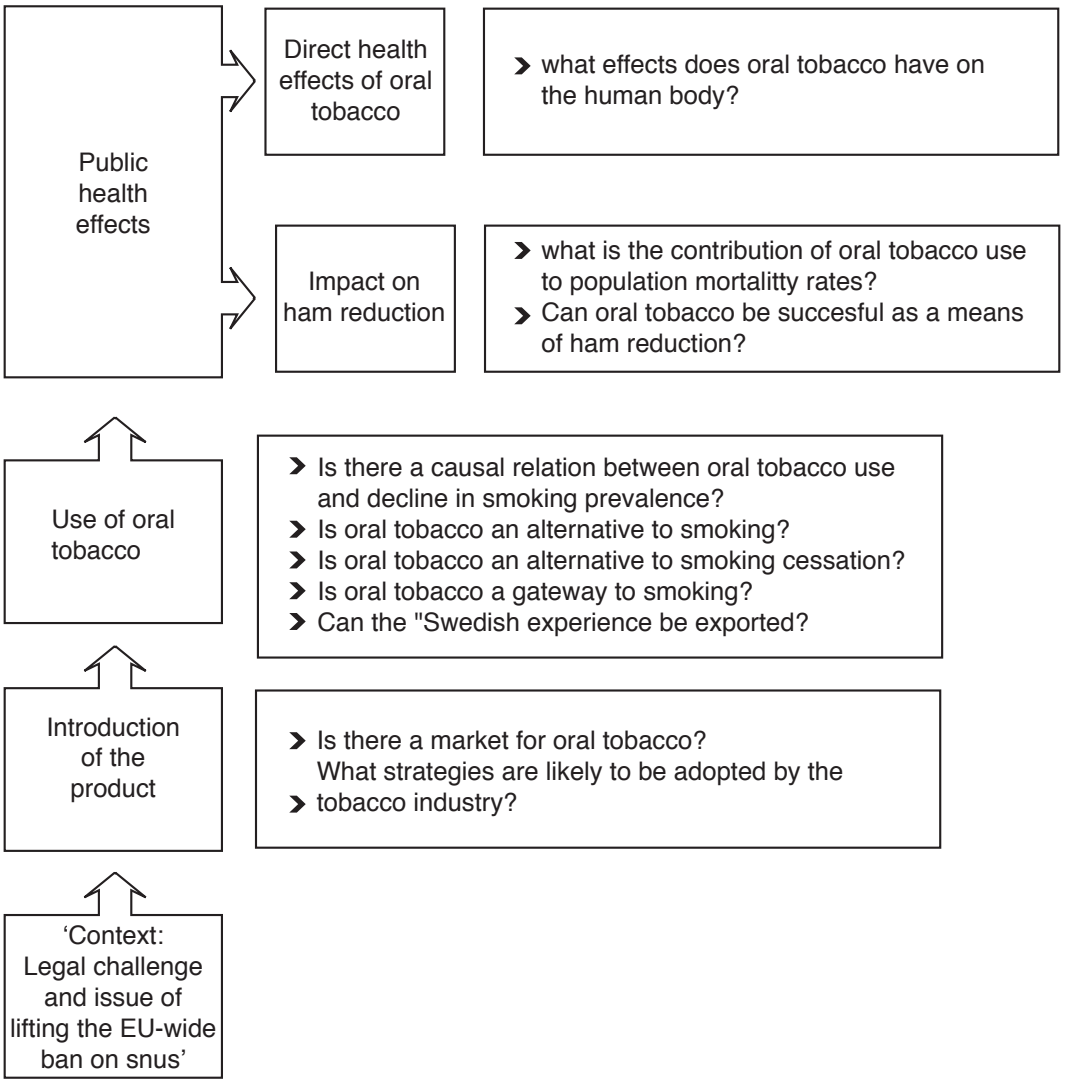
This report received funding from the European Commission through the ENSP Framework Project in the context of the 'Europe Against Cancer' Programme, as well as from the Swedish Public Health Institute and from Stivoro in the Netherlands - both of whom are members of ENSP. Stivoro, together with ENSP, was responsible for the co-ordination of the process which involved inviting researchers from different institutes to participate in this report. On 26 March 2003, a meeting took place where the outline for the report was set up and further co-ordination was assigned to the Dutch research company Research voor Beleid.

At the ENSP Network meeting in Utrecht, on 23 May 2003, a presentation on the report was made and authors presented the chapters for which they were to be responsible. The general summary at the end of this report was drawn together by Research voor Beleid and STIVORO with the idea that as a 'status report' the reader is given the material on which to base his/her own conclusion. Additionally, each chapter has been peer reviewed, partly in accordance with best practice and partly due to the controversial nature of the issues treated.

For general background information, interviews were held with policymakers and the existing literature was reviewed, as well as the postings on the GlobaLink network and other email groups. The specific research methods used by the authors are described at the beginning of each chapter.

Contents of the report

Following the research questions, the report is divided into four main themes. In the figure below, the blocks on the left side represent the themes. The blocks on the right side contain specific questions associated with each theme.


Public health effects
Direct health effects of oral tobacco
what effects does oral tobacco have on the human body?
Impact on ham reduction
what is the contribution of oral tobacco use to population mortalitty rates?
Can oral tobacco be succesful as a means of ham reduction?
Use of oral tobacco
Is there a causal relation between oral tobacco use and decline in smoking prevalence?
Is oral tobacco an alternative to smoking?
Is oral tobacco an alternative to smoking cessation?
Is oral tobacco a gateway to smoking?
Can the "Swedish experience be exported?
Introduction of the product
Is there a market for oral tobacco?
What strategies are likely to be adopted by the tobacco industry?
'Context: Legal challenge and issue of lifting the EU-wide ban on snus'

Chapter Two discusses the direct health effects of oral tobacco by reviewing the existing data. Chapter Three presents a historical overview of tobacco-related disease and smoking prevalence in a number of countries in order to discuss the relationship between smoking, oral tobacco and public health.

Another important issue is consumer behaviour. The 'Bates report' suggests that oral tobacco can play a role in harm reduction. When considering the issue of harm reduction, it would also be important to consider whether the following conditions are fulfilled:

a) Oral tobacco becomes an alternative for smoking
b) Oral tobacco does not become an alternative for smoking cessation
c) Oral tobacco does not become a lead-in to smoking for people who would otherwise not smoke.

Although consumer behaviour plays an important role in the public health effects, it is not easy to predict the possible consumer reactions to a possible introduction of oral tobacco on the market. Most of the available data on consumer attitudes comes from the Scandinavian countries. However, there is no firm evidence to suggest that consumers in other countries will behave in a similar way. Use of oral tobacco may depend on cultural factors; predictions of consumer reactions will therefore be quite speculative. Yet the experiences of Sweden and Norway, combined with the available (historical) data from other countries, can provide a useful insight into consumer behaviour. This will be dealt with in Chapter Four.

Consumer behaviour largely depends on how the product might be introduced. Oral tobacco would only be introduced if it could be marketed. Given the ban on tobacco advertising in some countries and other factors, it is neither certain that this would be a profitable project nor what a profitable strategy might be. To answer these questions, a theoretical analysis has been made of the industry's marketing strategies and commercial interests were a European-wide ban on oral tobacco not in force. Additionally, hypothetical scenarios will be presented on the likely reaction of the industry following legalisation. This will be done in Chapter Five.

2 Health effects associated with snuff use

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2.1 Summary

The present report covers oral snuff only as used in Europe and North America.
Snuff is produced from air or fire-cured tobacco. The leaves are subsequently either fermented or heated at high temperatures. Snuff can be bought both loose and in small, ready-to-use portions. The product is used by placing a pinch or a portion bag pouch between the lip and cheek or gum.

Health effects reported in relation to use of snuff have been studied mainly among men starting to use snuff at a considerably higher age than is the case today. Health effects among today's snuff users may thus be far more extensive than expected, in comparison to the earlier studies. Moreover, the burden of disease due to snuff could also be deemed higher if we consider snuff as a gateway to smoking or as an obstacle to quitting smoking for people who would otherwise have stopped. The World Health Organisation's (WHO) Scientific Advisory Committee on Tobacco Products Regulation has concluded that current evidence does not indicate that use of any smokeless tobacco is free of health risks and there is no evidence to recommend that any smokeless tobacco product should be used as part of a harm reduction strategy.

Nicotine is absorbed more slowly from snuff than from tobacco smoke, but the peak levels are similar and the high level continues for a much longer time than after smoking. The major manufacturers of snuff manipulate the nicotine dosing characteristics of the products. A snuff dipper may therefore be more dependent on nicotine than a smoker and users of both snuff and smoking products find tobacco cessation even more difficult than those who use only snuff or who only smoke.

"Snuff dipper's lesion" is a common term for the clinically observable changes in oral soft tissue morphology as a result of long-term snuff use. There are several degrees of severity of these lesions, ranging from slight superficial wrinkling to heavy thickening and furrowed, whitish or greyish coloured pre-cancerous lesions of the oral epithelium. Gingival recession and discoloration of the teeth are also usual findings. No apparent differences have been reported between Swedish snuff and American snuff in the prevalence or severity of oral lesions.

More than 2.500 chemical substances are identified in snuff and 28 of these are characterized as carcinogenic. Among these, the N-nitrosamines are considered major contributors to the carcinogenic activity of snuff.

Snuff has been classified both by the International Agency for Research on Cancer (IARC) and by the U.S. Department of Health and Human Services as a human carcinogen. An increased frequency of cancer in the oral cavity has been found among snuff users. Evidence regarding snuff use and cancer at other sites than in the oral cavity is limited.

The acute cardiovascular effects of nicotine result in an increase in heart rate and systolic blood pressure. The risk of hypertension has in one study been reported to be significantly increased among snuff users in age groups 46-years and above. One study indicates that snuff use increases the risk of type 2 diabetes similar to that found in relation to smoking. Increased risk of cardiovascular disease has been reported among snuff users and although the use of snuff increases some factors known to enhance the risk of cardiovascular diseases, more studies are necessary before any firm conclusion concerning cardiovascular disease among snuff users can be made. Use of snuff has been found to double the risk of musculoskeletal injuries in relation to physical activity.

It has been reported that snuff use enhances the risk of pre-eclampsia. Moreover, nicotine readily crosses the placental barrier, leading to substantial nicotine levels in the foetus. Nicotine concentrates in the breast milk that can be ingested by the infant. Recent data also indicate that exposure to nicotine may be related to Sudden Infant Death Syndrome (SIDS).

2.2 Introduction

The present report deals with oral snuff only as used in Europe and North America.

The use of snuff in Europe dates back to the mid 1600s (IARC, 1985). Today, snuff is produced from air or fire-cured tobacco. After the initial curing process, which takes several weeks, the leaves undergo a fermentation process. Subsequently, they are powdered and enriched with flavouring additives. In Sweden, the cured tobacco leaves are cut and ground before water and salt are added and the “tobacco meal” is heated at high temperature and humidity for 24 – 36 hours. Snuff can be bought both loose and in small, ready-to-use portions. Portion-bag pouches containing 0.5 g (mini-portion)) 1.0 g (regular-portion)) and 1.5 g of snuff are available. The use of these products involves taking a pinch of 1 – 2 g of loose snuff or a portion-bag pouch and placing it between the lip and cheek or gum. In Sweden the pinch is usually placed between the gum and upper lip. The saliva produced during the snuff dipping may be swallowed or, more commonly, spat out. The average snuff dipper keeps the snuff pinch in their mouth for approximately 11 – 14 hours per day.

Health effects reported in relation to the use of snuff have been studied mainly among men starting to use snuff at a considerably higher age than is the case today. Health effects among today’s snuff users who started using snuff at a relative young age may therefore be more extensive than expected from the earlier studies. Moreover, the burden of disease due to snuff could also be higher if we consider snuff as being a gateway to smoking or preventing people from quitting smoking who would otherwise have stopped. The WHO’s Scientific Advisory Committee on Tobacco Products Regulation (SACTob, 2003) has concluded that current evidence does not indicate that the use

of any smokeless tobacco is free from health risks and there is no evidence to recommend that any smokeless tobacco product should be used as part of a harm reduction strategy.

Table 1. *Some main components of Swedish moist snuff (Bolinder, 1997)*

Main components	Contents (%)
Tobacco	40 – 45
Water	40 – 60
Sodium carbonate	1.2 – 2.5
Sodium chloride	1.5 – 2.5
Moisturiser	1.5 – 3.5
Flavouring	<1
Nicotine	0.5 – 1.3

Table 1 shows the content of some main components in Swedish snuff. More than 2500 chemical substances are identified in snuff and altogether 28 of these are characterized as carcinogenic (Vaino and Weiderpass, 2003). Among these, the N-nitrosamines are considered major contributors to the carcinogenic activity of snuff. These include volatile and non-volatile nitrosamines, N-nitrosamino acids and especially the nitrosamines derived from N-nitrosation of nicotine and of the minor Nicotiana alkaloids, the tobacco-specific N-nitrosamines (TSNA). TSNA are formed, after the tobacco is harvested, by N-nitrosation of the alkaloids during curing, fermentation and aging. It should be noted that the product composition might change with storage (Brunnemann et al., 1996, MDPH, 2001, Djordjevic et al., 1993). Levels of total TSNAs in snuff at various time points is shown in Table 2. In general no significant changes have taken place during the last 20 years. Snuff production in Sweden involves the tobacco being heated instead of fermented and retailers are advised to refrigerate the snuff. Swedish snuff producers use an industry standard (Gothiatek standard) requiring that the snuff should contain less than 5 µg TSNA per gramme. Other carcinogenic substances in snuff are polycyclic aromatic hydrocarbons (PAH) such as benzo (a) pyrene, volatile aldehydes, metals such as arsenic, lead, cadmium and nickel and radioactive substances such as polunium-210, uranium-235 and uranium-238.

Table 2. *Levels of total TSNAs in moist snuff, by brand, at various time points* (IARC 1985, Hoffmann *et al*., 1987, Brunnemann and Hoffmann, 1992, Hoffmann *et al*., 1995, Brunnemann et al., 2001).

Brand	Company	Total TSNA (μg/g)			
		1981–82	1985–86	1990–91	2001
U.S. brands (unspecified)		1.3–79.5[a]	9.6–289.2[b]	5.9–280.0[c]	
Swedish brands (unspecified)		4.2–9.4[d]		9.3–11.4[e]	
Ettan Snus	Swedish Match				2.8
Timber Wolf, Wintergreen	Pinkerton (Swedish Sub.)				7.5
Kentucky Ref.	U Kentucky				15.9
Kodiak, Wintergreen	Conwood				16.6
Copenhagen	UST				41.1
Skoal Long Cut Mint	UST				64.0
Silver Creek, Long Cut, Wintergreen	Swisher				127.9

[a] 16 samples tested, unknown number of brands
[b] 5 brands tested.
[c] 5 brands tested.
[d] 5 brands tested.
[e] 3 brands tested.

2.3 Nicotine absorption and dependence

Nicotine is absorbed more slowly from snuff than from tobacco smoke, but the peak blood levels are similar (Figure 1). Thus, while the nicotine concentration after smoking a cigarette reaches its maximum concentration in about 5 – 10 minutes and thereafter falls rapidly, it takes about 10 – 20 minutes before the maximum levels are reached in a snuff dipper and it then falls fairly slowly. It is also seen that the top level after nicotine gum (4 mg) is only half that obtained through a cigarette or a snuff pinch.

It is well documented that the major manufacturers of snuff can and do manipulate the nicotine-dosing characteristics of their products (Food and Drug Administration, 1996; Tomar and Henningfield, 1997) and have developed snuff products that deliver nicotine resulting in various rates of absorption. These products include “starter” products with relatively slow rates of nicotine

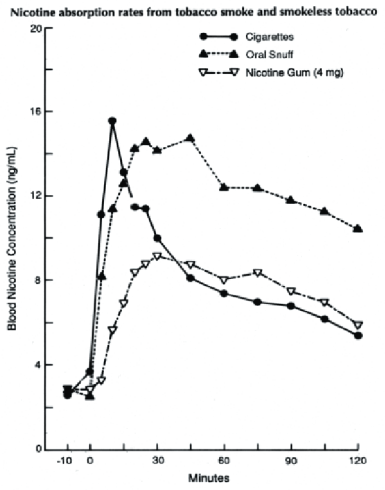

Figure 1. *Nicotine blood level after smoking, snuff use and use of nicotine gum (4 mg). (Adapted from Benowitch et al., 1988)*

delivery. “Starter” products often contain a flavouring that masks the tobacco taste and may appeal to young or novice users (Tomar et al., 1995, Connolly 1995). As users develop greater tolerance of nicotine and progress in their level of addiction, they are likely to “graduate” to brands engineered to deliver higher levels of nicotine with more rapid rates of absorption (Tomar et al., 1995). The control of nicotine dosing is accomplished primarily through adjustment of product pH and changing the available surface area by controlling the size of the tobacco particles in the snuff (Food and Drug Administration, 1996; Tomar and Henningfield, 1997). As a result of manipulating product pH, the brands of snuff vary dramatically in the proportion of nicotine in the unprotonated or “free” state from about 7% (0.7 mg/g) in Skoal Bandits Wintergreen to 79% (9 mg/g) in Copenhagen brand. Since only the free nicotine is absorbed, the pH has a strong influence on the rate of nicotine absorption across the oral mucosa, into the syste-

mic circulation and to nicotine receptors in the central nervous system.

Epidemiological evidence supports the “success” of the graduation marketing strategy. Thus as shown in the USA, relatively new, young snuff users were more likely to use brands that delivered nicotine at low to medium rates such as Skoal Bandits or Skoal, while those who had used smokeless tobacco for four years or longer were most likely to use Copenhagen, a high-dosage product (Tomar et al., 1995).

The average Swedish snuff user consumes about 19 g of snuff per day. This will contain about 150 mg nicotine (0.8%), about half of which will be absorbed (50 – 75 mg). The daily intake of nicotine is somewhat higher for a snuff dipper than for a smoker (50 – 75 mg versus 40 – 50 mg for 20 cigarettes per day). An average snuff dipper will thus get about the same amount of nicotine in 24 hours as a smoker smoking about 30 cigarettes per day. The maximum tissue concentration of nicotine is about the same in the two groups. The concentration of nicotine in the blood among snuff users, however, will stay at a high level considerably longer than among smokers, since nicotine will continuously be absorbed from the snuff through the mucus membranes of the oral cavity, as long as the snuff pinch is kept in the mouth. In agreement with this, Bolinder et al. (1997) found that the blood concentration of cotinine (a metabolite of nicotine) was higher after overnight abstentions in snuff users (333 µg/l; 232 – 421) than in smokers (213 µg/l; 163 – 359).

Using snuff may be similar to more-or-less continuous smoking, as nicotine is continuously absorbed. Some smokers have started using snuff to get rid of their smoking dependence. This is a solution with serious problems. Since the nicotine intake in snuff users may be even higher than in smokers, snuff users may be even more dependent on nicotine than a smoker. Users of both snuff and smoking products find tobacco cessation even more difficult to achieve than those who use only snuff or only smoke (Hatsukama and Severson, 1999, Tomar, 2002a). Additionally, the use of snuff has been reported to increase the chances of subsequent initiation of smoking (Haddock et al., 2001).

2.4 Health effects

2.4.1 Oral lesions

“Snuff dipper’s lesion” is a common term for the clinically observable changes in soft tissue morphology as a result of long-term snuff use. There are several degrees of severity of these lesions (eg. snuff dipper’s pouch) ranging from slight superficial wrinkling and normal or pale white or grey mucosa, to heavy thickening and furrowed whitish or greyish colouring (Poulson et al., 1984) as well as pre-cancerous lesions of the oral epithelium (Winn, 2001). Some oral pathologists include it as a form of leukoplakia, while others classify it as a separate lesion. Histopathological examinations show hyperkeratinisation, vacuolated cells, increased mitotic rate, as a zone of necrosis and inflammation. Oral examination surveys suggest a lesion prevalence in users of 13% – 65% for adolescents and 34% – 79% for adults (Poulson et al., 1984, Grasser and Childers, 1997, Kauger et al.,1992, Tomar et al., 1997, Martin et al., 1999). Lesion prevalence increases with greater use of smokeless tobacco measured by amount used, duration

and frequency (Tomar et al., 1997, Martin et al., 1999). Figure 2 shows the prevalence of oral lesions in young boys as a function of use. There is evidence that the lesions among adolescents and younger adults disappear with cessation of use (Martin et al., 1999)) but less is known about lesions in older adults with more long-standing snuff use and lesions.

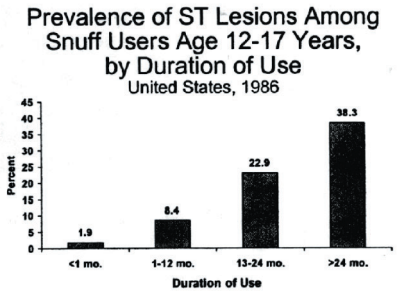

Figure 2. *Frequency of oral lesions among snuff users aged 12 – 17 years by duration of use From Tomar et al., 1997*

A guide for Health Professionals by the US National Cancer Institute (NCI, 2000) states: "*From a clinical standpoint, no leukoplakia should be ignored. Transformation of a benign leukoplakia to malignancy cannot be predicted. Nor can one predict which lesion will transform, or when the transformation might occur.*"

In most studies of snuff lesions, more gingival recession is observed in users than in non-users (Offenbacher and Weathers, 1985, Ernster et al., 1990, Winn, 2001). Gingival recession and discoloration of the teeth are usual findings; these are generally not reversible to the same extent as the epithelial lesions after discontinuing tobacco use. A longitudinal study of adults with gingival recession found that snuff use might predict loss of periodontal attachment three years later (Beck et al., 1995).

In studies of baseball players, the rate of dental attrition and abrasion was higher in smokeless tobacco users than in non-users (Robertson et al., 1997).

There is inconsistent and sparse evidence that snuff is a risk factor for gingivitis or for dental caries.

Soft tissue lesions, caries, periodontal conditions and tooth abrasion have been examined in Swedish studies of smokeless tobacco and oral health. A large oral examination study of the general population yielded a prevalence of smokeless tobacco lesions of about 15% for males and less than 1% for females (Salonen et al., 1990; Axell, 1976). Lesion prevalence increases with hours and regularity of daily use. Lesions tend to resolve with cessation of use (Mornstad et al., 1989). Higher levels of caries were observed in snuff users than in non-tobacco users among teenagers in Gothenburg (Hirch et al., 1991). Controlling for cigarette smoking, a dose-response relationship was also shown between caries and number of years of snuff use. In studies of periodontal conditions among snuff users, one study found excess gingival inflammation in young adolescents, but two other studies did not observe

higher loss of periodontal attachment (Kallestal and Uhlin, 1992) or alveolar bone (Wouters et al., 1993) in users.

Tomar (2002b) has performed a literature study on oral health effects in relation to use of snuff in the USA and Sweden. He concludes that there were no apparent differences between Swedish snuff and American snuff in the prevalence or severity of oral lesions. Most studies reported dose-response relationships between the duration or frequency of snuff use and the prevalence of lesions. The few studies that examined brand-specific effects suggested that loose snuff was associated with higher risk of lesions than portion-bag pouches of snuff.

2.4.2 Cancer of the oral cavity

2.4.2.1 Evaluations

The oral use of smokeless tobacco was listed in the 9th Report on Carcinogens by the U.S. Department of Health and Human Services (2000) as *known to be a human carcinogen* based on sufficient evidence of carcinogenicity from studies in humans. This indicates a causal relationship between exposure to smokeless tobacco (chewing tobacco and snuff) and human cancer. In the European Code Against Cancer And Scientific Justification: Third version, 2003, it is stated “There is strong scientific evidence that smokeless tobacco, whether sucked, chewed or inhaled, is also associated with an increased risk of cancer” (Boyle et al., 2003).

In 1985, the International Agency for Research on Cancer (IARC, 1985) evaluated snuff and the main results are summarized as follows (the relevant references have been inserted):

“Reports of case series indicate that a high proportion of oral-cancer patients took snuff orally and that the cancer frequently developed at the site of snuff application.

Four case-control studies, three from south-eastern USA (Vogler et al., 1962; Westbrook et al., 1980; Winn et al., 1981) and one from Scandinavia (Wynder et al., 1957), have implicated snuff use in the etiology of cancer of the oral cavity and, to a lesser extent, of the pharynx. In three of these studies, relative risks could not be computed; however, the differences in snuff usage between cases and controls were substantial and confounding by cigarette smoking could be largely excluded. In the fourth study, in south eastern USA (Winn et al., 1981), the relative risk of oral and pharyngeal cancer for white women who used snuff but did not smoke was four times that for women with no tobacco habit; a strong dose-response relationship was observed; adjustment for other risk factors did not substantially reduce the relative risks.”

In the evaluation, it was concluded that: “There is *sufficient evidence* that the use of oral snuffs of the types commonly used in North America and western Europe is carcinogenic to humans.”

Several studies have shown that snuff and tobacco-specific nitrosamines present in snuff induced or promoted tumours in rats and mice (IARC, 1985, Johansson et al., 1989, 1991, Hecht and Hoffmann, 1988).

2.4.2.2 Studies from USA

The study by Winn et al. (1981) and studies published after the IARC evaluation will in the following be presented and discussed in some detail.

Winn et al. (1981) studied the risk of oral cancer among non-smoking women using snuff. The study included 232 hospital cases and death certificate cases and 410 controls from the same sources. The use was conducted with the study subject or their next-of-kin. The relative risk of oral cancer associated with snuff use among non-smokers was 4.2 (2.6-6.7) (the parenthesis refer to the 95% confidence interval). Among users for more than 50 years the risk was 47.5 (9.1-249.5) for cancer of the gum and buccal mucosa - tissues that come in direct contact with the tobacco powder.

Stockwell and Lyman (1986) conducted a study on 2,351 cases with head and neck cancer in Florida and 8,285 controls. 18 cases and 31 controls used smokeless tobacco. The relative risk for cancer of the mouth and gums was 11.2 (4.1-30.7) after adjusting for age, race, sex and tobacco use. The risk estimates were not adjusted for alcohol and it is also unclear whether users of smokeless tobacco also used cigarettes.

Spitz et al. (1988) performed a study among 185 white patients with squamous carcinoma of the upper aerodigestive tract at the M.D. Anderson Cancer Center in Houston and an equal number of controls. Nine cases that dipped snuff were identified. Seven of the cases also chewed tobacco and only one denied smoking cigarettes, although he had smoked both cigars and pipes at different times. Three of the four controls that dipped snuff also smoked cigarettes and only one denied use of any other tobacco product. The unadjusted odds ratio was calculated at 3.4 (1.0-10.9).

Blot et al. (1988) conducted a case-control study that included 1114 cases with oral or pharyngeal cancer from four areas of the USA and a similar numbers of controls. Six per cent of cases and 7% of controls among males had used smokeless tobacco (primarily chewing tobacco) but nearly all were also smokers. Smokeless tobacco use was less common among females (3% cases, 1% controls) but users (primarily of snuff) generally were non-smokers. Among non-smoking females (6 cases, 4 controls) the odds ratio was 6.2 (1.9-19.8) for users of smokeless tobacco. All cancers occurred in the oral cavity. Too few men used smokeless tobacco but not cigarettes to assess the odds ratio for this group.

Maden et al. (1992) carried out a population-based case-control study in the western part of Washington State, USA. Nineteen men with oral cancer and 5 controls had ever used smokeless tobacco (including plug, mini-pouches and snuff). An odds ratio of 4.5 (1.5-14.4) was calculated. The data were been corrected for age, but probably not for other factors.

Kabat et al. (1994) studied the role of tobacco in oral and pharyngeal cancer. None of the male never-smoking cases used snuff, while 4/444 of the controls did. Among female never-smokers, 3.5% (4/113) used snuff compared to 0.0% among controls. The crude odds ratio for using snuff was 34.5 (8.49-140.1).

Mashberg et al. (1993) studied effects of tobacco and alcohol use on cancer of the oral cavity. The study involved 359 men with oral cavity-oropharyngeal cancer and 2,280 controls. No increased risk of oral cancer was found for use of snuff (OR=0.8 (0.4-1.9). The number of cases was not given and it was not stated whether any corrections were made. Muscat et al. (1996) studied gender difference in smoking and risk of oral cancer and stated that oral snuff and chewing tobacco were unrelated to oral cancer. Among men, 9 cases (1.3%) and 10 controls (1.6%) reported using snuff at least once a week for one or more years. Among women, only two cases and one control reported snuff use. No information was given as to whether the snuff users used cigarettes. Schwartz et al. (1998) studied oral cancer risk in relation to sexual history and papilloma virus infection. Among men, prior smokeless tobacco (chewing tobacco, snuff, or mini-pouches) use was similar between case with oral cancer and control subjects (6.7% and 5.6%, respectively) (OR= 1.0 (0.4–2.3)). Only one female (a control subject) reported smokeless tobacco use.

Two non- case-control studies observed no association between smokeless tobacco and oral cancer. One study specifically controlled for smoking when examining the relationship of smokeless tobacco and lip, oral, salivary and pharyngeal cancer (Sterling et al., 1992). This study obtained information about the proportion of people in the USA who used smokeless tobacco based on a nationally representative 1987 sample interview survey (the National Health Interview Survey) and compared it with the proportion of oral cancer decedents who used smokeless tobacco based on the National Mortality Follow-back Survey, USA, 1986. This survey obtained questionnaire data from the relatives of a probability sample survey of decedents. The proportions were similar, suggesting no association between smokeless tobacco use and these cancers. However, the two sample surveys may not necessarily be directly comparable. In the second study (Bouquot and Meckstroth, 1998) it was noted that oral cancer death rates are not higher in West Virginia than in the USA as a whole, even though it is the state with the highest prevalence of smokeless tobacco. However, this study had an ‘ecological’ study design, meaning that tobacco information, death status and cause-of-death data are not determined at an individual level.

2.4.2.3 Studies from Sweden

The decision by the European Union to remove the cancer warning from snuff was to a large extent based on two Swedish studies from 1998. These will now be presented and discussed:

The study by Lewin et al. (1998) included 545 cases of oral cavity, oro- and hypopharyngeal, laryngeal and oesophageal cancer from six ear, nose and throat departments in hospitals in Stockholm and parts of Southern Sweden, supplemented by additional cases from a cancer registry. Population registers provided 641 controls. Living subjects were interviewed about tobacco behaviours and other factors. The main results in relation to snuff use are presen-

ted in Table 3. While no increase of oral cancer was found among current snuff users (the relative risk was 1.0 (0.5-2.2)) the relative risk among ex-users was increased 1.8 (0.9-3.7). For cases of head and neck cancer, the relative risk increased with the usage of snuff. While the relative risk among those using 50 g or less of snuff per week was 0.8 (0.5-1.3), the relative risk among those using more than 50 g per week was 1.6 (0.9-2.6). There were only 9 cases and 10 controls that had ever used snuff but had never smoked tobacco. Having ever used snuff was associated with a relative risk of 4.7 (1.6-13.8). For current and former users of snuff, the relative risks of head and neck cancer were 3.3 (0.8-12.0) and 10.5 (1.4-118) respectively.

The second study (Schildt et al., 1998) included four counties in Northern Sweden. Four hundred and ten population-based cases of squamous cell carcinoma of the lip and oral cavity were identified from a cancer registry and compared to 175 living controls from a population registry and 235 deceased controls from a national death registry. Study subjects or their next-of-kin were interviewed. There was no overall association between snuff and lip/oral cavity cancer, controlling for smoking and different types of alcohol. The relative risk (see Table 3) among current living users was 0.5 (0.2-1.2) while the risk among former living users was 3.0 (0.9-3.5). Risks relative to cases and controls that never smoked were 0.7 (0.4-1.2) for active users of snuff and 1.8 (0.9-3.5) for ex-users of snuff.

Table 3. Use of snuff and risk of head and neck cancer or oral cancer (from Lewin et al., 1998 and Schildt et al., 1998)

Study	Cancer	Use of snuff	Cases/controls	RR (95% CI)
Lewin et al., 1998	Oral cancer			
		Never used	103/550	1.0
		Ever used	25/91	1.4 (0.8-2.4)
		Current users	10/50	1.0 (0.5-2.2)
		Ex-users	15/41	1.8 (0.9-3.7)
	Head and neck			
		Never used	462/550	1.0
		Ever used	83/91	1.1 (0.7-1.5)
		Current users	43/50	1.0 (0.6-1.6)
		Ex-users	40/41	1.2 (0.7-1.9)
		Intensity of usage		
		≤ 50 g/week	45/57	0.8 (0.5-1.3)
		> 50 g/week	38/34	1.6 (0.9-2.6)
		Never smoked		
		Ever used	9/10	4.7 (1.6-13.8)
		Current users	NG*	3.3 (0.8-12.0)
		Ex-users	NG	10.5 (1.4-118)
Schildt et al, 1998	Oral cancer			
		Ever users	67/72	0.9 (0.6-1.4)
		Current users	39/54	0.7 (0.4-1.1)
		Ex-users	28/18	1.5 (0.8-2.9)
		Alive		
		Current users	NG	0.5 (0.2-1.2)
		Ex-users	NG	3.0 (0.9-9.4)
		Never smoked		
		Current users	19/23	0.7 (0.4-1.2)
		Ex-users	9/4	1.8 (0.9-3.5)

*NG = not given

It is of interest that in both studies, the cancer risk among ex-snuff users was higher than among active snuff users. A possible explanation is that when the users discover changes in the mocusa, they may, in a country with a high level of health education and health consciousness like Sweden, worry that this could be something that would develop into cancer. Thus, the user will stop using snuff. It should also be noted that when cancer of the oral cavity including lips, or cancer of the head and neck is studied, possible effects would be diluted. This implies that even if the risk of cancer at the localizations usually found in connection with the use of snuff was increased by a factor of 5, the risk of cancer in the oral cavity including lips would only be expected to increase by about 60% and the risk of cancer of the head and neck will increase even less (Sanner et al., 2000).

Hirsch (2002) has presented 6 cases of oral cancer among Swedes attributed to snuff use. The tumours were initiated at the exact anatomical location where the snuff quid was placed. Later (personal communication) Dr Hirsch identified 3 additional patients with snuff-associated oral cancer. The patients are in the age group 50-91, with a mean age of 74.

2.4.3 Other cancer

Evidence regarding snuff use and cancer at other sites than the oral cavity is more limited. Findings are often inconsistent for a particular cancer type, some studies do not control for potential confounding by smoking and some have a small number of smokeless tobacco users.

Vainio and Weiderpass (2003) have pointed out that snuff use may increase the risk of pancreatic cancer. It is well known that cigarette smoking increases the risk of pancreatic cancer (IARC, 2003) and tobacco-specific nitrosamines (NNN [N'-nitrosonornicotine] and NNK [4-(methynitros-amino)-1-(3-pyridyl)-1-butanone]) have been found to be present in human pancreatic juice (Prokopczyk et al., 2002). Heuch et al. (1983) found, in a study from Norway, an odds ratio for pancreatic cancer of 2.85 (p for trend 0.060) in cases of regular use of chewing tobacco or snuff compared to cases of zero use, after adjustment for alcohol consumption and cigarette smoking. In a study of members of the Lutheran Brotherhood Insurance Society in the USA (Zheng et al., 1993) the age-, alcohol- and smoking-adjusted risk of pancreatic cancer among ever-users of smokeless tobacco was increased, although not statistically significantly (RR=1.7, 0.9-3.1) based on 16 deaths. In another study from the USA, six males with pancreatic cancer and five male controls who chewed tobacco regularly for at least 1 year and did not currently smoke cigarettes were identified. The crude OR for these tobacco chewers, compared to never-users and long-term quitters, was 3.6 (1.0-12.8) (Muscat et al., 1997). In addition, two of the TSNAs, NNK and NNAL (4-(methylnitrosamino)-1-(3-pyridyl) butanol) also present in snuff, are known to induce pancreatic cancer in rats (Rivenson et al., 1988, Hoffmann et al., 1993).

2.4.4 Cardiovascular effects

The predominant acute cardiovascular effects of nicotine are an increase in heart rate, systolic blood pressure, cardiac output, stroke volume and coronary blood flow, as well as cutaneous vasoconstriction and increased muscle-blood flow. The haemodynamic effects appear to be more pronounced immediately after cigarette smoking than after snuff use. On the other hand, the increase in blood pressure and heart rate seems to persist for a longer period after snuff use (Benowitz et al., 1988). Vibration-induced white fingers have been shown to be significantly more common in both snuff users and smokers than in non-tobacco users, as a sign of acute influence of nicotine (Ekenvall and Lindblad, 1985, Bolinder et al., 1992). During physical performance, snuff use has been found to raise heart rate and blood pressure to a submaximal work level (Hirch et al., 1992, van Duser and Raven, 1992, Bolinder et al., 1992).

As a result of putting a snuff pinch in the mouth the heart rate and blood pressure increases, presumably due to nicotine. In a Swedish study increases in blood pressure and heart rate were observed for middle-aged normotensive male snuff users, as well as smokers who were monitored for 24 hours. The elevation was observed during the day but not during nighttime, consistent with transient effect of both types of tobacco on blood pressure (Bolinder et al., 1998).

In a study by Bolinder et al. (1992) of Swedish construction workers, blood pressure values were dichotomised into systolic blood pressure >160 mmHg or lower; and diastolic pressure >90 mmHg or lower. It was found that hypertension among the study group became significantly evident during the fifth decade of life. Snuff users were at a higher risk of hypertension than non-users, whereas smokers were at a lower risk in all age groups. In the 46 to 55 years age group, the odds ratio for a diastolic blood pressure of > 90 mm Hg was 1.8 (1.5-2.1) and for a systolic blood pressure of > 160 mm Hg was 1.7 (1.3-2.1). At ages under 45 years, only smokers showed a significantly higher prevalence of heart rate, >80 beat/min compared to never users, but at older ages, both smokers and snuff users had a similar excess risk of elevated heart rate (OR=1.4 (1.3-1.6)).

On the other hand, several studies have reported that the blood pressure has not been found to be elevated among snuff users (Ernster et al., 1990, Eliasson et al., 1991, Siegel et al., 1992, Eliasson et al., 1995). It appears, however, that these studies involve persons of under 45 years of age. Thus, these studies are not in conflict with the study of Bolinder et al. (1992), as they observed enhanced blood pressure in age groups of 46-years and older.

Three hundred and ninety one healthy, 58 year old men were examined to evaluate tobacco use and atherosclerosis (Wallenfeldt et al., 2001). Snuff use was not associated with atherosclerosis based on ultrasound of the femoral and carotid arteries. In another study, snuff users did not differ from non-tobacco users in biochemical risk factors for cardiovascular disease (serum lipids, serum lipoproteins and plasma fibrinogen) and intima media thickness in the carotid arteries (Bolinder et al., 1997).

Some studies have found a link between snuff use and heart disease, while others have not. In one study, a cohort

of 135,036 male Swedish construction workers receiving medical checkups between 1971-1974 was followed for cardiovascular mortality until 1985 (Bolinder et al., 1994). Relative to men who had never used tobacco, a small statistically significant risk of death from cardiovascular disease (RR=1.4 (1.2-1.6)) and from all causes, 1.4 (1.3-1.9) was observed among smokeless tobacco users who did not smoke, compared to non-tobacco users. Excess mortality associated with smokeless tobacco use was observed among the younger men aged 35-54 years when entering the study (Table 4). The investigators controlled for age and region of origin. Additional control for blood pressure, blood pressure medication, previous cardiac symptoms, diabetes and body mass index had very little impact on the findings. Cholesterol could not be controlled for. The study has been criticised for not controlling alcohol consumption. The authors point out that the possible confounding effect of alcohol use is, in all likelihood comparable for both smoking and snuff use. It should be noted that the increase in death rates among smokers is similar to that found in other studies.

Table 4. *Cause-specific mortality among Swedish construction workers during 12-year follow-up after 1971 – 1974 health examination. The workers were 35 – 54 years when entering the study (Bolinder et al., 1994).*

Cause of death	Non-users of tobacco		Smokeless tobacco users		Smokers 1-14 cig/day		Smokers ≥15 cig/day	
	No.	RR	No.	RR (95 % CI)	No.	RR (95% CI)	No.	RR (95% CI)
Ischaemic heart disease	123	1.0	35	2.0 (1.4-2.9)	128	2.6 (2.1-3.4)	162	3.3 (2.6-4.2)
Stroke	16	1.0	4	1.9 (0.6-5.7)	17	2.7 (1.4-5.4)	19	3.9 (1.5-5.7)
All cardiovascular disease	154	1.0	44	2.1 (1.5-2.9)	164	2.7 (2.2-3.4)	199	3.2 (2.6-3.9)
All death	410	1.0	105	1.9 (1.6-2.4)	317	2.0 (1.7-2.3)	437	2.6 (2.3-3.0)

RR = relative risk

95% CI = 95% confidence interval

Bolinder et al., (1992) found that snuff users in the same construction worker population were more likely to have a disability pension than non-users of tobacco due to a cardiovascular diagnosis, hypertension, or a musculoskeletal diagnosis. Smokeless tobacco users had a higher risk of obtaining disability pension due to cardiovascular diagnosis, hypertension and muscular disease diagnosis, than non-tobacco users or smokers (Table 5). Longer sick leave (≥ 30 days in one year) occurred twice as often in older age groups than in younger ones, both among tobacco users and non-users. The overall age-adjusted risk for smokers was 1.7 (1.6-1.8) and that for smokeless tobacco users, 1.2 (1.1-1.2).

Table 5. *Disability pension – total number cardiovascular and musculoskeletal diagnosis in the different tobacco user groups and odds ratios with 95% confidence interval for smokeless tobacco users and smokers, compared to non-users in the 46 – 55 and 56 – 65 years age groups (Bolinder et al, 1992).*

Diagnosis	Age (years)	Non-users of tobacco No.	OR	Smokeless tobacco users No.	OR (95% CI)	Smokers ≥15 cig/day No.	OR (95% CI)
Cardiovascular	45 – 55	30	1.0	8	1.6 (0.7-3.5)	22	2.2 (1.3-3.9)
Cardiovascular	56 – 65	149	1.0	69	1.5 (1.1-1.9)	33	1.3 (0.9-1.9)
Hypertension	46 – 65	38	1.0	28	3.0 (19-4.9)	9	0.9 (0.4-1.9)
Musculoskeletal	46 – 55	43	1.0	20	2.8 (1.6-4.8)	34	2.4 (1,5-3.8)
Musculoskeletal	56 – 65	318	1.0	149	1.5 (1.2-1.8)	91	1.7 (1.3-2-2)

RR = relative risik

95% CI = 95% confidence interval

Two reports are based on the northern Swedish study of the World Health Organization Multinational Monitoring of Trend and Determinants on Cardiovascular Disease Study (MONICA). Men and women from the MONICA study were evaluated for the prevalence and levels of cardiovascular risk factors (Eliasson et al., 1995). The use of snuff was not associated with plasma fibrinogen, fibrolytic variables or serum insulin. It should be noted that the age of the snuff users participating was between 39.7 and 44.3 years.

Huhtasaari et al. (1992) compared men with a first myocardial infarction (n=585) to control men (n=589) without myocardial infarction. The patients represented men aged 35 – 64 years in northern Sweden that had their first acute myocardial infarction during the period from April 1989 to April 1991. Snuff users had no enhanced risk of myocardial infarction (OR=0.89, 0.62-1.29). About half the snuff users were former smokers. The same authors (Huhtasaari et al., 1999) later made a similar study involving men from the same area and sudden death and fatal and nonfatal acute myocardial infarction during May 1991 and December 1993. The study involved 687 patients and the same number of controls. Snuff users, excluding current smokers, were similar to non-users of tobacco with respect to myocardial risk (OR=0.96, 0.65-1.41). Regular use of snuff was associated with an adjusted (controlling for multiple cardiovascular risk factors, including diabetes and high cholesterol) odds ratio of 0.58 (0.35-0.94) for all myocardial infarction and 1.50 (0.45-5.03) for fatal myocardial infarction. There is a possibility that snuff causes disturbance of the hearth rhythm. This could enhance the risk of sudden death. Median snuff use was two boxes per day. The

median age at initiation of snuff use was quite high, 31.5 years, because many of the men started using snuff in conjunction with quitting smoking.

Benowitz (1999) points out in an editorial that nicotine replacement therapy does not increase the risk of cardiovascular disease. In this respect, it should be added that the plasma nicotine level is considerably lower in users of nicotine replacement therapy than in snuff users and smokers and that the therapy normally lasts only for a limited period of time. It can be concluded that future studies are needed to better understand potential cardiovascular disease risks.

2.4.5 Diabetes

Previous results have shown that heavy smokers experience up to a threefold increase in incidence of type 2 diabetes, as compared to never-smokers. Consequently, it was of interest to examine whether snuff users had an increased risk of type 2 diabetes. A cross-sectional study in Stockholm involving 3,128 men, aged 35-56 years was carried out. Half of them had a family history of diabetes. Use of 3 or more boxes of snuff per week was associated with an odds ratio of 2.7 (1.3-5.5) for type 2 diabetes. Among men smoking 25 or more cigarettes per day, an odds ratio of 2.6 (1.5-5.8) was found. The results were controlled for age, body mass index, family history of diabetes, physical activity and alcohol consumption (Persson et al., 2000).

2.4.6 Musculoskeletal injuries

A study has been carried out in Norway among infantry conscripts undergoing a physical training programme. The population consisted of 480 male conscripts in the Army. Data was obtained for height and weight measurements from a questionnaire and from a 3,000 metre run test prior to ten weeks of basic military and physical training. Physicians attached to the training camp registered injuries. Every fourth conscript sustained one or more musculoskeletal injuries during the training period. Of these, certain groups (subjects aged 22 years or more; those who were the least active before call-up; those who thought they were less fit than the average person; the slowest finishers in the 3000-metre run test; smokers of more than 10 cigarettes a day; and snuff-takers) suffered more injuries, according to univariate analyses. Seventy-two of the conscripts were snuff users and their relative risk for musculoskeletal injuries was 1.75 (1.18-2.58) compared to non-snuff users. For conscripts smoking more than 10 cigarettes a day, the relative risk was 1.53 (1.06-2.21) compared to non-smokers (Heir and Eide, 1997). These results are of particular interest in relation to the previous findings of Bolinder et al.(1992) that the use of snuff increased the odds ratio for disability pension, due to musculoskeletal diagnosis.

2.4.7 Pregnancy

In a recent study from Sweden (England, D and Cnattingius S, cited by Tobakksfakta 12.02.03) the use of snuff among women giving birth from 1999 to 2000 was studied. Seven hundred and eighty nine snuff users and 11.242 smokers were identified. Among the smokers, the weight of their child was, on average, 260 grammes less than

among women not using tobacco. Among snuff users, the child's weight was, on average, 40 grammes less than among non-tobacco users. The women using snuff during their pregnancy doubled the risk of giving early birth. Among snuff users, there was a higher risk of pre-eclampsia, while the risk for pre-eclampsia was reduced among the cigarette smokers.

It should be noted that nicotine readily crosses the placental barrier, leading to substantial blood nicotine levels in the foetus, including during development of a central nervous system. The consequences for breast-feeding might be similar to those of smoking, i.e. impaired breast-milk production and a shorter lactation period; the vasoconstrictive effects of nicotine might cause inadequate breast-feeding. Nicotine is also concentrated in the breast milk that is ingested by the infant. Recent data also indicates that exposure to nicotine may be related to Sudden Infant Death Syndrome (SIDS) through adverse effects on breathing regulation during sleep. It is well documented that prenatal maternal smoking increases the risk for SIDS (Anderson and Cook, 1997). In India, higher stillbirth rates, lower birth weights, changes in sex ratio and changes in placental morphology have been found among tobacco-chewing women (Bolinder, 1997).

2.5 Conclusions

The WHO's Scientific Advisory Committee on Tobacco Products Regulation has concluded that current evidence does not indicate that use of any smokeless tobacco is free of health risks and there is no evidence to recommend that any smokeless tobacco product should be used as part of a harm reduction strategy.

Health effects reported in relation to use of snuff have been studied mainly among men starting to use snuff at a considerably higher age than is the case today. Health effects among today's snuff users may thus be considerably more extensive than expected from the earlier studies.

The burden of disease due to snuff could also be higher if it is considered that snuff is a gateway to smoking or as preventing people from quitting smoking who would otherwise have stopped.

Use of snuff may result in similar or higher nicotine dependence than smoking and users of both snuff and smoking products find tobacco cessation even more difficult than those who only use snuff or only smoke. Consequently, snuff is not a good nicotine replacement product for smoking cessation.

Nicotine is absorbed more slowly from snuff than from smoking tobacco, but the peak levels are similar and the levels stay high for a much longer time than after smoking. It is well documented that the major manufacturers of snuff can and do manipulate the nicotine dosing characteristics of the products.

Use of snuff results in a number of different lesions in the oral cavity. The lesions range from slight superficial wrinkling and normal or pale white or gray mucosal surfaces, to heavy thickening and furrowed, whitish or greyish colouring and pre-cancerous lesions of the oral epithelium. Gingival recession and discoloration of teeth are also usual findings.

More than 2,500 chemical substances are identified in snuff and 28 of these have been characterised as carcinogenic. Among these, the N-nitrosamines are considered major contributors to the carcinogenic activity of snuff.

An increased frequency of cancer in the oral cavity has been found among snuff users. Evidence regarding snuff use and cancer at other sites than in the oral cavity is limited.

Nicotine increases blood pressure and an increased risk of high blood pressure has been reported in one study among snuff users in age groups of 46 years and older.

Swedish studies report increased risk of cardiovascular disease among snuff users. However, more studies are necessary before any firm conclusion concerning enhanced risk of cardiovascular disease can be made.

A study indicates that snuff use increases the risk of type 2 diabetes in a similar way to risks of type 2 diabetes found in relation to smoking.

Use of snuff has been found to double the risk of musculoskeletal injuries in relation to physical activities.

It has been reported that snuff use enhances the risk of pre-eclampsia. Moreover, nicotine crosses readily the placental barrier, leading to substantial nicotine levels in the foetus. Nicotine also concentrates in the breast milk that is ingested by the infant. Recent data also indicate that exposure to nicotine may be related to SIDS.

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3 Lung Cancer Trends in Selected European Countries: What we can learn from the Swedish Experience with oral tobacco (snuff)

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3.1 Introduction

Epidemiological data seem to indicate that Sweden is the only developed European country where male populations were partially spared from an epidemic of tobacco-related diseases in the 20th century. According to Richard Peto et al. (1992, 1994), the percentage of deaths attributed to smoking in Sweden among middle-aged men (35-69) ranks among the lowest ever observed in Europe, with a historical peak at 18% (1985), compared to 48% in the United Kingdom (1965) or 45% in Hungary (1995).

While a number of underlying factors must have been at play here, the 19th century custom of using oral tobacco which had survived in a significant proportion of Swedish men must have undoubtedly played a role. This custom sets Swedish tobacco users apart from their counterparts from other countries in Europe where the prevailing majority of men (99% in Poland) consumed tobacco in the form of cigarettes (inhalation of tobacco smoke).

The last decade has seen a revival of the debate on whether making Swedish oral tobacco (which the Swedes call “snus”) available on the EU market could lead to a reduction in the burden of tobacco-related diseases in Europe as a whole.

The present paper traces the natural history of tobacco-related mortality in several chosen European countries with a special focus on Sweden and uses these data to address the above question.

From an epidemiological viewpoint, lung cancer represents an attractive model on which to study the long-term effects of exposure to tobacco smoke (active smoking) in populations where this exposure has had a sufficiently long history. In the 20th century, lung cancer dominated the pattern of cancer burden in many countries, first in men and later in women. Epidemiological observations show unequivocally that lung cancer is seen almost exclusively in the smoking population and it is therefore a good indicator of health damage due to smoking (Peto et al. 2000). Lung cancer is very rare among non-smokers, as confirmed by clinical data from the beginning of the 20th century and two large prospective studies: one embracing British doctors and another million-strong cohort study by the American Cancer Society.

Length of exposure to cigarette smoking (i.e., number of years smoked) is regarded as the most significant risk fac-

tor for lung cancer. The risk also increases with the intensity of exposure (number of cigarettes smoked per day). The cumulative risk for 75-year-old smokers of long exposure in Great Britain at the end of the 20th century was nearly 25% in men and 18.5% in women (Peto et al. 2000).

As with other cancers, lung cancer is characterized by a long time lag or latency period. Population-based epidemiological observations suggest that exposure (smoking) being stopped leads to a sequential decrease in the risk of morbidity (Peto et al. 2000, Peto et al. 1992, 1994). Epidemiological observations also show that a reduction in exposure (prevalence of smoking) on a population scale leads to different reductions in morbidity (mortality) in groups of different length of exposure (age). (Peto et al. 1994). The positive changes or the decline in risk are seen much sooner in younger age groups (with less irreversible DNA damage) than in those with many years of exposure to tobacco smoke (years of smoking). (Hecht 1999) This may be an interesting find in terms of estimating the population effects of tobacco control in countries where the smoking epidemic has been developing for a sufficiently long time. A decrease in the overall incidence of lung cancer in a population follows relatively quickly among young adults (20–44 years old) where it can be seen after just a few years. In middle-aged adults (45–64 years old) a reduction in morbidity (mortality) as a result of reduced smoking rates in the population can be seen within next 10 years, while ten subsequent years must pass for the change to take effect in the over-65 population.

Despite some limitations, lung cancer appears to provide an attractive model for tracing the development of the epidemic of diseases, due to the exposure of the European population to tobacco smoking.

3.2 Method and material

Lung cancer mortality data of sufficient quality to allow analysis for all European countries has been available since the late 1950s. Data regarding tobacco consumption in selected countries in Europe has been from national statistical authorities and other sources.

Time trends in lung cancer mortality rates in Sweden and selected other countries

Lung cancer was the dominant cancer type in the 20th century, especially among males. The development of the epidemic in the USA from 1930 onwards may serve as a good example. The epidemiological trends in lung cancer in Europe can be seen in data on mortality from the late 1950s until present time.

Males

Sweden

Lung cancer mortality rates for the period 1959–1996 in men within three age groups (young adults: 20–44 years old, middle-aged adults: 45–65 years old, and males over 65 years of age) indicate that, of all European countries, Sweden had the lowest mortality rates in all three age groups throughout this period. Among young and middle-aged Swedish adults, mortality rates from 1989 to 2000, remained consistently low without any significant changes, while in the over-65 population mortality was rising until about 1980 (this parallels trends in Spanish men) and started to decrease slowly after 1980 [Fig.1].

United Kingdom and Finland

In the early 1960s, these two countries had the highest lung cancer mortality rates in Europe, nearly 4 times higher than in Swedish men in all age groups. Later on, both countries saw steady and rapid decreases in mortality (morbidity) first among young and middle-aged adults and then since the early 1980s also in the over-65 population [Fig.1].

At the end of the 20th century, the mortality rates among young British and Finnish adults became similar to the corresponding rates for Sweden and the figures for middle-aged adults have also been moving towards the Swedish figure (and will probably reach that goal in this decade by 2010) [Fig.6]. As regards the over-65 population, both countries are expected to attain current Swedish levels by 2020, which would mean halving the current British and Finnish levels [Fig.6].

Poland, Hungary, Spain

These countries had the lowest lung cancer mortality rates in Europe at the beginning of the 1960s. These rates, however, rose rapidly in young and middle-aged Hungarian men in the mid-1990s, to reach a level never before observed in Europe [Fig.3].

In Poland, mortality rates began to decrease among young adults from the early 1980s and among middle-aged adults from the beginning of the 1990s. Among males over 65 years old, lung cancer mortality rates were constantly on the rise until the end of the 20th century, both in Poland and in Hungary [Fig.3].

A similar increase in mortality rates has been observed in Spanish men, though the rise has been offset by a lower rate of increase among young adults in the last decade [Fig.3].

Females

The development of the lung cancer epidemic in women, in almost all European countries, has been a similar, but delayed version of the trends identified for the male population. However, in contrast to the male population, this is still phase of increasing risk; the incidence of lung cancer among women in last decade has been rising dramatically, (Fig.2,4) and this is also true in Sweden.

Sweden, Poland

Lung cancer mortality rates have been rising across all age groups (in young adults until 1990). The epidemiological time trends generally parallel those registered in other European countries. The rate of lung cancer mortality among Swedish women, unlike that among males, is identical to that in Poland [Fig. 2, 4].

Hungary

The threat of lung cancer in the young adult group (20–44 years old) has reached a level never observed in Europe (nor in the rest of the world). At the end of the 1990s, it was higher than in men (young adults) of most European countries. Mortality has been rising constantly and rapidly in the two remaining age groups; among middle-aged women it reached the highest rates ever observed in Europe in the late 1990's [Fig. 4].

United Kingdom

In the United Kingdom, as well as in some other countries, such as Denmark and the Netherlands, the lung cancer epidemic among women has reached the greatest magnitude in Europe. The United Kingdom ranks among the few European countries where the epidemic among women has already reached its peak levels, and now, a definite decreasing trend can be observed (not only in young adults, but also in middle-aged women) [Fig. 2].

Finland

The rate of lung cancer mortality has been rising among Finnish women, with the exception of young adult women. However, these rates remain at a much lower level than in most other European countries, such as in the United Kingdom and Denmark [Fig.2].

Spain

Spanish mortality rates due to lung cancer are among the lowest in Europe, with the exception of young adults, where an increase has been registered over the last decade. These have not changed for the last 40 years [Fig.4].

The history of tobacco consumption in Sweden and other selected countries in Europe

Information regarding tobacco consumption in Europe is fragmentary. The body of research and analytical data on the inhalation of tobacco smoke (smoking) in the European population is incomplete, even though tobacco smoking was the biggest killer in the 20th century. What data is available describes different periods and is not standardized, having been collected according to a variety of definitions of tobacco smoking, using various methods, and among diverse age groups and a variety of specific country populations. Available data and its reliability therefore often leaves much to be desired[1]. Thus, any comparison has to be carried out with extreme caution.

1.Figures of tobacco consumption in Hungary are fragmentary and the procedure for data collection means that they do not lend themselves to be used in comparative analyses.

Males

Sweden

The custom of male use of oral tobacco in this country has survived in the population throughout the second half of the 20th century. Sweden is practically the only European country (with Norway providing a much less spectacular second example) where cigarette smoking has not become the foremost form of tobacco consumption.

Smoking levels in Sweden grew steadily before peaking in the 1970s. This was accompanied by the dwindling popularity of oral tobacco. In the 1970s, however, both trends were reversed: the consumption of smoking tobacco began to decrease (falling by half by the end of the century) and the consumption of oral tobacco started to grow, its consumption doubling by the end of the 20th century [Fig. 5].

The prevalence of smoking among adults (defined as the population of people aged 15 or over) reached the highest levels – about 50% – in the second half of the 1960s and has continued to decrease since then, falling below 20% at the turn of the 21st century [Fig. 5].

Finland

Before World War II, smoking levels in Finland ranked among the highest in the world and studies in consecutive birth cohorts show that tobacco consumption was almost exclusively limited to males. During the war, shortages in tobacco supply resulted in dramatic fall in its consumption. However, shortly after the war, smoking levels became very high again. From approximately the beginning of the 1970s, smoking prevalence in men decreased systematically until the last decade when smoking rates among Finnish men leveled out, accounting for less than 30% .

Poland

Tobacco smoking accounts for nearly 100% of tobacco consumption in Poland. While the prevalence of smoking remained relatively low throughout the period between the two world wars, it began to rise rapidly after World War II. Peak smoking rates were observed in the 1970s, when a little over 60% of adult men, aged 16 years or older, smoked. The popularity of smoking has decreased steadily since the early 1980s. At the beginning of the 21st century, the level is 40% of adult men.

United Kingdom

The smoking habit spread rapidly through the United Kingdom during the two world wars, with 80% of the adult male population smoking at the end of the 1940s. The popularity of smoking has decreased steadily since then, with about 30% of adult men smoking at the turn of the 21st century.

Spain

Tobacco consumption reached a peak around 1980, when nearly 60% of adult men smoked; since then, smoking prevalence has been falling.

Females

Sweden

The rate of tobacco consumption by women in Sweden, as in the rest of Europe, is mainly limited to cigarette smoking. The prevalence of smoking among adult Swedish women rose until the end of the 1970s to approximately 30%. Since then, it has decreased steadily, down to a little less than 20% at the turn of the 21st century [Fig.5].

Finland

Despite high smoking prevalence in men before World War II, smoking among women born before 1940 was very rare in Finland. Studies in consecutive birth cohorts show that tobacco consumption among Finnish women referred only to a few percent of the population. After the war, smoking prevalence increased mostly among young women, though it never exceeded 20%. Because of exchange in birth cohorts in the recent decades, smoking prevalence among women has remained at about 20%.

United Kingdom

From the late 1940s onwards, the prevalence of smoking among adult British women (young: aged 25–34 and middle-aged: 35–59 years old) was about 50%. Smoking rates started to decrease in the late 1970s and at the beginning of the 21st century, there were less than 30%.

Poland

Before World War II, female smokers in Poland were mostly well-educated city women and accounted for approximately 12% of all Polish women. The figures rose after the war, mostly among younger women, to reach 20% in 1974 and then 30% of the adult female population in the early 1980s. There is a strong relationship between the age of a female smoker (her birth cohort) and the prevalence of smoking among her female peers. At the beginning of the 1980s decade, smoking figures were 50% for young adult women, 30% for middle-aged women and only a few percent of those aged 60 years or older. In the 1980s, the growing trend halted, with a significant reduction in smoking prevalence among young women (a little more than 20% in the late 1990s). At the beginning of the 21st century, the highest prevalence of smoking is among middle-aged women (more than 30%).

Spain

Tobacco smoking among Spanish women is a new trend. Smoking prevalence in women began to increase only in the 1960s and since then, the levels have been growing rapidly and consistently. It is estimated that at the beginning of the 21st century, a little more than 25% of women in Spain smoke, and the age (birth cohort) determines smoking prevalence very clearly. Among the youngest, born in the 1960s and 1970s, every second woman smokes, while among those born before 1940, smoking prevalence is negligible and accounts for less than 2% of the population.

In summary:

- The survival in Sweden of the 19th century custom of using oral tobacco by the country's male population may be one of the reasons why Swedish smoking prevalence in the second half of the 20th century was much lower than in many European countries. The relatively low prevalence of smoking is the cause of a low incidence of lung cancer in Sweden (which is a good epidemiological marker of diseases, due to the inhalation of tobacco smoke).
- Whereas during the 1950s, nearly all adult males (80%) smoked in numerous countries in Europe, at the end of the 20th century the prevalence of smoking came closer to Swedish figures. Additionally, the rate of decrease in smoking prevalence was actually higher in Finland and the United Kingdom than in Sweden [Fig.5]. Similarly, the incidence (mortality) from lung cancer in men in the United Kingdom and Finland on the one hand and Sweden on the other, is becoming ever more comparable, with the figures falling at a much faster rate in the first two countries than in Sweden [Fig.1]. The rate of decline in smoking (without 'snus') among women in Sweden is similar to the decline in smoking prevalence among Swedish men [Fig.5].
- The rate of decrease of morbidity (mortality) due to lung cancer in men, especially within the last few decades and in numerous European countries (particularly in the United Kingdom and Finland) has been much higher than in Sweden [Fig.1]. In the coming two decades, the extent of the risk of lung cancer for these populations is expected to be similar to the risk of lung cancer in Sweden [Fig.6].
- The availability of, and advertising for, oral tobacco in Sweden does not appear to affect smoking by women or the ensuing health consequences. The prevalence of smoking among women in Sweden is higher than in neighboring Finland and is similar to Polish figures (Fig.5). Similarly, lung cancer rates in middle-aged women and women over 65 years have been on a steady increase in Sweden. These are significantly higher than in Finland, for example [Fig.2]. The similar exposure of Polish and Swedish women to tobacco is reflected by identical time trends of increasing lung cancer mortality rates among women in both countries.
- The prevalence of smoking among Swedish men has decreased within the last decade. This decrease has been accompanied by a greater popularity of oral tobacco, but the overall number of people addicted to nicotine has remained the same. The prevalence of smoking among Swedish men is twice as low as the corresponding figure for Poland. However, the total percentage of nicotine addicts among men, including consumers of oral tobacco, is the same in Sweden and Poland.

3.3 Conclusion

It is likely that the surviving 19th century custom of oral tobacco use by Swedish men is one of the factors responsible for the lower rates of lung cancer and other tobacco-related diseases in the 20th century among Swedish men, compared to male populations in other European countries. However, the entire phenomenon cannot be fully explained only by oral tobacco use. We must also consider the Swedish tobacco control model, which is regarded as exemplary in the world (Fagerström et al 2001).

On the other hand, projections regarding lung cancer rates [Fig.6] indicate that the incidence of this disease in Finland or the United Kingdom will have dropped to Swedish level by the end of the decade. Thus, its shows that in the second half of the 20th century efforts towards reducing the health consequences of tobacco smoking in these countries without using oral tobacco was as effective as in Sweden (with oral tobacco).

We cannot also ignore the fact that irrespective of the extent of damage caused, any oral tobacco, including that produced in Sweden, contains carcinogenic, mutagenic, or teratogenic substances[2].

In terms of public health, oral tobacco can also be a gateway, particularly for children and youth, to using tobacco in the form of cigarettes, a relationship confirmed by numerous observations in many countries. Thus it would appear that Sweden is going to face an oral tobacco problem in the 21st century (especially if the chewing of tobacco will continue to increase in popularity among Swedish children and youth as it has done in the past 20 years).

Seen in this way and from the viewpoint of the health of Europeans, arguments for allowing Swedish oral tobacco into the European market in the 21st century are simply unreasonable.

However, there is a lesson that we may or should have learned from the natural experiment in harm reduction in Sweden with oral tobacco. The Swedish experience seems to indicate, that population-based harm reduction can be an effective way to both: a reduction of the health consequences of smoking and the eradication of inhalation of tobacco smoke from human habit.

However, such interventions in the 21st century should be based on pure nicotine.

Harm reduction is a well-established concept that has been put to effective use in the management of other forms of dependence in medicine. In the field of smoking cessation, nicotine replacement therapy (the substitution of pure nicotine, manufactured under special conditions as a pharmaceutical product, for tobacco as the source of nicotine) is increasingly being applied to treatment for periods of months, years or even terminally, in the case of smokers with a severe nicotine dependency syndrome. The need for this kind of intervention is well illustrated by the example of Poland, where more than a half million people are highly addicted to nicotine and have made ten or more unsuccessful attempts to quit during the last five years.

2.Recent Studies in India indicate that children born to mothers chewing tobacco during the pregnancy have lower birth weight (Prakash Gupta – private communication).

Such interventions have for some time been the topic of discussions among scientists (Henningfield 2001; Editorial/Lancet 1991). Papers based on the last 50 years' experience conclude that the recreational use of nicotine will not cease within the foreseeable future (Gray, Boyle 2003). Epidemiological estimations show significant health benefits from replacing cigarettes with nicotine inhalers (a fast acting, clean nicotine delivery system) (Sumner 2003).

It seems that the issue of population-based harm reduction should urgently become a topic for discussion among tobacco control leaders and policy makers.

Figure 1

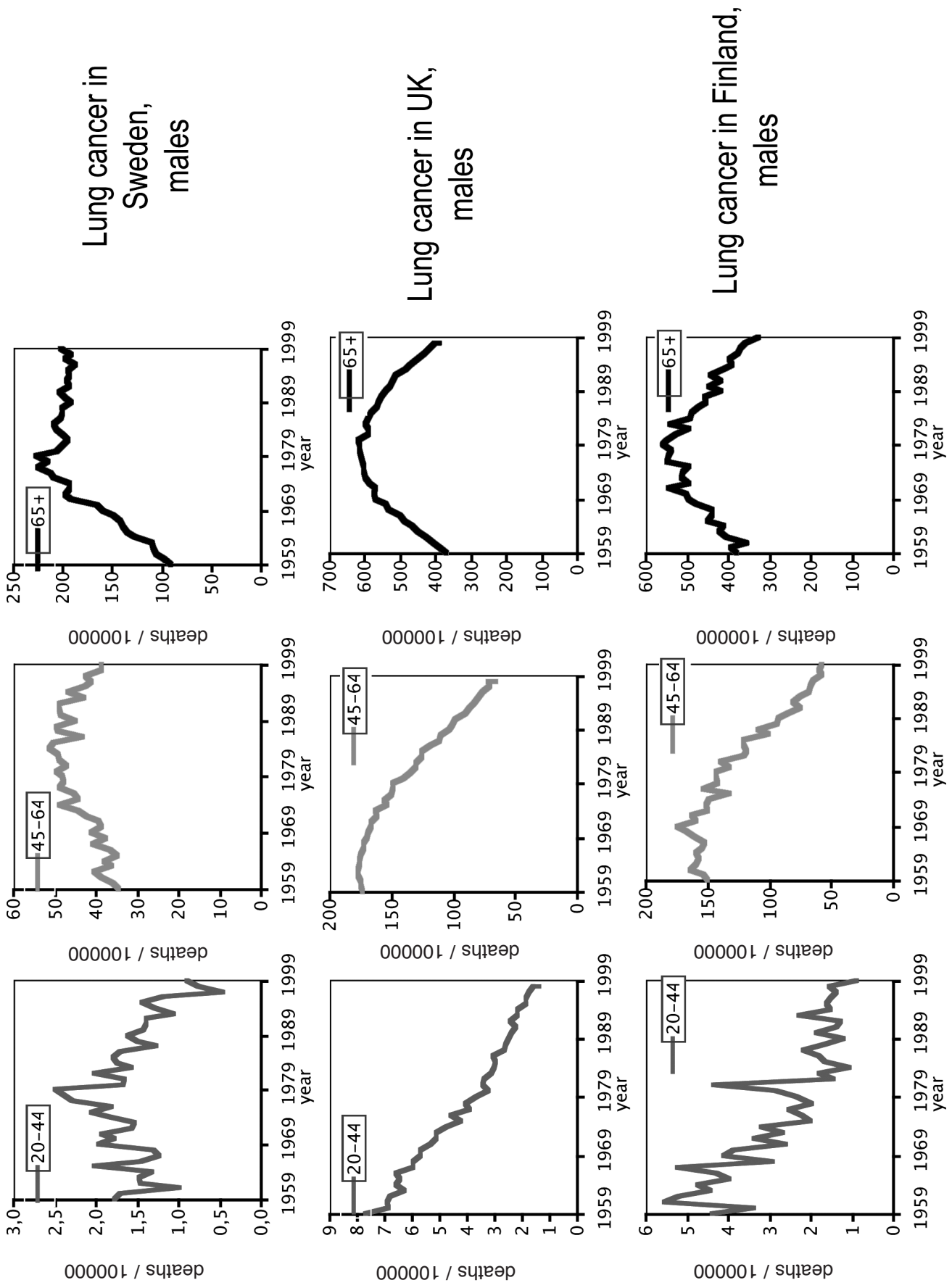

Lung cancer in Sweden, males
Lung cancer in UK, males
Lung cancer in Finland, males
65+
45–64
20–44
deaths / 100000
year
1959 1969 1979 1989 1999

Figure 2

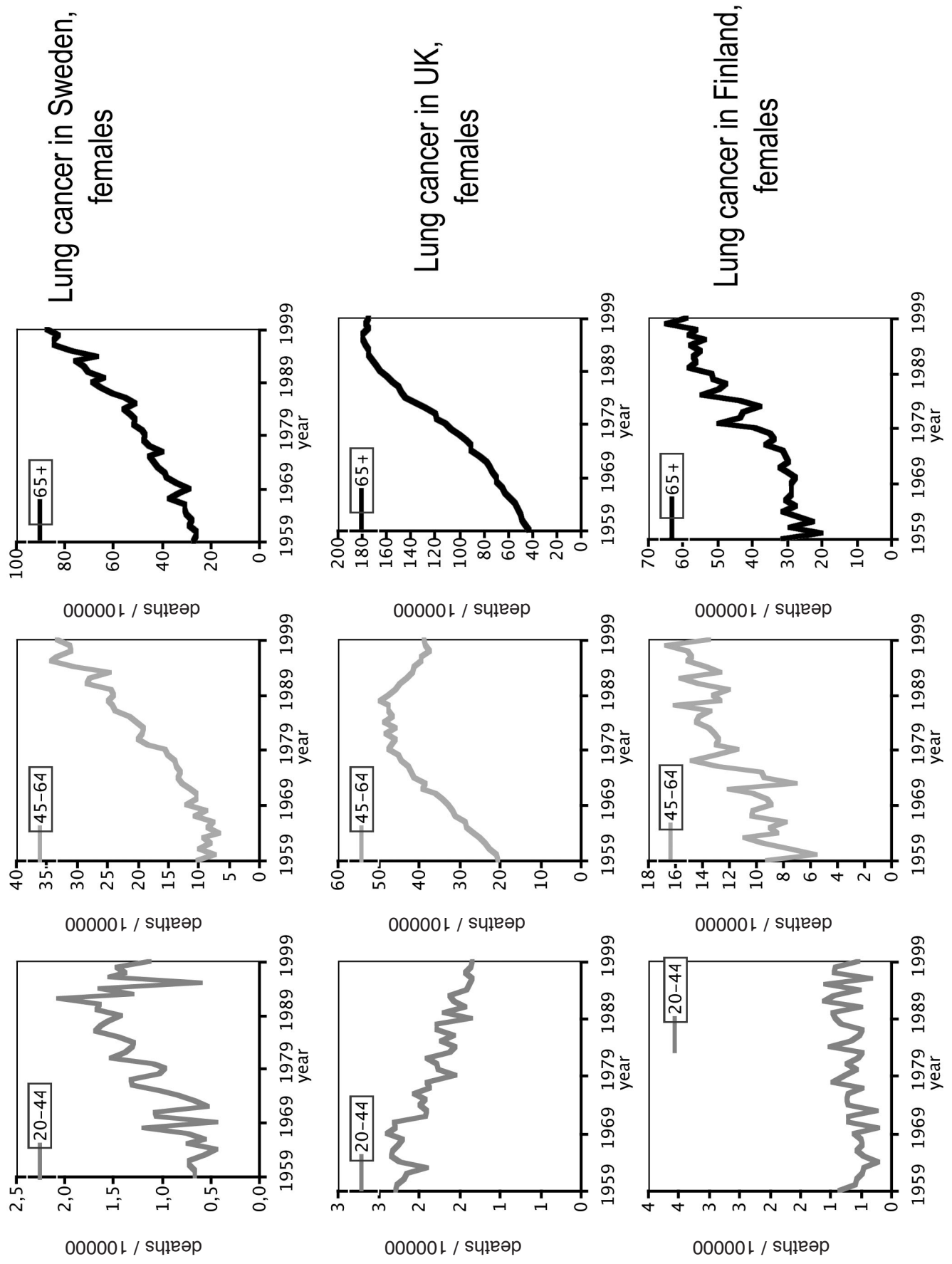

Lung cancer in Sweden, females
Lung cancer in UK, females
Lung cancer in Finland, females
65+
45–64
20–44
deaths / 100000
year
1959 1969 1979 1989 1999

Figure 3

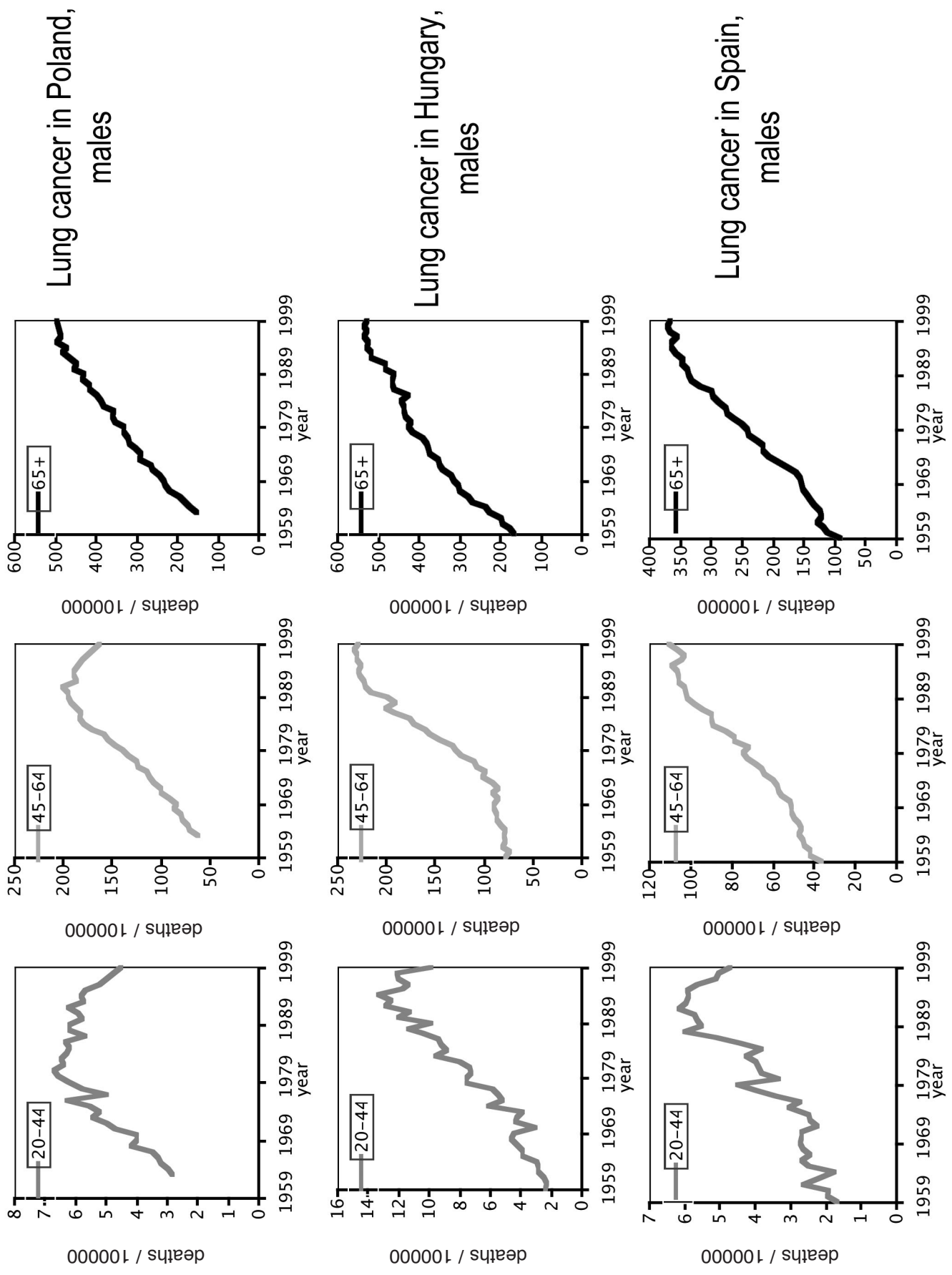

Lung cancer in Poland, males
Lung cancer in Hungary, males
Lung cancer in Spain, males
65+
45–64
20–44
deaths / 100000
year
1959 1969 1979 1989 1999

Figure 4

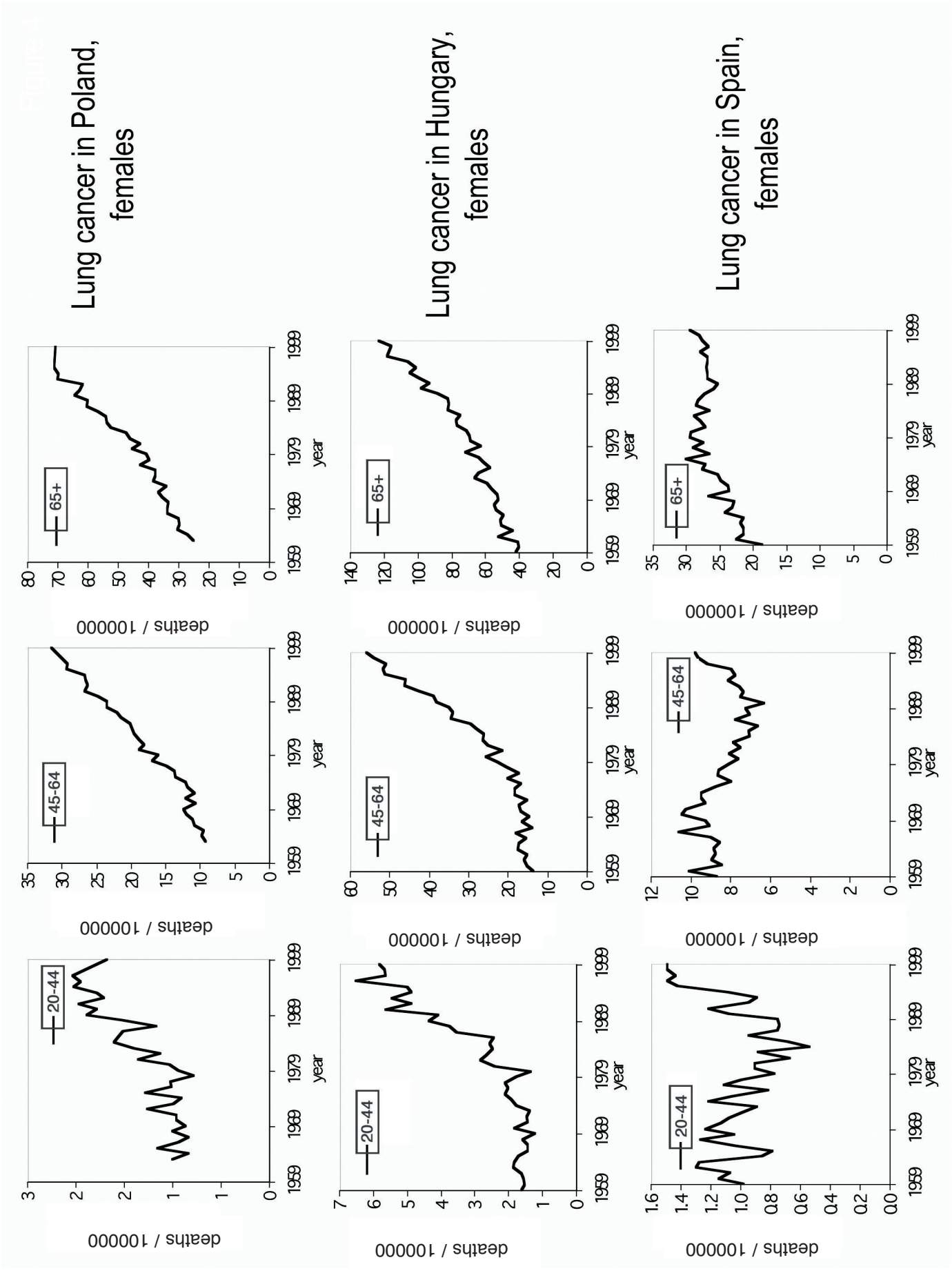
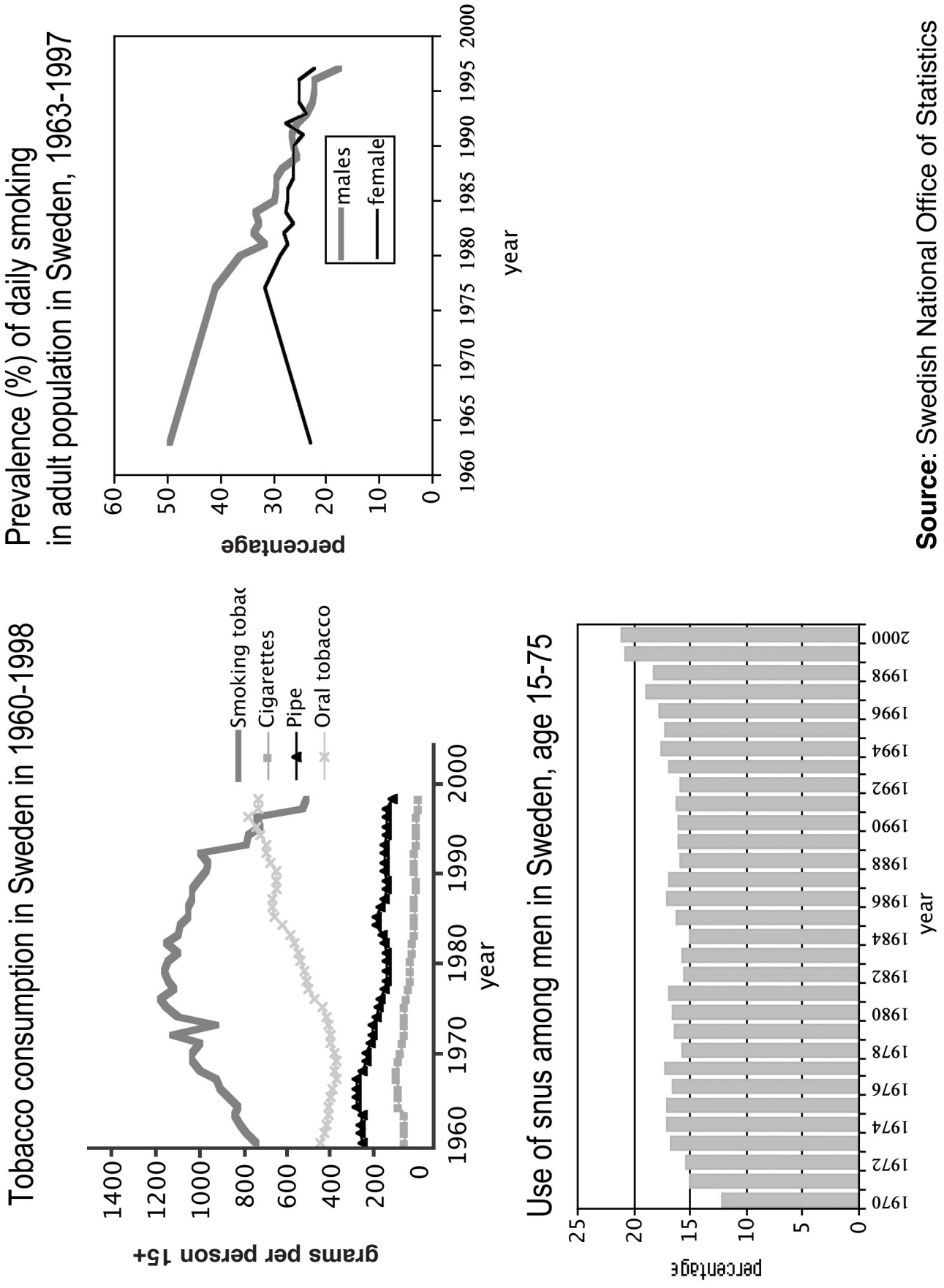
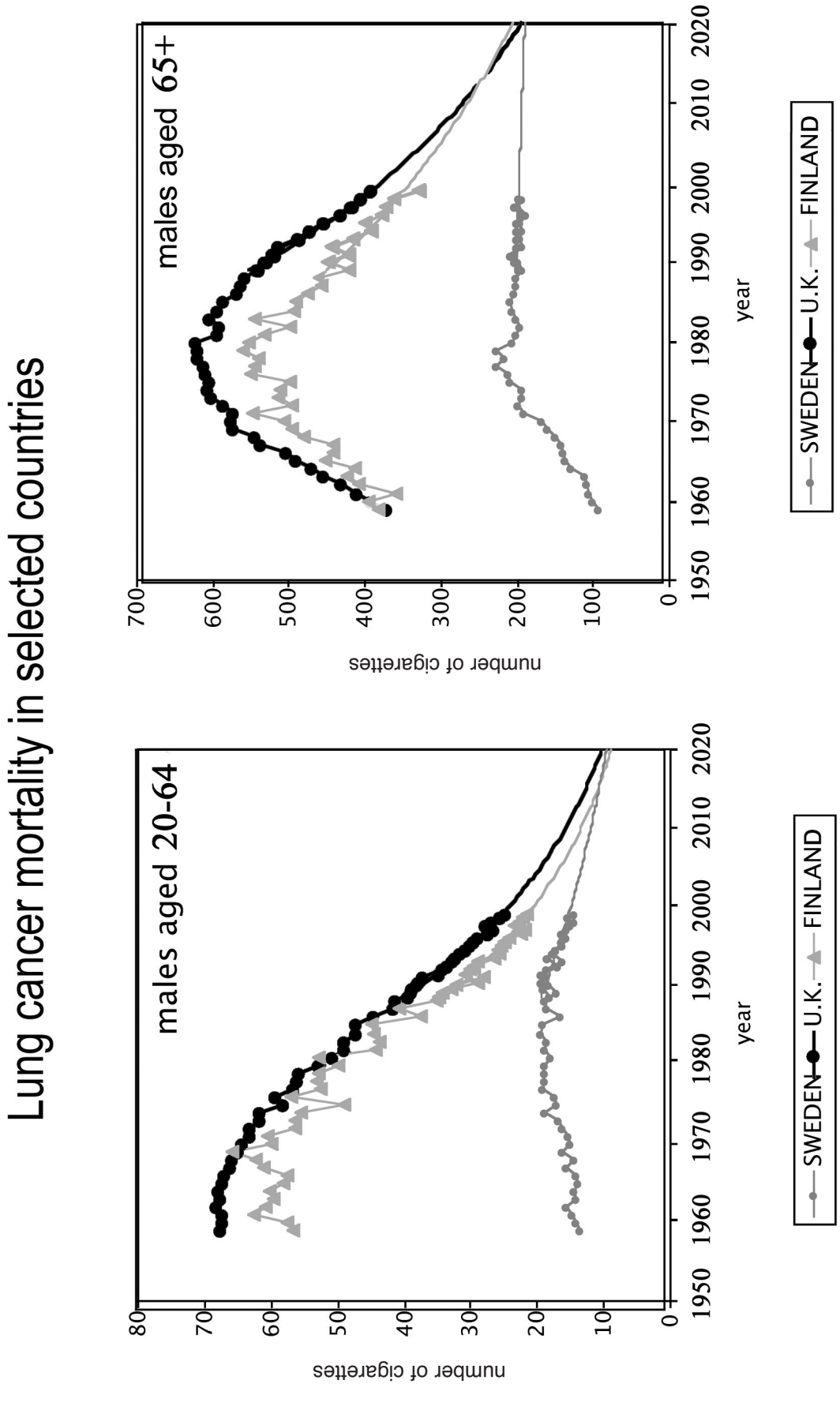

Lung cancer in Poland, females
Lung cancer in Hungary, females
Lung cancer in Spain, females
65+
45-64
20-44
deaths / 100000
year

Figure 5



Source: Swedish National Office of Statistics

Figure 6


Lung cancer mortality in selected countries
males aged 65+
number of cigarettes
0
100
200
300
400
500
600
700
1950
1960
1970
1980
1990
2000
2010
2020
year
SWEDEN
U.K.
FINLAND
males aged 20-64
number of cigarettes
0
10
20
30
40
50
60
70
80
1950
1960
1970
1980
1990
2000
2010
2020
year
SWEDEN
U.K.
FINLAND

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4 The consumer perspective

4.1 Oral tobacco consumption trends

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For the purpose of this study, we have analyzed data for European countries compiled in the “International Smoking Statistics” publication (Forey, Hamling, Lee & Wald, 2002). Although data on tobacco product consumption and the prevalence of smoking from 24 European countries (and 6 other developed countries) are compiled in that publication, there is sufficient information on oral tobacco consumption for the study of only 10 European countries (Austria, Denmark, Finland, France, Iceland, Ireland, Italy, Norway, Sweden, and United Kingdom). For a number of countries there is a category for "other tobacco products", but this may include hand-rolled, pipe or other special "national" forms of tobacco. Hence unfortunately it is not possible to derive a valid estimation of "oral tobacco" sales for countries other than those afore mentioned.

The information regarding the annual sales of chewing tobacco and snuff tobacco (in tonnes) as well as the total amount of annual sales for all tobacco products is available for all the 10 countries, except for Finland (data only for snuff) and Iceland (data on snuff only until 1970; then incorporated with chewing tobacco figures from 1975 onwards). To analyze the trend in oral tobacco consumption, we present total and oral tobacco annual sales (in tonnes) (Table 1) and the percentage of oral tobacco products (chewing tobacco plus snuff) over the total tobacco products sales (Table 2).

The data show a differential pattern of consumption of oral tobacco (mainly snuff) between some Nordic countries and the rest of countries considered (see Table 2). The percentage of oral tobacco has steadily decreased during the 20th century in Austria, France, Ireland, Italy, and the UK from initial low percentages around 3% before the WW II to very low levels (<0.5%) in the last decades. The peculiar pattern in the Nordic countries deserves more attention: although Finland presented a low consumption of snuff (i.e. 3.2% in 1925) similarly to other European countries also experiencing a similar decrease, a considerable increase in consumption has been apparent since the 1980s, with a 150% increase between 1985 and 1995. Denmark and Iceland presented an important consumption of oral tobacco as compared to other tobacco products in the first decades of the past century (see table) but the percentage of oral tobacco consumed has steadily decreased. In Denmark, less than 0.5% of tobacco products consumed have taken the form of oral tobacco, while in Iceland this percentage leveled-off around 2.5% since 1985. In Norway (41.6% of oral tobacco over total tobacco sales in 1930) and Sweden (64.3% of oral tobacco sales over total tobacco sales in 1930) a decreasing pattern is observed until the 1970s, when oral tobacco represented 4.7% and 24.1% of total tobacco sales in Norway and Sweden, respectively. In Norway, a level-off and recent small increase of that percentage is observed till 1995, while in Sweden a clear pattern of increasing in oral tobacco sales over total tobacco products sales is observed (45.5% in 1995).

These trends reflect the preference of tobacco users to smoked types of tobacco in most countries, as promoted with the massive availability and introduction of manufactured cigarettes during (and after) World War II (WW II), even in the Nordic countries, with the exception of Sweden, because it was not directly involved in WW II. It is important to know that the sale of moist snuff was banned by the European Union (EU) in 1992 (the prohibition is not yet implemented by law in all countries and in any case does not apply to Sweden, where snuff use has been considered a "traditional" consumption) (Bolinder, 1997). The baseline consumption in the other Nordic countries, even after EU regulation (or similar legislation when not applicable) is mostly explained by tax-free sales on the ferries operating between the Nordic countries (Vainio and Weiderpass, 2003). Thus, these trends are also indicative that a lifting of the ban in the European countries (followed by increasing marketing pressure from the tobacco industry) might increase the use in the Nordic countries and in other currently "oral tobacco-free" countries.

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Table 1. Total annual sales (in tonnes) of tobacco products by selected country, selected years, 1925-1995.

Country		1925	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995
Austria	Chewing	320	360	270	320	50	140	90	50	50	0	9	2	1	8*	10*
	Snuff	140	140	90	90	0	50	0	0	0	0	5	7	7		
	Total	10700	10840	9030	13290	3720	7850	8800	10800	12070	14060	14631	16055	16160	14851	13667
Denmark	Chewing	1130	950	730	590	360	410	320	270	180	140	93	61	43	26	14
	Snuff	270	360	450	500	540	500	450	450	360	270	223	159	107	70	37
	Total	6710	7300	8210	8620	5260	11340	10800	12430	13430	13740	12390	11691	11738	10666	9834
Finland	Chewing	500**	500**	360**	450**	180**	820**	410**	500**	820**	1000**	812**	905**	851**	619**	929**
	Snuff	90	90	50	50	0	50	50	0	50	50	27	23	27	87	91
	Total	2770	3360	3220	3630	1360	4540	5170	5530	6940	7570	6416	5683	5449	5532	4525
France	Chewing			860	540	450	590	540	590	500	500	685*	516*	404*	397*	381*
	Snuff			2180	1410	860	770	590	410	320	180					
	Total			53840	54970	31970	60110	65470	74510	85270	100600	117470	119551	126778	122857	115297
Iceland	Chewing															
	Snuff			32	18	32	36	36	32	32	27	17*	15*	13*	12*	12*
	Total			100	110	170	220	220	270	370	440	465	474	512	472	421
Ireland	Chewing															
	Snuff	140	140	90	90	90	50	50	50	0	0					
	Total	3860	4080	4260	4670	4810	6580	6530	5900	5990	5850	6580	6640	5712	5202	5637
Italy	Chewing															
	Snuff								450	320	180	130	90			
	Total								55480	66070	73690	91630	100800	106896	92338	91134
Norway	Chewing		910	640	540	180	320	230	180	140	90	63	57	40	24	17
	Snuff		450	410	540	270	540	540	450	410	320	263	263	292	286	314
	Total		3270	3180	4040	1910	4850	5030	5440	5990	6530	6909	7275	7503	7615	6958
Sweden	Chewing	230	140	90	90	50	50	50	50	0	0	14	18	20	14	12
	Snuff	5310	4850	4490	3900	3490	3130	2860	2680	2490	2490	2943	3665	4560	4632	5407
	Total	7890	7760	7890	8350	8890	9980	10520	11880	12970	13060	12246	12759	13404	12886	11913
UK	Chewing															
	Snuff		410	450	450	500	320	320	270	230	180	180	90	100	0	0
	Total	63870	72940	78970	92120	113130	100470	111810	124560	115570	112220	111420	109870	91800	87469	69234

* Chewing and snuff tobacco tonnes

** Chewing and smoking tobacco tonnes

Table 2.

Proportion (%) of annual sales (tonnes) of oral tobacco products (chewing and snuff) over all tobacco products sales (tonnes) by country, selected years, 1925 - 1995

								Year						
	1925	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990
Country														
Austria	4,3	4,6	4,0	3,1	1,3	2,4	1,0	0,5	0,4	0,0	0,1	0,1	0,0	0,1
Denmark	20,9	17,9	14,4	12,6	17,1	8,0	7,1	5,8	4,0	3,0	2,6	1,9	1,3	0,9
Finland	3,2	2,7	1,6	1,4	0,0	1,1	1,0	0,0	0,7	0,7	0,4	0,4	0,5	1,6
France			5,6	3,5	4,1	2,3	1,7	1,3	1,0	0,7	0,6	0,4	0,3	0,3
Iceland			32,0	16,4	18,8	16,4	16,4	11,9	8,6	6,1	3,7	3,2	2,5	2,5
Ireland	3,6	3,4	2,1	1,9	1,9	0,8	0,8	0,8	0,0	0,0	0,0	0,0	0,0	0,0
Italy								0,8	0,5	0,2	0,1	0,1	0,0	0,0
Norway		41,6	33,0	26,7	23,6	17,7	15,3	11,6	9,2	6,3	4,7	4,4	4,4	4,1
Sweden	70,2	64,3	58,0	47,8	39,8	31,9	27,7	23,0	19,2	19,1	24,1	28,9	34,2	36,1
UK	0,0	0,6	0,6	0,5	0,4	0,3	0,3	0,2	0,2	0,2	0,2	0,1	0,1	0,0

4.2 Consumer attitudes towards oral tobacco: a case study

Oral Tobacco in Sweden – The "Swedish experience"

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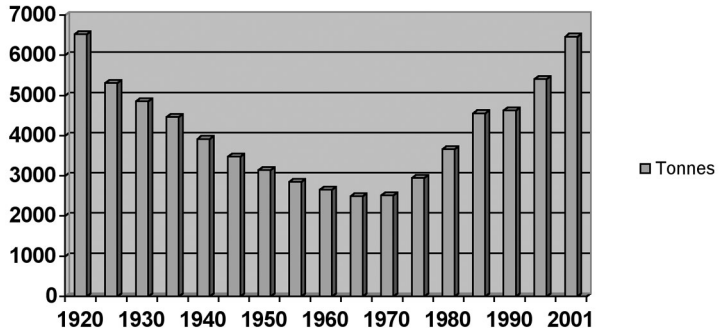
For about the last ten years, oral moist smokeless tobacco has been banned throughout the European Union, except in one Member State – Sweden. Oral tobacco use in this country has deep historical roots and its use has never disappeared entirely, unlike in most other countries. The Swedish product is a form of ground tobacco with a high moisture content, called "snus", and is traditionally used in its "loose" form: the user takes a portion between their fingers and forms it into a "pinch" which is then placed between the cheek and the gum, behind the upper lip. Loose snus still holds about half the snus market, but during the last decades, snus has also been available in small-size sachets or 'teabags'. The use of snus has generally been an exclusively male habit. Even today, snus use among women remains rare, despite indications of an increase over the last few years.

Snus use in Sweden was already widespread in the 19th century. After World War II, consumption decreased rapidly and snus use was considered a "dying" habit, practiced mainly by elderly men in rural areas (fishermen, lumberjacks etc.). In 1968, consumption reached its lowest level, at 2,375 tonnes.[1] [2]

The turn of the tide

The producer – the Swedish Tobacco Company, formerly a governmental tobacco monopoly but today privatised and known as Swedish Match – was not prepared to let this "noble old Swedish tradition" disappear. Around 1970, the company launched a large marketing campaign for snus, including heavy advertising, new package design and new brands. Since then, the consumption of snus has been increasing steadily.



Consumption (sales) of snus (metric tonnes) in Sweden, 1920-2001. Source: Swedish Tobacco Company/Swedish Match.

1.Socialstyrelsen (National Board of Health and Welfare): Tobaksvanor i Sverige (Tobacco Habits in Sweden). So-cialstyrelsen redovisar 1986:9, Stockholm 1986 (Swedish)

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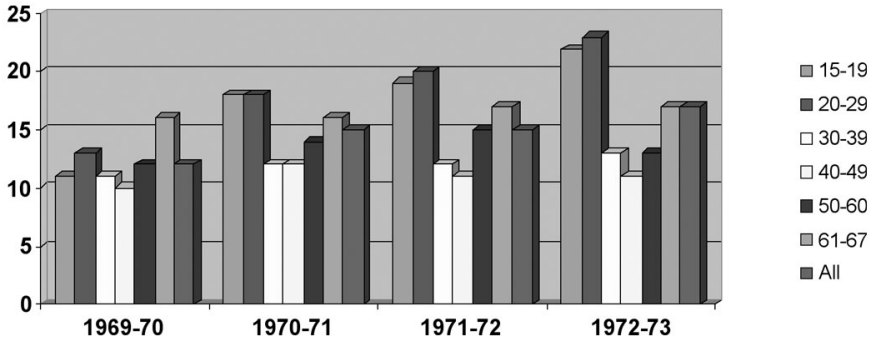
This first major campaign aimed to popularise the product itself and increase the social acceptability of snus use. “Snus use is fine” was the slogan used to bolster the image of the product – from something old, dirty and low-class into something new, fashionable and high-class. The targets were young, urban men, including male athletes and during the 1970s, the use of snus increased rapidly in this group. Attempts were made to promote snus use among women also, but without any noticeable success.



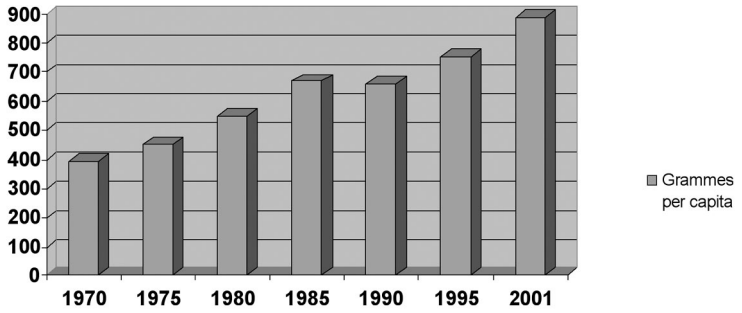
Percentage of snus users (%) among adult males.aged 15 to 67 years, in Sweden, 1969-1972. Source: Swedish Tobacco Company.

The marketing campaign did, however, bring about a rapid increase of snus use among younger males. By contrast, almost no changes occurred among men above the age of 30.[3]

During the 1980s, new marketing strategies were introduced. The main sales arguments focused on price (snus has always been cheaper than cigarettes) or promoted snus as an alternative for smokers, for “when you cannot smoke”. The latter argument came in rather timely, as there was a strong movement in Sweden during this decade to make public places smoke-free. During the last few years of the 1980s, the sales increase slowed down, probably due to an increased awareness of potential health risks. For example, in 1985, the World Health Organization’s International Agency for Research on Cancer (IARC) published a report, which concluded: “there is sufficient evidence that oral use of snuffs of the types commonly used in North America and Western Europe is carcinogenic to humans”.

3.Nordgren P & Ramström L. Moist snuff in Sweden – tradition and evolution. British Journal of Addiction (1990) 85, 1107-1112.

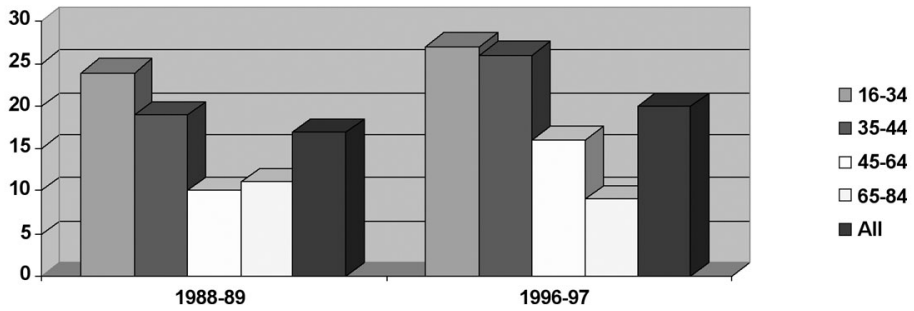
During the 1990s, however, the consumption of snus continued to increase rapidly.



Consumption (sales) of snus (grammes) per capita (consumers aged 15 years or older) in Sweden, 1970-2001. Source: Swedish Council for Information on Alcohol and other Drugs(CAN).

Despite this significant rise in snus sales, the overall prevalence of snus use seems to have remained relatively unchanged over the last few decades. In 1980-81, according to surveys by the Swedish National Bureau of Statistics, 17% of adult males aged 16 –84 years (16-84) used snus on a daily or occasional basis*. In 1988-89, 17 % of these males used snus daily, whereas the corresponding figure for 1996-97 was 20 % (occasional snus use accounting for additional 5%). There has, however, been a significant increase of daily snus use among younger males during the 1990s.

Snus use among women has traditionally been almost non-existent: 0.6% of adult women were daily snus users in 1988-89, compared to 0.9% in 1996-97.[4]



Prevalence (%) of daily snus use among males in different age groups in Sweden, 1988-89 and 1996-97. Source: Statistics Sweden.

* The question asked in 1980-81,"Do you use snus?", was rather unspecific. Most probably, all daily users and some, but not all, occasional users answered in the affirmative.

4.Boström G. Habits of Life and Public Health. In: Persson G et al (editors) Health in Sweden – The National Public Health Report 2001. Scandinavian Journal of Public Health, 2001 (Supplement 58).

The next official survey on snus use will be conducted in 2004. There are, however, data from other sources that indicate a continued increase among females, as well. For example, one study in 2002 found an overall prevalence of daily snus use among adult women (age 16-79) of two percent, with four per cent daily snus users in the age range of 25-44 and zero per cent in the age range of 65-79. *(Lars Ramström,ITS, personal communication).*

Marketing strategies during the 1990s

During the last decade, the marketing strategies for snus have undergone a major shift. During the 1970s and 1980s, snus marketing focused on the product as a cheaper form of tobacco use than cigarette smoking and as a temporary substitute for cigarettes when public places, such as public transport etc. became smoke-free. In the 1990s, however, the promotional arguments for snus have increasingly focused on health aspects, presenting snus as a practically harmless cessation aid for smokers who want to quit. As all forms of tobacco advertising (except point-of-sale) were banned in Sweden in 1994, these arguments had to be channelled through advertising in shops, for example and through unpaid publicity.

During the 1990s, new snus products were launched and new producers entered the market. This has contributed to increased promotional activities at points of sale. The promotion of snus in teabags, in particular, has increased, accounting now for about half the consumption *(Ulf Svensson, Swedish Match, personal communication).* Many snus brands now come in smaller pouches and in new flavours, obviously aiming to make snus use more acceptable among women and young people.

At the beginning of the 1990s, Sweden started negotiations to join the European Union, where snus had been totally banned. The producers then started an intense lobbying effort to exempt Sweden from the EU ban. Snus use was portrayed as a unique Swedish tradition, which now had to be defended against the “Brussels bureaucracy”. Soon, lots of vehicles, especially lorries, carried a streamer saying “EU – but not without my snus pinch”. The issue was positioned as a major determinant for EU membership. The decision to join the EU was put before a referendum and opinion polls indicated a 50-50 result. The possibility that some 800,000 snus users would vote “no” if snus should be banned had political weight. After lengthy negotiations, Sweden got a permanent derogation from the EU snus ban. All this, of course, generated significant amounts of unpaid publicity.

Upon joining the EU, Sweden accepted the Directive then in force on the labelling of tobacco products (Directive 92/41/EEC). This meant that all snus packages after 1995 had to carry the health warning “causes cancer” (based on the IARC report). At the same time, several studies that could not find a significant increase of cancer risks among Swedish snus users were published. In 1996, the National Board of Health and Welfare, the National Institute of Public Health and the National Food Administration jointly organised a scientific symposium on the health hazards of snus. The report from this symposium[5] concluded: “there is little evidence for an increased risk of cancer”. The report went on to emphasize: “It is not possible to conclude that snuff use does not increase the risk of cancer. To permit such a conclusion, greater demands must be put on the data: currently available data do not meet these demands. In fact, the results of the Swedish studies are compatible with a slightly increased risk, particularly

5.Ahlbom A, Olsson UA and Pershagen G. Health hazards of moist snuff. SoS-report 1997:11, The National Board of Health and Welfare. Stockholm 1997.

for cancer in certain locations, such as the oral cavity."
The scientific debate on snus and cancer was very cleverly used by the snus producers to generate a lot of publicity on the 'harmlessness' of snus. The health warning about cancer was displayed very prominently on the packages (covering almost a third of one of the biggest surfaces instead of only 4% of it, as stipulated by the Directive) together with an equally prominent reference to the National Board of Health and Welfare (NBHW) (not stipulated by the Directive). At the same time, the producers heavily promoted the idea that this health warning was not true, accusing the NBHW of misleading consumers. One of the smaller producers even sent an open letter to the Archbishop of Sweden, asking him whether the civil servants at the NBHW would be allowed into heaven after having lied so openly on the snus packages. The NBHW finally had to agree that the cancer warning was "too dogmatically worded" and that another kind of health warning would be more appropriate.

Eventually, the health warning on snus (and other kinds of smokeless tobacco products) was changed by a new European Directive adopted in 2001 (Directive 2001/37/EC). The adoption and implementation of this new Directive generated a great amount of unpaid publicity about the "removal of the false cancer warning".

The 'harm reduction' approach

This development was driven and accompanied by operational and policy changes within the Swedish tobacco industry. In 1999, the dominating company, Swedish Match (formerly the Swedish Tobacco Company) sold its entire cigarette division. The cigarette operations (including traditional Swedish cigarette brands such as Blend and John Silver) were taken over by an international company, and Swedish Match now focuses on 'brown tobacco', that is cigars, for example, and snus. While the cigar business remains very big internationally, the company in its national operations focuses almost exclusively on promoting snus. This enables the company to distance itself from cigarette smoking and to present snus as a 'less harmful alternative' to smoking or even as a cessation aid.

This new policy was expressed very clearly in a speech by Bo Aulin, Senior Vice President of Swedish Match AB, at the WHO Public Hearing on the Framework Convention on Tobacco Control (FCTC) in 2000[6]. "It is our belief," he said, "that the adverse health effects of tobacco use, at least in the Western World, is primarily related to inhalation of smoke. Snus provides a far more sensible alternative foremost because it is simply not smoked and consequently does not deliver toxic pyrolysis products. (…) We do not claim that the use of snus could not have any adverse health effects and we do recognize that the use of snus raises serious questions that need to be addressed. The youth issue being one, not increasing tobacco use and nicotine dependence in total being another. And there are more. What we do claim, however, is that all scientific data clearly demonstrate that the health risks associated with the use of snus are significantly lower than those of cigarette smoking.

Now, if you believe that you will be able to eliminate all forms of tobacco use in the world within a number of years, snus might not be considered as an attractive alternative, anyway. If you on the other hand realize that the Tobacco Free World simply will not happen within a foreseeable future, an alternative harm reduction strategy needs to be developed. In such a strategy snus can play an important and constructive role."

6.Speech by Bo Aulin, Senior Vice President of Swedish Match AB, at the WHO Public Hearing on Framework Convention on Tobacco Control, Oct. 13, 2000, Geneva, Switzerland. www.swedishmatch.com/eng/index.asp

The 'Swedish experience'?

Today, the harm reduction approach has become a major issue of debate within the tobacco control community. The 'Swedish experience' is often referred to in this debate[7].

Indeed, Sweden has seen a significant reduction in smoking, especially among men, during the last few decades. Sweden is often referred to as the only European country to have met the WHO target of less than 20% of the population being smokers by the year 2000. One notes especially that male smoking rates are low in Sweden compared to other European countries. This has led to the idea that there must exist some "specifically Swedish" factor which explains this "extraordinary" achievement, and sometimes the impression arises that Sweden has been successful in reducing smoking only (or at least mainly) thanks to the availability of snus.

Long-term data on the role of snus in smoking cessation are scarce. There is, however, some data available from a panel study on living conditions during the 1980s. In this panel, the percentage of daily smokers decreased from 31 % in 1980/81, to 25 % in 1988/89. By 1988/89, one quarter of the smokers in 1980/81 had quit, whereas 5 % of the non-smokers had taken up smoking. If we look at the smoking cessation rate by sex, the results show that 26 % of the female smokers in 1980/81 had given up smoking by 1988/89. There was no snus use at all among these women. Among the male smokers in 1980/81, 23 % had quit smoking by 1988/89. In addition, 5 % had given up smoking and started using snus, whereas another 2 % started using snus without giving up smoking. Thus, the total percentage of quitters was 28 % for men and 26 % for women[8].

Of the male snus users in 1980/81, 10 % had taken up smoking by 1988/89, whereas 26 % had given up tobacco use entirely.

Data from the same panel study made in 1988/89 and 1996/97 shows a similar pattern. Among the women, 27 % were daily smokers in 1988/89, and of these, 29 % had quit smoking by 1996/97, lowering the percentage of smokers in the group to 22 %, without any noticeable increase of snus use. Meanwhile, the number of snus users among the 2,442 women in the panel increased from 17 to 25. Among the male smokers (21 %) in 1988/89, 26 % had quit smoking by 1996/97, whereas additional 10 % had quit smoking and switched to snus. Also, 3 % took up snus use without giving up smoking. In 1996/97, 16 % of the men were daily smokers. Thus, the total percentage of quitters was 36 % among men and 29 % among women (Peeter Fredlund, NIPH, personal communication).

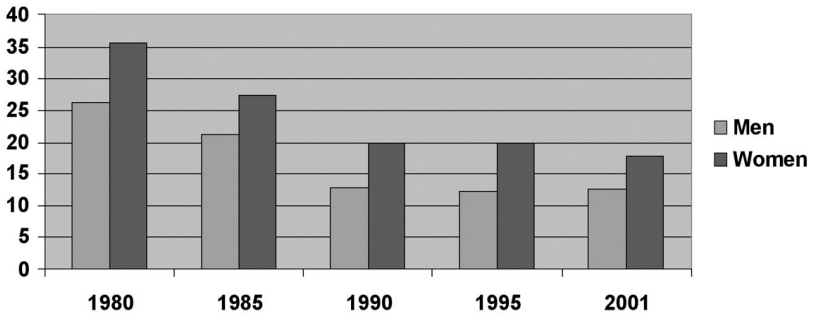
Of the male snus users in 1988/89, 5 % had taken up smoking by 1996/97, whereas 21 % had given up tobacco use entirely.

While an association – amongst men – between quitting smoking and taking up snus use seems evident, no conclusions can be drawn about causality. How many of the "switchers" would have remained smokers, had snus not been available? For the moment, nobody knows!

7.See e.g. Fagerstöm KO & Schildt EB. Should the European Union lift the ban on snus? Evidence from the Swedish experience. Addiction, 98 (sept. 2002) 1191-1195.
8.Tillgren P, Haglund BJA, Lundberg M and Romelsjö A. The sociodemographic pattern of tobacco cessation in the 1980s; results from a panel study of living conditions surveys in Sweden. Journal of Epidemiology and Community Health, 50 (1996), 625-630.

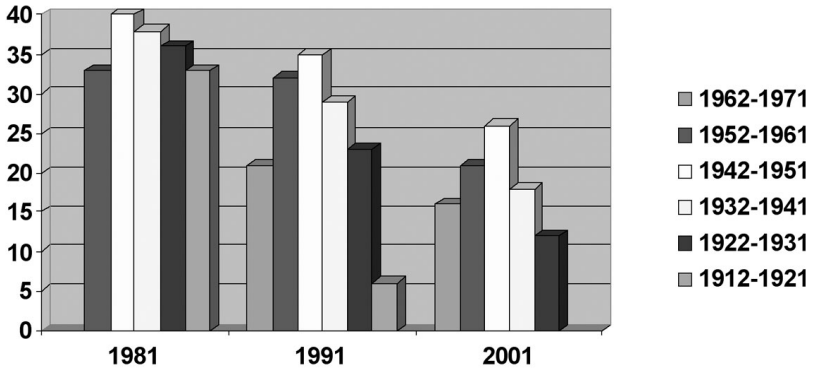
So, to what extent could snus use explain the low smoking prevalence in the Swedish adult Swedish population in general? Obviously, a reduction of overall smoking rates can be achieved by two mechanisms: through a reduced initiation rate among young people and an increased cessation rate among adults. In Sweden, both these mechanisms have been at work.

Smoking prevalence among young people has decreased by about 50% since the early 1980s. While smoking prevalence has been generally higher among young women than among young men during these years, the decrease has taken place at about the same rate in both sexes.



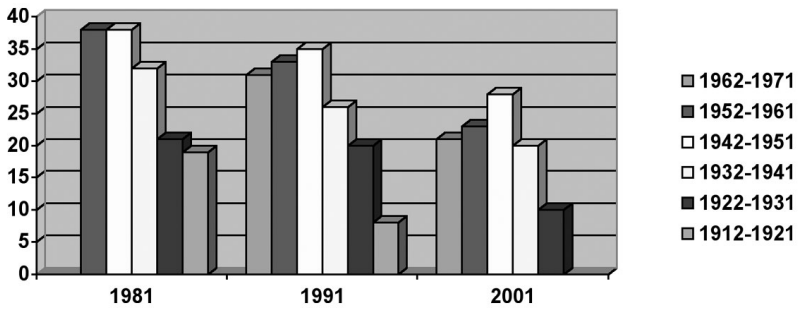
Prevalence (%) of daily smoking among males and females aged 16-24 years, in Sweden, 1980-2001. Source: Statistics Sweden.

Also, smoking cessation has contributed to the low total smoking prevalence for both sexes.



Percent prevalence (%) of daily smoking among men according to year of birth, in 1981, 1991 and 2001. Source: Statistics Sweden.

Among men, smoking rates decreased both during the 1980s and the 1990s. Among women, the decrease came later and happened mainly during the 1990s. During the 1980s, however, the decrease had about the same magnitude among both men and women.



Percent prevalence (%) of daily smoking among women according to year of birth, in 1981, 1991 and 2001. Source: Statistics Sweden.

The reasons for this development are not fully known. Potential explanations could be sought in many various fields, e.g. strengthened tobacco control legislation, increased public understanding of the health risks of smoking, decreased social acceptability for smoking in public places, new cessation aids, increased availability of cessation services etc.

Given the strikingly similar developments among men and women, especially during the 1990s, there seems to be no obvious reasons why a 'specifically Swedish factor' should be snus use – practically non-existent among women, at least until recently.

Certainly, lots of questions about snus remain to be answered. Is snus an effective aid for smoking cessation or reduction? Is the use of snus among youth a 'gateway' into smoking? Debate will continue, and further research, including well-designed prospective studies, is urgently needed. The argument over the idea of snus alone causing a uniquely 'Swedish experience', however, is simplistic and should be avoided.

5 The producer perspective: Potential Strategies for the Marketing of Snus

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5.1 Introduction

The debates about the public health, smoking cessation and harm minimisation attributes of snus are covered elsewhere in the report. This chapter focuses purely on the marketing implications were the current European ban to be relaxed.

We begin with a discussion of the current market structure and usage patterns for snus, and examine how its sole producer, Swedish Match, markets this and its other products at present. We will also look at the wider market for smokeless tobacco both in the US and elsewhere. This analysis is then used to explore two hypothetical scenarios: a) snus being completely freed up for commercial exploitation and b) its much more regulated release as a harm reduction strategy.

The chapter concludes by arguing that this is an extremely contentious issue that is likely to cause rifts in tobacco control unless it is handled with great care. These divisions will be exploited with enthusiasm by the tobacco industry. It is therefore essential that we find a consensual way forward. We suggest tight market regulation as a potential candidate.

5.2 The Current Market for Oral Tobacco

5.2.1 Current Snus Use in Sweden

Snus, as noted in Chapter 4, is used by approximately 20% of Swedish men and 1% of Swedish women, compared with smoking rates for these groups of 17.4% and 20.4% (Statistics Sweden 2003). Recent data suggest that the traditional older male manual worker is gradually being replaced in this market by younger men and women from a broader social spectrum (NIPD in press, Tobacco Reporter 2003). If confirmed, these trends accord with the pattern of smokeless tobacco consumption elsewhere in the world. In the USA, for example, smokeless tobacco use was traditionally used by older men and concentrated in less educated rural populations (CDC 1991). More recently, young males (18-24) comprised the largest portion of the market (Connolly 1995, NCTFK 1999).

5.2.2 Swedish Match

Swedish Match is the sole producer of snus. However, as their website (http://www.swedishmatch.se) shows, it represents less than a quarter of their business, providing 21% of sales in 2002; by comparison smoking tobacco accounted for 30% (cigars 24% and pipe tobacco 6%) and chewing tobacco 10%. Despite the company name, matches provide only 12% of sales and lighters 5%. (The remaining 22% comes from other operations.)

Perhaps in line with its attempts to create an image of a socially responsible tobacco company (it was formerly state controlled) Swedish Match sold its cigarette interests to an Austrian company (Austria Tabac) in 2000, which was, in turn, bought by Gallaher in June 2001. Arguably this could be seen as setting an example for the tobacco consumer - switching from cigarettes to snus. It could also be seen as a strategic business move, which would help to disassociate snus from smoking-related harm and increase the chances of the European ban being lifted. The company is said to have predicted that it could recruit 100 million new snus users in Europe and the rest of the world (Swedish Match 2001, quoted in Vainio & Weiderpass 2003). Swedish Match is also supportive of attempts to disassociate oral tobacco from smoking-related harm in the USA, where oral moist tobacco is not prohibited.

At present, the company has approximately 14,790 employees and manufactures in 15 countries, both within and outside the EU. Sales of Swedish Match's products are distributed across Northern Europe (35%) Western Europe (13%) North America (34%) and the rest of the world (18%). The company has been acquiring smaller tobacco companies, most recently a Slovene cigar manufacturer, and has shown consistent growth in recent years, particularly in the snus and cigar sectors.

In short, Swedish Match is a successful and determined tobacco company.

5.2.3 The Current Marketing of Snus

Marketing is a complex process involving a range of skills and activities to identify the needs and wants of different segments of the population and to develop, promote, price and distribute products that satisfy those needs. Swedish Match uses all these techniques to support its snuff products, including snus, in Sweden and elsewhere.

Product

Snus is a variety of moist oral snuff, which is designed to be sucked. It consists of tobacco, water, sodium carbonate, sodium chloride, moisturiser and a range of flavourings of various strengths (NCI & CDC 2002). Many snus products adhere to the strict 'Gothiatek Standard', which limits the amount of harmful constituents (such as nitrates, nitrosamines, lead and arsenic). It is noteworthy that such safety standards do not apply to a wide range of oral tobacco products currently available throughout Europe. This gives snus what marketers call a 'USP', or unique selling proposition, over other oral snuffs and smoked tobaccos.

Three principle brands of snus are detailed on Swedish Match's website and each shows clear signs of being designed to meet the needs of specific market segments. As with all good brands, these needs are both tangible and intangible, with imagery being much in evidence.

- Catch is a liquorice or eucalyptus snus sold in dark blue tins and described as being "for a contemporary urban lifestyle" and "the modern individual". This brand uses the (counter-addictive) slogan "Catch: The Conscious Choice".
- General comes in black tins, and is associated with a "heritage of fine craftsmanship". Varieties include loose, mild portioned or mini portioned and it is described as using one of Swedish Match's "oldest recipes" to produce a "pure elegant aroma, with a hint of citrus and a deep rich taste". It has also introduced a pure malt whiskey flavoured variety, complementing its association with quality and heritage.
- Timber Wolf (see Figure 1) is sold in bright blue, green and black tins with a picture of a snarling wolf on the lid. It is designed for the North American market and for consumers who want "quality tobacco at a sensible price."

Source: www.swedishmatch.se

Figure 1

These brands are also available in different varieties, including combinations of cut, flavour, dryness and net size of tin. In addition, Swedish Match continues to innovate and to introduce new brand differentiations. For example, General White Portion is a new form of snus in pouches and flavoured with lemon. It comes complete with an "ash-tray lid" for disposal of used snus. As described in a previous chapter (3) such innovations suggest an intention to make snus more acceptable to women and young people.

Place

Snus has wide distribution in Sweden and Norway (which is not part of the EU). It is available in most smoked tobacco retail outlets, including tobacconists, newsagents, supermarkets and take-away food shops. It is also available via specialised vending machines that are operated by card rather than coin, so as to prevent underage usage. As snus is moist and therefore perishable, it is recommended that it be stored for sale under refrigeration.

Some varieties of snus are marketed in North America. These include the popular Timber Wolf brand, which competes with United States Smokeless Tobacco (UST) and Conwood products and, as far as we can establish, does not conform to the Gothiatek standard.

Promotion

Evidence from Sweden and North America suggests that Swedish Match uses a variety of advertising and promotional techniques to market its products. In the USA, despite the Smokeless Tobacco Master Settlement Agreement (Massachusetts Department of Public Health 2002) some smokeless tobacco products, including those manufactured by Swedish Match, have been advertised and promoted in ways that may reach youth (eg. magazine adverts, baseball caps).

As described in Chapter 3, snus has been actively promoted in Sweden since the 1970s. During that time, the message and focus of the promotional activity has changed to suit cultural, social and political trends. Initial promotions sought to change the image of the product and increase its social acceptability (1970s) while price and usage of snus as an alternative to cigarettes (in circumstances when smoking is not permissible) were the key issues promoted in the 1980s (Henningfield et al 2002). More recent campaigns have focused on the comparative health-related benefits of snus compared with smoked tobacco.

Snus is sold in attractive tins, which are eye-catching (eg. Figure 1) and have the potential to act as advertising. At the core of this promotional activity is a concerted effort to develop and reinforce the brand images described above.

Price

As indicated in Chapter 4.2 the unit price of Swedish snus has always been cheaper than that of cigarettes. However, different varieties of snus vary in price incorporating premium and economy brands (see above).

In summary, Swedish Match employs sophisticated and successful marketing strategies to encourage the use of its products. These strategies present snus in an attractive light with its own unique benefits and brand images. Snus is not positioned as a tobacco cessation aid, but rather as a less harmful alternative to smoking tobacco. There is little doubt that Swedish Match would apply at least the same level of sophisticated marketing across Europe in the event of legalisation (see Section 5.3).

5.2.4 The US Smokeless Tobacco Industry

There are three main forms of smokeless tobacco: moist oral tobacco, which is sucked by users, dry chewing tobacco and nasal snuff, all of which are less harmful than smoked tobacco in general and cigarettes in particular. However, only moist oral tobacco is currently prohibited in the EU. Snus is one form of this, but other types are manufactured and marketed in the USA and examining this industry gives some clues about how a moist oral snuff market may develop in Europe, should the ban be lifted.

The international tobacco companies can be roughly divided into those, which specialize in producing cigarettes and those concentrating on other tobacco products such as cigars, smokeless and pipe tobacco. The second group of companies are much smaller enterprises. The world's largest smokeless tobacco manufacturer is the United States

Tobacco Company (UST) with around 4,700 employees. UST has around 40% of the US market for all smokeless products and around a 75% share of the moist oral snuff trade (Federal Trade Commission 2001). Its main rivals are Conwood (24% market share) and Swedish Match North America (20% of the total market). In the United States, there has been a great deal of legal conflict between these companies in recent years, specifically involving anti-trust legislation over attempts to monopolise sectors of the smokeless tobacco market. For example, in April 2000, Conwood was awarded $1.05 billion in damages when UST was found guilty of paying slotting fees to retailers (Nagengast 2000).

The oral moist snuff products currently prohibited in the EU and manufactured by these companies, come in two forms: 'loose' or 'dip' (packaged in a sachet or 'ready to use pouch'). The user holds the tobacco or the sachet in the mouth, with saliva being swallowed or spat out. Moist snuff is also produced in various cuts; with the greater surface area of the finer cut products releasing nicotine more rapidly. Up to 50% of the composition of these products is moisture and they also come in a variety of strengths and flavours. Moist snuff is used by approximately thirteen times more males than females (NCI & CDC 2002). Examples of oral moist snuff products include:

- *Copenhagen*, produced by UST, which claims to be the first ever brand of moist smokeless tobacco dating back to 1822. In 2001 a bourbon flavoured variant of this brand was introduced called Copenhagen Black. In 2002, this was followed by a pouch form, which, like its loose version, is marketed on premium quality.
- *Skoal*, also produced by UST, comes in a variety of flavours (eg. spearmint, cherry, classic, berry-blend) and two sizes of pouches, the smaller size being called Bandits and the larger being marketed towards those who prefer a "more robust tobacco experience".
- *Kodiak*, produced by Conwood and sold in attractive, colourful tins with a picture of a grizzly bear on the front. This brand has variants, including the appealingly named Kodiak Ice, packaged in a blue tin.

The ban on moist oral tobacco in Europe stems from the 1980s when fears were raised that moist tobacco sachets, or 'tobacco tea-bags' as they were dubbed by the press, were being marketed to children (for example, UST was promoting its Skoal Bandits products through motor racing sponsorship). UST still has strong links to both motor racing and rodeo. There is evidence in the US that certain brands are more popular with youth and some argue that they form part of a graduation process from low nicotine brands (Skoal, Skoal Bandits) to higher nicotine ones eg Copenhagen and Kodiak (Tomar et al 1995).

One key lesson emerges from this brief review of the US smokeless tobacco market: the market is highly competitive and very profitable and as a result, companies fight hard to gain market share.

5.2.5 Non-US Producers

Unlike moist oral snuff, chewing (spit) tobacco is not banned in the European Union. Although still less harmful than smoked tobacco, such products are particularly dangerous, as they may also contain other highly toxic substances in addition to tobacco and their manufacturers may not remove harmful impurities. As such, snus, with its Gothiatek Standard, may be considered less dangerous than many of these compounds. Such chewing tobacco has been banned in other parts of the world where this method of nicotine ingestion has become popular (eg. the Indian states of Maharashtra, Karnataka and recently, Bihar). Examples of potentially more dangerous smokeless tobacco products include:

- *Chimo* is a spit tobacco product, which is used in Venezuela. It comprises a tobacco-leaf concentrated paste, which contains added bicarbonate of soda, sugar, mamon tree ash and flavourings. It is sold in attractive tins or confectionery-wrapper style packages. Its use is said to be spreading from unskilled workers to urban youth (NCI & CDC 2002).
- *Gutkha* is commonly used in India, and contains another psychoactive substance - betel nut - as well as lime saffron and flavourings. Sold in colourful packets, this spit or swallow product is most popular with young males and advertising is typically targeted to them.
- *Zarda* is a chewing product used in India and the Arab world by males and females in higher income groups. It is sold in tubs containing broken up, dried tobacco leaves, coloured with vegetable dyes, mixed with lime and chopped betel nuts and spices.

At present, the use of smokeless tobacco in the EU is rare in comparison, for example, with India, the USA and parts of the Middle East. Nonetheless, it raises three concerns for this paper. Firstly, the success of these products elsewhere in the world suggests the potential for a smokeless market to grow in Europe. Secondly, the uncontrolled legalisation of snus may blur the border between it, which is relatively safe, and these other products. Thirdly, smokeless tobacco use highlights what is a worrying anomaly in the current legislative framework, where the relatively safe snus is the only smokeless tobacco to be banned.

5.3 In the Event of Legalisation, How Will Snus be Marketed?

At this point, our task becomes more speculative. We have to imagine the hypothetical response of different groups (the tobacco and pharmaceutical industries, the public health community and policy makers) to a hypothetical event: the legalisation of snus.

To try to make this task manageable, we have hypothesised two alternate scenarios:

a) That the ban on snus be simply lifted and the market left relatively free to act as it will (Section 5.3.1). The possible responses of Swedish Match, the smokeless tobacco companies and the cigarette companies are discussed in turn.

b) Snus being released onto the market as a harm reduction device in a tightly controlled way (Section 5.3.2).

5.3.1 Marketing of 'Snus' the Tobacco Product

5.3.1.1. The Response of Swedish Match

Swedish Match will inevitably take the lead in marketing snus. As we have seen, it is a sophisticated marketer, and we can expect it to develop powerful strategies to build their newly available European market.

Product

Snus is an unknown concept, let alone product, in most of Europe and its use will involve a cultural and behavioural change. This suggests that snus will not be adopted on a large scale. However it is clear Swedish Match would not be attempting to legalise snus unless it felt able to create demand and increase market share. Furthermore, as noted above, the company is on record as saying it can expand the international market for snus.

Its strategy for doing so could build on the two tangible benefits that snus offers the consumer: safety and being smoke-free. The former is a potentially powerful proposition; not only does snus have a genuine unique selling proposition (USP) in the Gothiatek Standard, but lifting the ban will have obvious symbolic value. In this regard, any statements by the public health community that snus is less harmful than other tobacco products could be readily exploited as a health endorsement. As their website shows there are already claims about snus as a cessation aid - even though, as other parts of this report explain, the scientific evidence remains unclear:

> *"Switching to snuff has proved to be an effective method for giving up smoking... With more than 20 percent snuff users among its adult population, Sweden shows the lowest incidence of tobacco-related illnesses in the entire western world, and this has come to be known as 'The Swedish Experience'."*
>
> Source: www.swedishmatch.se

Snus' smoke free status, on the other hand, offers the opportunity to promote it as a nicotine maintenance device in non-smoking areas. The increasing controls on smoking in public places will make this an attractive proposition.

Swedish Match is also likely to continue its current strategy of promoting snus to meet emotional needs, in the same

way as other tobacco products, through evocative branding. We would expect the three main brands (Catch, General and Timber Wolf) to be developed and rolled out across Europe with similar targeting and segmentation strategies to those currently favoured in Sweden and North America.

As with all good marketing, decisions between and about these different strategies will be guided by careful market research. The consumer will be the ultimate arbiter of the direction Swedish Match takes. Furthermore if trends noted in Section 5.2 materialise these will be young men and women from a range of social backgrounds. We already know that young people tend to be unconcerned about the health consequences of tobacco, but find sophisticated brands engaging.

Place

Wide availability and easy access is vital for any tobacco product; users consume tobacco habitually and need to be sure they can obtain their supply at any time. Smokers, for example, typically know where they can buy cigarettes 24 hours a day. The importance of distribution is highlighted by evidence that the introduction of Skoal Bandits in the UK in the 1980s was largely unsuccessful because they were only stocked by 500 retail outlets, compared to 300,000 outlets for cigarettes (Hillhouse 1990). Swedish Match already has links with the tobacco retail community through its extensive cigar, pipe tobacco and accessories business, and it can be expected to build and strengthen these relationships just as the cigarette manufacturers do. In the UK, for example, tobacco companies operate a sales force that regularly visits retail outlets and advises on stock control, positioning and point-of-sale display. Swedish Match is likely to adopt these techniques, perhaps by offering incentives such as discounts or free gifts in return for retailers' stocking and promoting their products.

Furthermore, research has indicated that point-of-sale marketing is one of the most important ways of influencing the consumers' decision-making process, particularly for impulse buying. This importance has increased following restrictions on more overt advertising (eg. Promo 1999 and POPAI 1992, cited in Feighery et al 2001). Swedish Match will want snus to be placed next to the smoked tobacco products so that potential users perceive it as a sensible alternative. From a public health perspective, this has the potential benefit of steering users towards a safer form of tobacco use. Alternatively, however, the presence of a safer product may simply reduce their concerns about tobacco in general.

Promotion

In the light of the new EU Directive on tobacco advertising, Swedish Match would be introducing 'snus' into what the industry refers to as a 'dark' market (ie. where there are restrictions on the forms of media at their disposal). However, as stated above, a strong form of promotion will be point-of-sale. The issue of regulation of point-of-sale advertising is still being debated in Europe and remains unresolved.

Press coverage of any change of policy over snus is also likely to be considerable. Swedish Match can be expected to exploit it to the fullest. There is already evidence of such action in the Netherlands where Swedish Match placed an advertorial in the Dutch press, which advocated 'snus' as a product to be used in situations where smoking

is not allowed. In addition, the company will have to inform the market of its product and explain how to use it.

As noted above, brand image will also need to be promoted to the different target groups. One concern would be whether to market snus to young people and, if so, how. Cigarettes have been promoted to 'beginner' smokers as a product that gives them an identity and makes them feel adult and sociable by association with a product that is dangerous. If unregulated, Swedish Match may identify a similar strategy to attract young people to snus or snuff in general. Consider, for example, images of young people's role models or heroes portrayed in magazines as 'cool' snus users. Snus could become cult behaviour, perhaps for rebellious teenagers using it while in class or in front of their parents. As noted below, the web-site promotional material for 'Independence' cigars, another Swedish Match product does not inspire confidence in this regard.

Price

In the smoked tobacco industry, price is used to differentiate brand image and quality. Companies produce a range of economy, medium and premium brands to cater to different budgets. If marketed as a tobacco product, Swedish Match will need to consider its pricing strategy and how the price of snus should compare to other tobacco products. It has flexibility in this regard; as noted above, the cost structures of the industry means that snus is cheaper to produce than cigarettes. Despite this, it may opt to cater to the well-established appetite for more expensive premium brands among young and low-income smokers (Barnard & Forsyth 1996, Pierce et al 1991, Pollay et al 1996).

A related issue that also needs to be addressed concerns the number of units/price of snus, i.e. number, size and price of tins per purchase. For example, small tins of expensive snus may be viewed as both premium and affordable by young non-smokers. In addition, it may be less expensive to manufacture more harmful oral tobacco products, which may then masquerade as snus.

Corporate Strategy

The legalisation of snus will also offer Swedish Match wider strategic benefits. It is clear from their website that they see enormous opportunities in the market for 'cigarette replacement products' (CRPs) and that exploiting this through snus is a key plank of their corporate strategy. As their strategy and vision statement says, *"Growth for snuff is the core of Swedish Match's strategy".*

However snus is only one of the CRPs produced by Swedish Match; they also market cigars, pipe and chewing tobacco. Furthermore, these latter three combined provide the company with nearly twice the turnover of snus. They have for example, as the website boasts, "built up a world-leading position in cigars since 1998". The site goes on to explain how they plan to exploit this position: *"As world number two in terms of sales value, Swedish Match has also achieved a critical mass in this area, and this is now providing the platform for ongoing international expansion, including, among other measures, expansion of market coverage for Caribbean handmade cigars in Europe and Asia, and investments in renewal of the range."*

This raises three issues: first the company clearly see the legalisation of snus as a key to overall corporate growth and 40% of this business is for distinctly unhealthy tobacco products. Second there will undoubtedly be imbricative benefits for the rest of their product portfolio in the snus marketing activity discussed above. Sales forces encouraging shopkeepers to stock snus will also take the opportunity to promote Independence or La Paz cigars, for example, and the health benefits of snus can be spread by inference and good public relations to the rest of the CRP sector. Finally, it is worth noting that Swedish Match's smoked tobacco products are promoted on their website using fun graphics, cartoons and interactive competitions. It is far more entertaining than, for example, the websites for Imperial Tobacco or Philip Morris. The corporate growth potential of the European snus market will also support the marketing of Swedish Match's smoked tobacco portfolio.

5.3.1.2. The Response of Other Smokeless Tobacco Companies

These companies will have the biggest immediate interest in the liberalisation of the European market. They already compete aggressively and successfully with Swedish Match in North America, as discussed above, and would probably develop similar marketing strategies (including sports sponsorship and evocative brands) in Europe. It should be noted that these producers do not follow the Gothiatek standard and therefore may be less likely to develop health propositions for their brands. Furthermore this competitive pressure might well limit the capacity of Swedish Match to go down this route. It is interesting to note that health is not a key part of their marketing in North America, and as noted above, as far as we can establish, their leading brand in this market – Timber Wolf - does not meet the Gothiatek standard.

5.3.1.3. The Response of Cigarette Companies

Outside Sweden, the tobacco market in Europe is dominated by cigarette manufacturers ('Big Tobacco'). The main players are Philip Morris (part of the Altria group, which includes Kraft foods), Brown & Williamson, RJ Reynolds, Japan Tobacco, Atladis, Imperial Tobacco, Gallaher and British American Tobacco (BAT). As noted above, these companies are much larger enterprises than Swedish Match. BAT (14.6% of global trade), for example, has around 85,000 employees and manufactures in 66 countries. They have diversified ownership into many non-tobacco products; are often involved in mergers, take-overs or sell-offs; and may even distribute one another's brands in different geographical regions. Some of the major manufacturers are located both within the European Union (eg. Imperial in the UK - which acquired the German firm Reemtsma in 2002 and the Spanish/French firm Atladis - which is the world's largest cigar distributor) and outside the EU (eg. the US company Philip Morris, which is the world's largest tobacco firm). At a local level, traders' 'own brand' cigarettes are also popular in some countries (eg. Germany).

It is interesting to note that the major tobacco companies are not presently developing snus products, although some (eg. RJ Reynolds and Brown & Williamson) do produce other oral (chewing) tobacco products. As a result, the com-

panies may see snus legalisation as a threat, for two reasons. First, it favours Swedish Match, a (successful) rival tobacco firm that will be competing for their customers. Second, snus may be seen as a danger if it offers attractive benefits to its consumers and (most worryingly) if it proves easier to quit than cigarettes and could be seen as a stepping-stone away from tobacco consumption altogether. Swedish Match's rivals' reaction may, therefore, be to resist legalisation, using the same arguments as public health advocates, (such as the potential appeal to children and the dangers of recruiting new users) creating an embarrassing and potentially dangerous link between themselves and parts of the tobacco control community.

However, this seems a difficult standpoint to maintain. How can tobacco companies plausibly argue against the legalisation of any tobacco product let alone one that is safer than cigarettes?

A more likely scenario is that the major cigarette manufacturers will not see legalisation as a threat at all, but as an opportunity. From their perspective, any liberalisation of the tobacco market is a good thing; it will, for once, create a positive tobacco story. It will also generate doubt and uncertainty among both consumers and professionals, and doubt has been a valuable ally over the years. As far as consumers are concerned it raises questions around what has up until now been a very clear and simple message: 'tobacco is bad'. This will change to a more complex: 'some forms of tobacco are better than others, though none are safe'. This could be exacerbated by mischievous public relations such as *"if the health police got it wrong with snus, can you believe what they tell you about ordinary tobacco?"* Among professionals there will be an obvious chance to exploit the divisions over this issue that are already emerging in the tobacco control community.

Snus liberalisation may offer tobacco companies a chance to promote their own new products, such as *Eclipse* (manufactured by RJ Reynolds) or *Accord* (Philip Morris). There is considerable debate, however, about the relative safety of these products. This therefore suggests a need for careful regulation in this area. The big companies may even decide to compete by getting into the snus market themselves. Such competitive forces would inevitably drive the market forward more quickly and effectively.

Finally, Swedish Match's competition may respond with indifference to snus, seeing it as a small and insignificant operation and leave it to the small players - as they do now, to a large extent, with pipe, cigar and other smokeless products.

In summary, the response of Big Tobacco is difficult to predict. However, it seems that they are most likely to see snus legalisation as an opportunity in various ways and exploit it accordingly. In an increasingly difficult regulatory environment, any liberalisation is likely to be seized upon as a rare bit of good news.

5.3.2 Marketing of Snus - The Harm Reduction Product

The hypothetical scenario we are describing here assumes that the legalisation of snus is based on an EU decision that snus is less harmful than smoked tobacco products. It would be in the interests of public health, therefore, to inform smokers and the public that a less harmful product exists to meet their nicotine delivery needs. It is unlikely that the tobacco control community, however, will have the expertise, resources or desire to market the product in Europe.

In theory, the marketing of snus as a harm reduction product could be done by the tobacco industry (probably in the form of Swedish Match) or the pharmaceutical industry. Each is discussed in turn.

5.3.2.1. Tobacco Industry / Swedish Match

As noted above, the tobacco companies have vast experience, resources and commercial motivation to launch these new 'harm reduction' products across Europe. They have the skills and techniques at their disposal to design, promote and distribute snus tailored to the needs of their 'potential' customers. The advantage here is that commercial monies are used to inform the public about these products, how to use them and in a way which is tailored to the needs of key target groups.

This scenario, however, also raises some issues for discussion. It is possible that Swedish Match, for example, will maximise the relative safety of snus in its marketing. However, judging by its current business practices, this is likely to be a small part of its effort; the only initiative it seems to be taking at present (apart from the relevance to cessation on their website noted above) is to promote snus as a nicotine maintenance device in non-smoking environments - and this could be seen as undermining tobacco de-normalisation rather than harm reduction. This suggests that Swedish Match would have to be encouraged down a harm reduction / cessation route by regulation and enforcement.

<u>Product</u>

Of the various positions discussed in Section 5.3.1, only the health and potential cessation benefits are really relevant here. The first does show potential in that a clear evidence base shows that snus is much less harmful than smoked tobacco. However, the marketing implications of such a move are complex.

The cessation route is more difficult because it is unproven (Gilljam & Galanti 2003).

<u>Place</u>

Distribution of snus as a harm reduction tool raises some difficult issues. Should it be sold with tobacco or Nicotine Replacement Therapy (NRT) products? This in turn will influence the type of retail outlet to be used (pharmacy or tobacconist). Crucially, it will also indicate whether it is competing with cigarettes or NRT, thereby having a big impact on the product's core values. Placing snus next to cigarettes may be seen as equating it with these items,

and thereby encouraging tobacco use; on the other hand, putting it elsewhere risks missing the key target audience for this product's harm reduction and cessation properties. Placing snus alongside NRT products would identify it as an aid to smoking cessation but also discourage the user from buying a tobacco-free product.

There is clearly some advantage in permitting the marketing of snus at the point-of-sale of cigarettes and other tobacco products. There would be an opportunity at such locations for smokeless tobacco products with bona fide harm reduction messages to reach smokers at the point at which they decide which tobacco product to purchase. However, control of these messages is likely to be another contentious issue.

Promotion

What could be said about the safety and efficacy of snus, and who would say it? The public health community is likely to be very wary of any overt health claims given the lack of formal pharmacological testing. On the other hand, should a tobacco company be trusted to communicate such messages with honesty? And if they do so, with the tacit or overt backing of the medical establishment, will it give them an authority that campaigns like 'The Truth' (Sly et al 2001) have actively sought to strip away?

Brand imagery and the mix of emotions and facts that this creates further complicate the picture. Snus, like other fast-moving consumer goods, will need branding if it is to succeed. Some would argue that the branding should reflect its harm-reduction status, rather than style, tradition or price themes of current brands (see 5.2.3). Others, however, may feel that stylistic 'tobacco' marketing is exactly what is needed to promote what is deemed to be a much less harmful product.

Similarly, snus packaging should not be too eye-catching or attractive to children (Nordgren & Ramstrom 1990). Some smokeless tobacco products may be packaged, look or taste like children's confectionery (Connolly 1995). Any gravitation towards minors would cause alarm.

Price

The pricing of snus seems likely to be a crucial factor in its effectiveness in competing with cigarette smoking. On the one hand, if the cost of snus is less than that of smoking, smokers may be encouraged to switch. On the other hand, if snus were seen to have a particularly cheap image, then some smokers may actually be less likely to do so (Bloom & Birnbaum 1994). Past experience suggests that, in an unregulated market, some oral tobacco brands are priced lower than cigarettes and some higher (Wyckham 1999).

Wyckham (1999) also shows that price was used as a motivator for retailers to stock smokeless tobacco in Canada. It typically allows an attractive 15-20% mark-up (some take more), which would help overcome the distribution problems experienced by Skoal Bandits (HillHouse 1990) mentioned above.

In summary, the tobacco industry would have the motivation, expertise and resources to market snus across Europe but controls may be needed to ensure that the messages and promotional techniques adopted support a public health agenda.

Another possible way forward may be marketing of snus through small companies such as Star Scientific whose mission is to "reduce toxins in tobacco so that adult consumers can have access to products that may prove to lessen the health risks linked with tobacco use." (www.starscientific.com). Star Scientific is currently marketing a product called 'Ariva' which has low nitrosamine levels and offers smokers a less harmful nicotine-delivery device. Again, however, there is going to be the need for a clear regulatory framework.

5.3.2.2. How Would the Pharmaceutical Industry Respond to Snus the Cessation or Harm Minimisation Aid?

NRT products and related pharmaceuticals such as bupropion have become increasingly commercially important in recent years. Nicotine gums (accounting for about half the market, Novotny et al 2000), pills, lozenges, sprays, patches and cartridges come in many brands, including Nicorette® (Lundbeck, Pharmacia & Upjohn) Nicotinell® (Novartis) Niconil® (Parke-Davis, Elan) Niquitin (SKB) Nicabate (Rousell) and Nicotrol (McNeil). Additional products, such as 'nicotine water' and 'nicotine inhalers', are likely to join this rapidly diversifying market. Even before such expansion, this is a big business; sales of NRT products in the USA rose from zero in 1995 to $664m by 2000 (AC Nielson, cited in CHPA 2003). With the bulk of the global trade in NRT occurring in the USA, the EU is a tempting target for this industry.

The pharmaceutical companies are unlikely to welcome the promotion of snus as either a cessation aid or a way of minimising harm. It will threaten their position as the sole providers of a pharmacological route to quitting and be an unwelcome competitor. And snus has two distinct competitive advantages over NRT. First it is not a medical product and no health professionals are involved in its distribution. It therefore provides a pharmacological solution without the disempowering medical hegemony that currently dominates NRT.

Second, it has major cost advantages over NRT because it is not subject to the highly expensive development and licensing procedures demanded of pharmaceuticals products.

The pharmaceutical industry is also likely to reject the idea of snus for perceptual reasons: it is a form of tobacco, which is a harmful recreational product, whereas the industry produces health-bolstering medicines. Finally, and more contentiously, the NRT industry, like it or not, relies on 'addicts' for its continued growth and survival. Any potential reduction in the supply of consumers is a potential threat.

It is still less likely that the pharmaceutical companies would get directly involved in marketing snus, despite the fact that this would remove the competitive threats. They are in the health, not the recreational drug, business.

In summary, we can see no reason why the pharmaceutical industry would support the legalisation of snus whether it is built on a platform of harm minimisation or cessation.

5.4 Summary and Conclusions

This chapter has considered two scenarios: snus legalisation in a relatively unregulated European market as a result of court action by Swedish Match; and the proactive encouragement of its legalisation by the tobacco control community as a deliberate harm-reduction strategy.

The first of these presents considerable dangers, because although the reactions of the tobacco industry are difficult to predict, they are unlikely to benefit public health. The industry as a whole will seek to maximise market opportunities and exploit PR benefits - particularly the notion of 'healthy tobacco'. Furthermore, the market leader in Europe, Swedish Match, clearly sees snus as a bridgehead for building their business as whole. In this respect it is important to note that their snus business is significantly smaller than their smoked tobacco business.

The proactive harm-reduction route raises concerns about who would do the marketing. The pharmaceutical industry, which might be considered the more trustworthy candidate, is likely to be resistant to getting involved - and may well fight the whole idea of liberalising snus.

This leaves only the tobacco industry - probably in the form of Swedish Match. However, if the dangers discussed above are to be avoided then strict regulation is absolutely essential. All aspects of marketing - promotion, packaging, pricing, distribution and product design - would need to be comprehensively policed. Ultimately the only the way to do this is through a fully regulated market (Borland 2003), where a public body procures tobacco products from the manufacturers according to strict public health criteria. This provides a crucial buffer between the smoker and any form of marketing exploitation by the industry. Moreover, it would be illogical and inconsistent to apply such regulation only to snus, when other far more harmful tobacco products remain unfettered. The need then is for a fully regulated market for all tobacco products.

Borland's vision may be too radical at present and a more achievable aim may be for a regulatory authority. This would be akin to the Medicines and Healthcare Products Regulatory Agency (MHRA) (www.mhra.gov.uk) or the UK Food Standards Agency (www.foodstandards.gov.uk) and apply and police tight controls on all forms of tobacco marketing.

There may be other administrative solutions, but the crucial thing to remember is that tight regulation is essential.

We realise that even this is an extremely ambitious agenda, which will be many years in arriving. However, to our mind, it is the only way of ensuring that snus liberalisation, notwithstanding the product's clear relative safety, does not result in marketing opportunities for the tobacco industry - and resulting damage to public health. It also provides a potentially consensual way forward in a very contentious area. Without this we fear that the tobacco control community will waste much time and energy on internal disagreements and division; and the tobacco industry will waste no time in exploiting the resulting opportunities.

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6 Summary

In this report, an overview is presented of the possible effects and implications of lifting the EU-wide ban on oral tobacco. The research questions were as follows:

1. What are the health effects of oral tobacco, and especially the Swedish variety?
2. What is the effect of oral tobacco use on population mortality rates?
3. What is the effect of oral tobacco use on smoking prevalence?
4. What marketing strategies will most likely be adopted by the industry to place oral tobacco on the European market?

Each chapter of the report discussed one of the research issues. Chapter two discussed the direct health effects of oral tobacco through an analysis of existing literature on the subject. Chapter three presented an historical overview of lung cancer mortality and smoking prevalence in several countries. Chapter four described the experience in Sweden, where oral tobacco is legally available on the market. Chapter five discussed the possible reaction of the tobacco industry if the ban should be lifted.

The main findings for each research question are summarized below.

Health effects of oral tobacco (Chapter 2)

- More than 2.500 chemical substances are identified in snuff and more than 25 of these are characterized as carcinogenic. Among these, the N-nitrosamines are considered major contributors to the carcinogenic activity of snuff.

- The health effect of oral tobacco use that has most consistently been reported in epidemiological studies is lesions in the oral cavity. Lesion prevalence increases with greater use of smokeless tobacco. These lesions range from slight superficial wrinkling and normal or pale white or gray mucosa, to heavy thickening and furrowed, whitish or grayish color and pre-cancerous lesions. Gingival recession and discoloration of teeth are also usual findings.

- An increased frequency of cancer in the oral cavity has been found among snuff users.

- Evidence regarding snuff use and cancer at other sites than the oral cavity is limited.

- Nicotine increases blood pressure and an increased risk of high blood pressure has been reported in one study among snuff users in age groups of 46 years and older.

- Swedish studies report increased risk of cardiovascular disease among snuff users. However, more studies are necessary before any firm conclusion concerning enhanced risk of cardiovascular disease can be made.

- Health effects reported in relation to use of snuff has mainly been studied among men starting to use snuff at a considerably higher age than is the case today. Health effects among todays snuff dippers may thus be considerably more extensive than expected from the earlier studies.

Relation between oral tobacco use and population mortality (Chapter 3)

- Lung cancer and smoking prevalence in Swedish males have been significantly lower than in the rest of Europe. It is likely that the surviving 19th century custom of oral tobacco use by Swedish men is one of the factors responsible for this lower rate of lung cancer among Swedish men, compared to male populations in other European countries.

- In the UK and Finland, due to tobacco control efforts smoking prevalence shows a strong decline since the 1980's, both among men and women. Projections regarding lung cancer rates indicate that the incidence of this disease in Finland or the United Kingdom will have dropped to the Swedish level by the end of the decade. Thus, its shows that in the second half of the 20th century efforts towards reducing the health consequences of tobacco smoking in these countries without using oral tobacco was as effective as in Sweden (with oral tobacco).

- The availability of, and advertising for, oral tobacco in Sweden does not appear to affect smoking by Swedish women.

- The prevalence of smoking among Swedish men has decreased within the last decade, accompanied by a greater popularity of oral tobacco, but the overall number of people addicted to nicotine has remained the same. The prevalence of smoking among Swedish men is twice as low as in Poland, but the total percentage of nicotine addicts among men, including consumers of oral tobacco, is the same in both countries.

The consumer perspective (Chapter 4)

- Oral tobacco consumption was quite common in Denmark, Sweden, Iceland and Norway in the period before WWII, but not in other European countries. Due to the increasing availability and aggressive marketing of factory-made cigarettes, this consumption has declined since then in these countries, including Sweden (until the end of the sixties). Consumption of oral tobacco is now a marginal phenomenon in the Nordic countries, with the exception of Sweden. Lifting the EU ban on oral tobacco and the increase in the marketing of snus in these Nordic countries that could be expected as a result might revive the old custom of dipping oral tobacco in these countries, but it seems very unlikely that it would become popular in other European countries where snuff usage has no historical roots.

- While an association among Swedish men between taking up snus use and quitting smoking seems evident, no firm conclusion can be drawn about causality. How many of the "switchers" would have remained smokers had snus not been available is unknown.

- It is not known whether snus may be a gateway into smoking for young people.

The producer perspective (Chapter 5)

- Older male manual workers traditionally consume Swedish snus. Younger men and women from a broader social spectrum are gradually replacing this market.

- The oral tobacco market is highly competitive and very profitable and as a result companies fight hard to gain market share.

- Snus, by adhering to the Gothiatek Standard, which limits the amount of harmful constituents, has a 'unique selling proposition' over other oral snuffs and smoked tobaccos.

- Snus has been actively promoted in Sweden since the 1970s. Initial promotions sought to increase its social acceptability, while prices and health-related benefits were more recent key issues. It is now actively positioned as a less harmful alternative to smoking tobacco. There is little doubt that in the event of legislation, this marketing strategy will be continued across Europe

- Any statements by the public health community that snus is less harmful than other tobacco products could be readily exploited by the industry as a health endorsement.

- The industry is likely to promote snus as a cessation aid - even though the scientific evidence remains unclear

- Swedish Match will want snus to be placed next to the smoked tobacco products so that potential users perceive it as a sensible alternative. From a public health perspective, this has the potential benefit of steering users towards a safer form of tobacco use. Alternatively however, the presence of a safer product may simply reduce their concerns about tobacco in general.

- The capacity of Swedish Match to promote snus as a less harmful alternative to smoking may be limited by competitive pressure from other smokeless tobacco producers that do not follow the Gothiatek standard and therefore may be less likely to develop health propositions for their brands.

- The major cigarette manufacturers (who do not produce snus products) are most likely to see legalisation not as a threat, but as an opportunity. From their perspective, any liberalisation of the tobacco market is a good

thing; it will, for once, create a positive tobacco story. It will also generate doubt and uncertainty among both consumers and professionals - and doubt has been a valuable ally over the years.

- As far as consumers are concerned, it raises questions around what has up until now been a very clear and simple message: 'tobacco is bad'. This will change to a more complex: 'some forms of tobacco are better than others, though none are safe'. This could be exacerbated by mischievous public relations such as "if the health police got it wrong with snus, can you believe what they tell you about ordinary tobacco?" Among professionals there will be an obvious chance to exploit the divisions over this issue that are already emerging in the tobacco control community.

- There are two scenarios for the introduction of oral tobacco: the legalisation of snus within a relatively unregulated European market as a result of court action by Swedish Match, and the proactive encouragement of its legalisation by the tobacco control community as a deliberate harm reduction strategy.

- Many problems (see points above) will occur in a scenario where snus is let into a relatively unregulated European Market, because, although the reactions of the tobacco industry are difficult to predict, they are unlikely to benefit public health. The industry as a whole will seek to maximise market opportunities and exploit PR benefits - particularly the notion of 'healthy tobacco'. Furthermore, the market leader in Europe, Swedish Match, clearly sees snus as a bridgehead for building their business as whole. In this respect it is important to note that their snus business is significantly smaller than their smoked tobacco business.

- If these dangers are to be avoided, strict regulation is absolutely essential. All aspects of marketing - promotion, packaging, pricing, distribution and product design - would need to be comprehensively policed. Ultimately the only way to do this is through a fully regulated market, where a public body procures tobacco products from the manufacturers according to strict public health criteria. This provides a crucial buffer between the smoker and any form of marketing exploitation by the industry. Moreover, it would be illogical and inconsistent to apply such regulation only to snus, when other far more harmful tobacco products remain unfettered. The need then is for a fully regulated market for all tobacco products. This may be too radical at present and a more achievable aim may be for a regulatory authority.

- Strict regulation is the only way of ensuring that snus liberalisation, notwithstanding the product's clear relative safety, does not result in marketing opportunities for the tobacco industry - and resulting damage to public health. It also provides a potentially consensual way forward in a very contentious area. Without this we fear that the tobacco control community will waste much time and energy on internal disagreements and division; and the tobacco industry will waste no time in exploiting the resulting opportunities.