Chapter 10

Smokeless Tobacco Use in the European Region

Chapter Contents

Tables and Maps

Description of the Region

The World Health Organization (WHO) European Region consists of 53 member states and a population of over 890 million. The European Region includes high-income countries (e.g., Germany, Norway) and lower income countries (e.g., Uzbekistan, Georgia, Kyrgyzstan).[1] This region also includes the European Union (EU), which consists of 27 predominantly Western European member countries with a population of over 500 million (see Table 10-1 for the population of select European countries). The five Nordic countries, all considered high-income countries, have a total population estimated at 25.5 million. Within the EU, tobacco products remain widely traded. Globally, the EU is the fourth largest tobacco producer, after Asia, the Americas, and Africa.[2]

The European Region is home to two populations that have longstanding traditions of smokeless tobacco (ST) use: Scandinavians, particularly in Sweden and Norway, and the large South Asian community that has immigrated to Europe and especially to the United Kingdom (UK). Sweden is exempt from the EU's tight regulations on the sale of many types of oral and ST products and can therefore manufacture and sell snus legally nationwide.[3] The UK is home to the largest South Asian community within Europe, estimated at 4.2 million people in 2011.[4] Research shows that these groups have to varying degrees brought ST products with them from their countries of origin such as Bangladesh and India, which have the highest rates of ST use in the world. And studies show that a third population, the Uzbeks, have one of the highest rates of ST use in the European Region, although published information about ST use in Uzbekistan is limited.[5]

This chapter examines ST use—its health effects, industry marketing practices, government policy, and interventions to combat use—in the United Kingdom, the Scandinavian countries (especially Sweden), Kyrgyzstan, and Uzbekistan. These countries were selected based on the availability of survey and other research information and on the availability of documented ST prevalence rates. Because survey methods and questions differ, comparisons of estimates among the surveys should be made with caution.

Prevalence of Smokeless Tobacco Use

European regional data on tobacco use are largely focused on cigarette smoking; limited information is available on ST use.[6] In addition, surveys' definitions of current use may vary. For example, some surveys define current use as any use within the past 30 days, while other surveys ask about different time periods; some surveys ask about daily use and use on some days, and still other surveys ask about "current" use without defining the term further.

The Global Youth Tobacco Surveys provide national and/or subnational prevalence data for adolescents aged 13–15 years in 12 countries[7] (Table 10-2). The prevalence of current ST use among adolescents (defined as use in the past 30 days) ranges from 1.1% in Montenegro to 6.9% in Estonia. Smokeless tobacco use appears to be higher among boys than girls in all countries and locations except in Warsaw, Poland.[7]

Table 10-1. Population and land area of selected countries in the European Region

Country	Area (km²)	Population (thousands)
Albania	28,864	3,204
Armenia	29,731	3,092
Azerbaijan	86,679	9,188
Croatia	56,449	4,403
Denmark	43,023	5,550
Estonia	44,700	1,341
Finland	335,313	5,365
Georgia	70,194	4,352
Germany	356,286	82,302
Hungary	93,308	9,984
Iceland	106,667	320
Kyrgyzstan	197,556	5,334
Latvia	64,343	2,252
Macedonia	25,730	2,061
Moldova	33,867	3,573
Montenegro	13,717	631
Norway	375,615	4,883
Poland	70,144	38,277
Russian Federation	17,869,750	142,958
Serbia	88,000	9,856
Slovenia	20,300	2,030
Sweden	46,667	9,380
Switzerland	41,204	7,664
United Kingdom	243,278	62,036
Ukraine	605,973	45,448
Uzbekistan	449,918	27,445
Total	**21,397,252**	**492,929**

Abbreviation: km = kilometer.
Source: United Nations 2011 (69).

Table 10-2. Percentage of adolescents aged 13–15 years who currently used smokeless tobacco in the European Region, from the Global Youth Tobacco Surveys, 2007–2009

Country	Year	Total (%)	Boys (%)	Girls (%)
Albania	2009	2.0	2.3	1.7
Croatia	2007	1.9	2.7	1.1
Estonia	2007	6.9	9.4	4.5
Hungary	2008	1.7	2.1	0.9
Kyrgyzstan	2008	2.5	3.3	1.8
Macedonia	2008	3.0	3.2	2.8
Moldova	2008	3.8	5.2	2.6
Montenegro	2008	1.1	1.1	0.9
Poland – Warsaw	2009	1.8	1.3	2.2
Poland – Mazovia Province	2009	1.4	1.5	1.0
Serbia	2008	1.2	1.6	0.7
Slovenia	2007	2.2	2.0	1.8
Srpska	2008	1.4	1.8	1.1

Source: Global Youth Tobacco Survey, 2007–2009 (7).

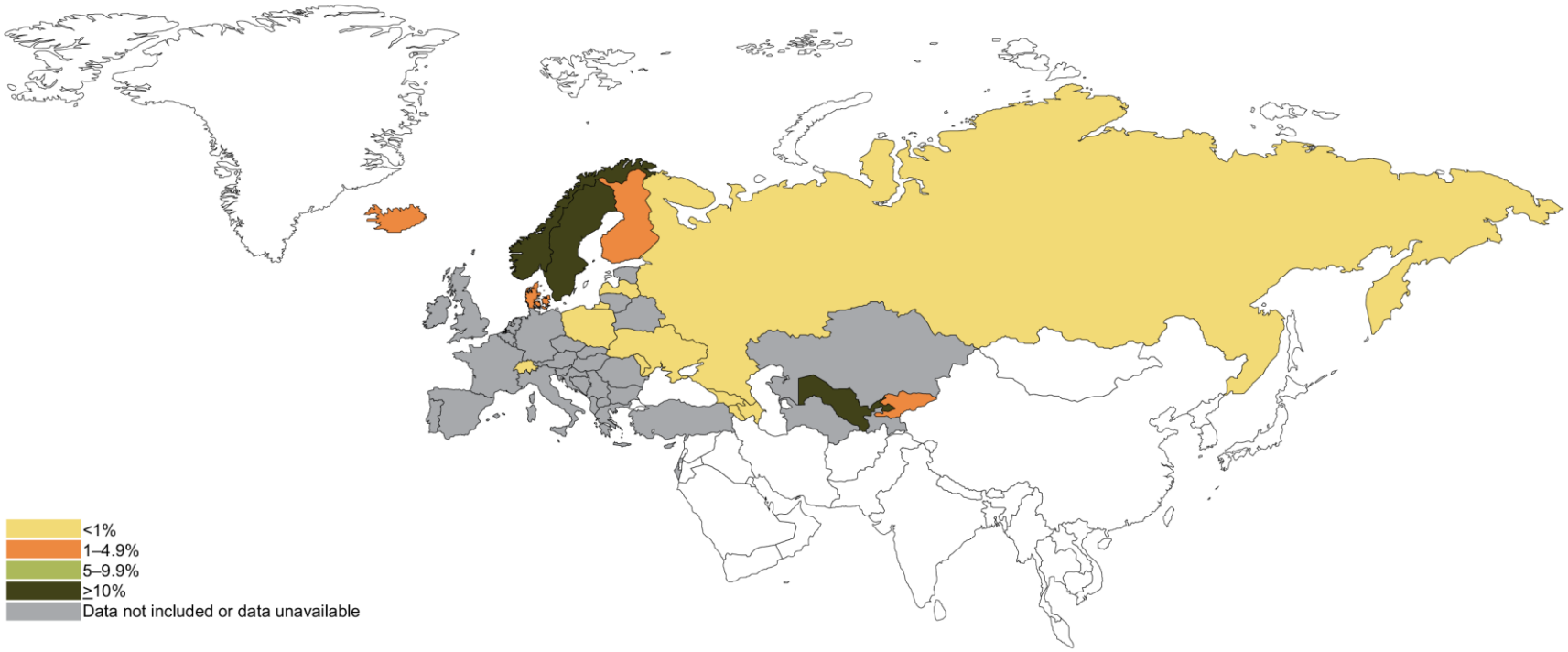
National prevalence data on ST use among adults (people aged 15 years and older) are available in 16 countries in this region (see Table 10-3; Map 10-1). These data were collected from multiple surveys including the Global Adult Tobacco Surveys (GATS), the Demographic and Health Surveys (DHS), the WHO STEPwise Approach to Surveillance (WHO STEPS), and individual country surveys as reported in the *WHO Report on the Global Tobacco Epidemic, 2011* (GTCR). While these surveys may employ different measures for smokeless tobacco use, comparisons among them should be made with caution; however, they represent the best available national estimates of prevalence. Reported prevalence of current ST use among adults (defined as use on some days or every day) varies from 0.1% in Switzerland to 17.0% in Sweden. Men reported higher rates of current use of ST products than women, with 17.0% of Norwegian men, 22.5% of Uzbek men, and 26.0% of Swedish men reporting current use.

Table 10-3. Percentage of adults who currently used smokeless tobacco in the European Region, 2005–2010

Country	Year	Age group (years)	Total (%)	Men (%)	Women (%)
Armenia*	2005	15–49	—	1.8	0.0
Azerbaijan*	2006	Men, 15–49	—	0.3	—
Denmark†	2010	15+	2.0	3.0	1.0
Finland†	2009	15–64	—	5.5	0.4
Georgia‡	2010	18–64	0.6	1.0	0.2
Iceland† (daily use only)	2008	15–89	2.9	6.0	—
Kyrgyzstan†	2005	15+	3.4	7.0	0.3
Latvia† (daily use only)	2008	15–64	0.1	0.2	—
Moldova*	2005	Men, 15–19; Women, 15–49	—	0.1	0.0
Norway†	2009	16–74	10.0	17.0	5.0
Poland§	2009	15+	0.5	1.0	0.1
Russian Federation§	2009	15+	0.6	1.0	0.2
Sweden†	2010	16–84	17.0	26.0	7.0
Switzerland†	2009	14–65	0.1	0.2	0.0
Ukraine§	2009	15+	0.2	0.5	0.0
Uzbekistan†	2006	15+	11.3	22.5	0.4

*Demographic and Health Surveys (71).
†Individual country surveys from: *WHO Report on the Global Tobacco Epidemic, 2011* (15).
‡WHO STEPS from: *WHO Report on the Global Tobacco Epidemic, 2011* (15).
§Global Adult Tobacco Survey (70).

Map 10-1. Prevalence of smokeless tobacco use among adults in the World Health Organization's European Region



Sources: Demographic and Health Surveys (71); Individual country surveys from: *WHO Report on the Global Tobacco Epidemic, 2011* (15); WHO STEPS from: *WHO Report on the Global Tobacco Epidemic, 2011* (15); Global Adult Tobacco Survey (70).

United Kingdom

Varying estimates of the prevalence of ST use in South Asian communities in the UK have been reported in 22 published papers.[8] The most comprehensive dataset is provided by the Health Survey for England (HSE), which has oversampled black and minority ethnic groups. The 2004 HSE suggested a decrease in use among Bangladeshis in the UK compared to a similar survey conducted in 1999.[9] Only two studies validated self-reported tobacco use with salivary cotinine analyses. One found a prevalence of 26% for Bangladeshi women in 1999 and 16% in 2004,[9] but the second found a prevalence of 48.5% for the same population in 2000–2001.[10] Thirteen other studies focusing on Bangladeshi samples yielded prevalence estimates between 2% and 57%, with prevalence rates higher among women.[8]

Evidence that prevalence is declining is contradicted by other sources, which indicate that (1) legal imports of ST from India increased nineteenfold between 1995 and 2009; (2) the number of retail outlets for these products has not decreased in one London municipal area, where a large Bangladeshi community lives, in the previous 11 years[11]; and (3) generational analyses have identified no significant differences in consumption between first and second generation immigrants.[12]

Studies of ST use in the UK have been criticized for using poor quality sampling methods, relying on self-reports,[8] and asking ambiguously worded questions. Terminology is also an issue. Members of Indian communities will more commonly use the term *paan* instead of *betel quid* (the term this report uses), whereas members of Bangladeshi communities might also use *khilli paan.* Many studies have failed to distinguish between paan or khilli paan with or without tobacco. The HSE includes *paan masala* as a possible response even though samples of this product, when analyzed in the laboratory, rarely contain tobacco.

No data are available on the use of ST products by the general population of the United Kingdom.[5]

Nordic Countries

In addition to the EU's ban on the sale of Swedish snus, individual countries have further restricted ST products. Sweden was exempted from the ban when it joined the EU in 1995. The market for Swedish snus in Finland and Denmark is limited because both countries are members of the EU; Swedish snus has been marketed more widely in Norway and Iceland, neither of which are EU members.

According to national WHO surveys conducted in 2009 using representative samples, the prevalence of daily snus use among adults in Sweden was 19% for men and 4% for women.[13] In Norway, 11% of men and 1% of women use snus every day.[14]

Uzbekistan and Kyrgyzstan

According to WHO data, in 2006 the prevalence of current ST use was 11.3% among the Uzbek population aged 15 years and older.[15] Males in this age group (22.5%) were much more likely to be users than females (0.4%). An earlier national survey found an "ever in lifetime" prevalence of 37.9% among males and 0.4% among females.[16] A separate study found that men who are married (odds ratio [OR] = 2.8, 95% confidence interval [CI]: 1.5–5.1), older (35–54 years: OR = 2.5, 95% CI: 1.3–4.8), or live in rural areas (negatively associated with urban residence: OR = 0.5, 95% CI: 0.3–0.7) were more

likely to use nasway, a form of ST widely used in Uzbekistan.[17] It may be that the prevalence of nasway use in Uzbekistan is influenced by the relatively higher price of cigarettes.

Less information is available for Kyrgyzstan. According to data from the National Epidemiological Study of Tobacco Use Prevalence in Kyrgyzstan, in 2005, 3.4% of adults currently used smokeless tobacco. Among men, 7% reported current ST use, compared to only 0.3% of women.[15]

Types of Smokeless Tobacco Products and Patterns of Use

Europeans use a variety of ST products. Snus originated in Sweden and is traditionally used in the Nordic countries of Sweden, Norway, Finland, and Iceland; a range of products are imported from South Asia (India, Pakistan, Bangladesh, and Sri Lanka) and used by communities of South Asian origin in Great Britain; and three national companies produce twisted tobacco for oral use in Denmark, Germany, and the UK (primarily used by the Danes). The product used in Kyrgyzstan and Uzbekistan is nasway or nasvay, a multinational product made of locally grown tobacco and an alkaline modifier such as ash or slaked lime (calcium hydroxide).

United Kingdom

Following a protocol for determining the availability of South Asian ST products in England,[18] researchers identified municipal areas with high proportions or numbers of residents of South Asian origin catalogued ST retail outlets in these areas. Then ST products for each outlet were listed, along with their branding, regulatory compliance, and sale price. South Asian ST products were found to be widely available from a variety of outlets.

Employing this protocol in a further exploration of product and brand availability within the five London municipal areas with the highest numbers of residents of South Asian origin, 54 non-duplicated brands were identified. These were prepackaged products, excluding in-store, custom-made products or products sold loose. Fifty-two percent of them originated in India, and 33% in Bangladesh. The three main types available for purchase were zarda (60%), gutka (14%), and khaini (11%).[19] Other available products included tobacco leaf, toothpowder, mawa, and qiwam. Common ingredients in zarda, gutka, and khaini are tobacco flakes or powder, with slaked lime (calcium hydroxide) as an alkalinity enhancer. Gutka also contains areca nut, which is recognized by the International Agency for Research on Cancer (IARC) as a carcinogen.[20] Gutka and zarda contain additional spices and flavorings such as saffron and menthol. Zarda is often mixed with areca nut and other ingredients to produce the homemade product paan/khilli paan. Gutka and khaini are typically sold in small individual sachets, and zarda is sold in larger containers so it can be used in the production of paan by the user at home or by a vendor at a kiosk.

Seven brands have been identified as dominant—six from India and one from Bangladesh (Table 10-4).[19] Within individual boroughs, or neighborhoods, these brands represented between one-quarter and two-thirds of the products available. Outlets serving communities of Indian origin were likely to sell a more homogeneous group of products (gutka and khaini), but those serving the Bangladeshi community were more likely to sell a variety of zarda brands from Bangladesh. These variations reflect differing cultural contexts, with domestically made khilli paan being the predominant

form of consumption in Bangladeshi communities. Zarda is produced commercially, gutka and khaini are often produced by both commercial and cottage industries, but betel quid is mostly a cottage industry or custom-made product.

Table 10-4. Dominant smokeless tobacco products and brands available in five London boroughs

Product	Brand	Origin	Price per portion			Warning
			U.S.	UK	Weight	
Gutka	Tulsi Mix	India	US$1.25–$4.20	80p–£2.69	20 g	Yes
Gutka	RMD	India	US$0.40–$1.98	25p–£1.20	5 g	No
Zarda	Baba 120 Blend	India	US$4.94–$11.56	£2.99–£7	50 g	No*
Zarda	Baba 600 Blend	India	US$57.78–$82.55	£35–£50	50 g	No*
Zarda	Dulal	Bangladesh	US$0.83–$1.63	50p–99p	15 g	No
Khaini	Mirage	India	US$0.83–$1.24	50p–75p	12 g	No
Khaini	Kuber	India	US$1.47–$2.81	89p–£1.70	10 g	Yes
Khaini	Ansal Udta Panchi	India	US$1.47–$2.81	89p–£1.70	10 g	No

*A correctly worded warning sticker is now placed on the base of the packaging.
Source: Croucher 2011 (19).

According to an assessment of 73 types of paan/khilli paan prepared for local consumption and purchased from 31 shops in these five areas of London, the mean total weight was 10.06 grams (g) per packet (95% CI: 9.26–10.86) with a mean price of US$2.32 (£1.43) (range = US$0.81–5.68, £0.50–3.50) per packet. Zarda alone was the most commonly used tobacco type in paan/khilli paan (64.4%).[21]

The excise duty for these products as of 2011–2012 was US$14 (£8.49) per 10 grams of weight, regardless of the proportion of tobacco present.[21] It has been estimated that the legal price (incorporating excise and other taxes) of a 5-gram individual packet should be at least US$1.14 (69p), but the prices identified were almost always higher. The approximate retail price of a pack of 20 cigarettes in January 2011 was US$10.95 (£6.63). Although smokeless tobacco products are required to display warning labels, it was found that the dominant brands identified here were mostly non-compliant.

The assumption that ST use will decline as immigrants become acculturated is not supported in the literature. First, chewing of paan/khilli paan with tobacco is recognized as a longstanding traditional behavior among South Asian women, whereas cigarette smoking stigmatizes women in South Asian communities. Second, although paan/khilli paan without tobacco may be chewed from an early age, women start to add tobacco to it as they reach early adulthood, marry, and leave their family home. Women's initial use of these products with tobacco is commonly attributed to social pressure from family and friends; Bangladeshi male smokers are sometimes described as chewing paan/khilli paan with tobacco as a way of building a relationship with their wives, although chewing is not regarded as a male behavior. Third, use of paan/khilli paan with tobacco is thought to relieve various health problems. It is mistakenly believed to alleviate nausea during pregnancy, promote digestion, and reduce bad

breath; there are recurrent reports that its use alleviates dental pain.[22] Finally, in the Hindu tradition, areca nut is considered a vital ingredient in paan/khilli paan and is known as the food for God; it may be used while praying if images or idols are unavailable. Paan/khilli paan is very commonly offered to guests at social occasions such as weddings.

Nordic Countries

Although *snus* is the Swedish word for all oral or nasal tobacco products, it has become synonymous with the oral moist form of pasteurized ST placed under the upper lip, and is increasingly recognized as such in the international literature. Snus has been manufactured and marketed in Sweden since the 1820s. It remained the best-selling tobacco product in Sweden for the next 100 years, until the early 1940s, when cigarettes became the preferred way to consume tobacco. Snus use and tobacco chewing were strictly male behaviors, and spittoons were found in banks, on railway trains, and in hotels. However, with the rapid increase in smoking, snus use came to be seen as a behavior of rural and older men.

In Sweden, snus consumers are now mainly under the age of 50, which reflects heavy marketing efforts by the commercial industry since the 1970s, when snus use was becoming unfashionable.[23] Patterns of snus use between regions of Sweden, however, may differ. The proportion of snus users is greater in the northern parts of Sweden, particularly among women. Cultural barriers against snus use by women have been lowered, but the percentage of women who are daily users is still low—less than 5%.[13] Among Swedish 6th graders, 2.7% of boys and 1.8% of girls use snus in addition to the 15% of boys and 5.2% of girls who use both cigarettes and snus.[24]

Swedish snus is sold either packed loose or portion-packed in small teabag-like sachets. Both varieties are sold in tins or round paper or plastic boxes. Loose snus is a moist powder which can be formed into a cylindrical or spherical shape with the fingertips. The end result is referred to as a *pris* (pinch) or *prilla.* Longtime users may simply pinch the tobacco in place under the upper lip where it is kept in the recess between gingiva and lip. Prepacked portion snus, the better selling variety, usually contains smaller doses that can be used more discreetly. Swedish snus, in both loose and sachet forms, is placed under the upper lip for a period of 30 minutes to a couple of hours. The nicotine in snus is absorbed through the mucous membrane of the oral cavity, as are other substances. The juice produced in this process is usually swallowed and spitting is uncommon. Prepacked portion snus comes in two variants. The original portion, introduced in 1977, is packed in a moisturized brown material when manufactured; the white portion is packed in white sachet material and not moisturized. Prepacked portion snus is available in three different sizes: mini, normal/large, and maxi. Total portion weight in boxes or tins may vary, but mini portions weigh 0.5 g, normal/large portions weigh 1 g, and maxi portions weigh 1.7 g. Swedish snus is sold in general stores, convenience stores, gas stations, tobacco shops, and from vending machines in shops and restaurants. It is often stored in refrigerators to minimize fermentation and bacterial growth.

The price of snus compared to cigarettes varies according to country. A box of the General brand of Swedish snus costs between US$5.50 and $7.20 (37 to 49 Swedish kronor), and a pack of Marlboro cigarettes costs US$7.20 (49 Swedish kronor).[25] In Norway these two products cost

between US$8.50 and $13.50 for General snus (51 to 81 Norwegian kronor) and roughly US$14.00 (84 Norwegian kronor) for Marlboro cigarettes.[26]

In 2012, it was estimated that over 200 different varieties of snus were offered on the Swedish market.[27] The products differ in packaging, alkalinity, other additives, and flavoring. Flavoring of snus is abundant. The largest manufacturer, Swedish Match, lists over 240 ingredients that are used as flavors in snus, including herbal extracts (e.g., menthol), spices/flavorings (ginger, basil, and lime oil/extract), and alcohol (whiskey).[28] General is the best-selling brand of snus in Sweden.

Snus manufactured in Sweden is sold in Nordic countries as well as in other countries around the world. There are about a dozen manufacturers of snus, and Swedish Match is the dominant producer, with about 85% of the market in Sweden and 70% of the market in Norway.[29] Smaller domestic companies market products mostly within the Nordic region. The Nordic market has been fairly stable since the year 2000. In European Region countries other than the Nordic countries, international tobacco companies such as British American Tobacco, Japan Tobacco International, Philip Morris, and Imperial Tobacco market snus products that are not considered Swedish snus and do not meet the manufacturing standards set for Swedish snus.

Uzbekistan and Kyrgyzstan

In both Uzbekistan and Kyrgyzstan, the most commonly used form of ST is known as nasway or nasvay. As central Asian countries, they are geographically close to Pakistan and Afghanistan (in the WHO Eastern Mediterranean Region) where this product is referred to as nass, naswar, or niswar.[20,30] Nasway contains the same main ingredients as nass, but the published information is insufficient to determine if nass and nasway are exactly the same product.

In Uzbekistan and Kyrgyzstan, nasway is mostly produced as a custom-made or cottage industry product. Nasway is partially manufactured before it is sold to consumers. The core ingredients are locally grown, sun-dried tobacco and an alkalinity modifier such as ash or slaked lime (calcium hydroxide).[20,30] Other flavorings and spices such as cardamom or menthol may be added according to preference. The product also contains an emulsifying agent such as butter or oil. Water is added during mixing of the ingredients, and the mixture is then rolled into balls. A ball is placed under the tongue on the floor of the mouth and sucked. Nasway is sold in 15- to 20-gram packs at US$0.21 in Uzbekistan, where it is cheaper than locally produced cigarettes (US$0.35 per pack).[17]

Toxicity and Nicotine Profiles of Products

United Kingdom

Some of the South Asian ST products used in the UK contain *Nicotiana rustica,* a tobacco with high alkalinity and a higher concentration of nicotine than the more commonly used tobacco, *N. tabacum*. In India, most ST products are made of *N. rustica*, while smoking tobacco tends to be made of *N. tabacum.* (For more information on the toxicity and nicotine profiles of ST products used in England, see chapter 3.)

One study investigating the toxicity of some of the products available in the UK assessed data on nicotine content and tobacco-specific nitrosamine levels, and found that all the tested products were likely to be hazardous to users' health, with all but 1 of 11 tested brands containing tobacco-specific nitrosamines (TSNAs) at varying levels. Nicotine ranged from 3 milligrams per gram (mg/g) to 83.5 mg/g in these tobacco products, with gutka at the low end of the range and tobacco leaf at the highest. Free nicotine was also high in several of the gutka products as well as in tooth-cleaning powder and Swedish snus (between 3 mg/g and 63.2 mg/g in these products). Gutka and tooth-cleaning powder also had the highest pH levels of the products tested.[31]

An additional UK data source is the Niche Tobacco Products Directory (NTPD).[32] This website informs the activities of local authorities and excise enforcement officers with respect to ST regulation and seizure. The directory focuses primarily on the tobacco content of a product; it does not report additional toxicity information. The NTPD data suggest that tobacco content varies considerably, particularly in Bangladeshi products; the tobacco content of one popular zarda brand was observed as varying between 5% and 20%. An assay of the contents of paan/khilli paan sold in London found that the mean tobacco weight was 0.65 g (95% CI: 0.56–0.76) and the mean weight of slaked lime (calcium hydroxide) was 0.58 g (95% CI: 0.41–0.75).[21] Although zarda alone has a relatively low pH, the mixture of slaked lime and zarda used in paan/khilli paan varied between pH 12.2 and pH 12.5, indicating that 99% of the nicotine was available as free nicotine.[21]

Nordic Countries

Swedish snus products vary in their levels of nicotine content and free nicotine. For example, so-called "starter" brands such as Catch Mint often have a lower pH and less free nicotine, and stronger varieties such as General, the market's leading brand, have a higher alkalinity.

All manufacturers of Swedish snus pasteurize their products, and most adhere to the GothiaTek standard (Table 10-5).[33] As a consequence, snus products manufactured in Sweden using this standard have lower levels of toxicants than most products found in other countries. This voluntary standard[34] comprises the following requirements with respect to:

- *Manufacturing*
  - Adherence to the International Organization for Standardization's quality standard ISO 9001:2000 and environmental standard 1401:1996.
- *Raw materials*
  - Selected leaf tobacco is used; additives should comply with requirements specified in the Swedish Food Act.
- *Process*
  - Snus pasteurization involves heat treating to kill the natural microbial flora. The manufacturing process must be performed in a closed system, and the tobacco must be comminuted (i.e., made into a powder) in a controlled process. Directly after packaging, the finished product is placed into cold storage with a maximum temperature of 8ºC.

- *Manufacturing hygiene*
  - All product exposure must satisfy the hygiene requirements of food manufacturing.
  - The processing equipment is cleaned and disinfected at least once in every production cycle, and packaging machinery is cleaned and disinfected at least once every 24 hours. Water activity, bacterial content, and shelf-life stability are tested on finished products. The packaging material must also satisfy hygiene standards.
  - The results of all controls must meet the tolerance limits specified for Swedish snus by GothiaTek.

Table 10-5. The GothiaTek standard limits and average content for important toxic constituents in tobacco, 2011

Component	Limit	Content* (2011) (±2 SD)	Component (mg/kg)	Limit*	Content* (2011) (±2 SD)
Nitrite (mg/kg)	3.5	1.0 (<0.5–1.9)	Cadmium	0.5	0.2 (0.1–1.4)
TSNA (mg/kg)	5	0.7 (0.5–1.1)	Lead	1.0	0.1 (0.05–0.2)
NDMA (µg/kg)	5	0.4 (<0.3–1.1)	Arsenic	0.25	<0.05 (<0.05–0.09)
BaP (µg/kg)	10	0.5 (<0.5–0.8)	Nickel	2.25	0.7 (0.3–1.0)
Agrochemicals	According to Swedish Match Agrochemical Management Program	Below Swedish Match internal limits	Chromium	1.5	0.3 (0.1– 0.6)

*Limits and average contents are based on Swedish snus with 50% water content.
Abbreviations: TSNA = tobacco-specific nitrosamines; NDMA = *N*-nitrosodimethylamine; BaP = benzo*(a)*pyrene; SD = standard deviation; mg/kg = milligram per kilogram; µg/kg = microgram per kilogram.
Source: Swedish Match 2012 (34).

Uzbekistan and Kyrgyzstan

The predominant product in these countries, nasway, is made from *N. rustica,* which has a higher concentration of nicotine than common tobacco. Nasway samples have high pH levels and contain more than 70% free nicotine, indicating their high potential for causing dependency.[35]

Health Problems Associated With Use

The carcinogenicity of ST has been evaluated by the IARC,[20] which concluded that ST is carcinogenic. This section discusses data on cancer, addiction, and other health problems associated with ST use specific to the UK, the Nordic countries, Uzbekistan, and Kyrgyzstan.

United Kingdom

Data on cancer incidence rates suggest that cancer of the oral cavity (excluding the inner part of the lip and the hard palate) is one of the most common subtypes of head and neck cancer.[36] Among the more than 6,400 people diagnosed with head and neck cancers in 2007 in the UK, more than

2,000 (approximately 1,200 men and 800 women) had oral cavity cancer. Rates of oral cavity cancer in the UK increased between 1990 and 2007 by nearly 30%.[36] In addition to smoking and drinking alcohol, chewing paan/khilli paan by ethnic South Asians is suggested as the main risk factor. London, which has many South Asian communities, has the highest incidence rate for oral cancer, with a higher incidence of oral and pharyngeal cancer among women of South Asian origin. Other data indicate that women of South Asian origin were more than three times more likely to have oral cancer than non–South Asian women (incident rate ratio = 3.7, 95% CI: 3.0–4.5), after controlling for levels of social deprivation.[37]

A second major health consequence in the UK is the creation of nicotine dependence, specifically among people who chew paan/khilli paan with tobacco. Studies validating self-report measures of dependency with salivary cotinine scores found associations with a high daily consumption frequency, having the first paan within 1 hour of waking, and feelings of craving.[11] Of particular concern in relation to high dependency is the dual use of tobacco leaf and zarda together in paan/khilli paan.

Nordic Countries

Because the GothiaTek standard of snus manufacturing and storage was adopted in the late 1990s, the health effects of long-term exposure to modern Swedish snus manufactured under this standard are largely unknown as of this writing (2014).

Habitually placing snus in the same place in the mouth often leads to irritation of the gum ("the snus lesion").[38] A comprehensive meta-analysis of the health effects of ST found mixed, inconclusive evidence for the role of snus in periodontal conditions including gingival diseases.[38] This work (and the earlier reviews underpinning it) was supported by Philip Morris Products, Swedish Match, and the European Smokeless Tobacco Council (comprised of tobacco manufacturers and distributors and representing tobacco industry interests).

In 2008 the EU Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) published its opinion "Health Effects of Smokeless Tobacco Products," with particular emphasis on snus, noting that these products are addictive and hazardous to health.[30] Results of epidemiologic studies on snus use and cancer are not fully consistent. A 2008 review[39] of the existing evidence concluded that snus is carcinogenic. In Northern European studies, the relative risk of snus use for esophageal cancer was found to be 1.6 (95% CI: 1.1–2.3) and for pancreatic cancer, 1.6 (95% CI: 1.1–2.2). A meta-analysis funded by the European Smokeless Tobacco Council found that when adjusting for smoking, smokeless tobacco products in general had a significant association of 1.4 for oropharyngeal cancer (95% CI: 1.0–1.8) and 1.3 for prostate cancer (95% CI: 1.1–1.6).[40] When only looking at reports published since 1990, the Council found that the association with oropharyngeal cancer was not significant.

Epidemiologic studies and experimental animal studies show that snus affects the cardiovascular system—for example, blood pressure and pulse rate. The evidence regarding an association between long-term use of snus and hypertension is not consistent. Snus use does not appear to increase the risk of myocardial infarction (heart attack),[41,42] but it is associated with an increased risk of mortality from heart disease, including myocardial infarction.[41,43] Similarly, long-term snus users seem to be at increased risk for fatal stroke (relative risk: 1.4, 95% CI: 1.3–1.5).[41,44]

The available evidence is too limited to allow firm conclusions about snus use in relation to diabetes. The evidence regarding snus use during pregnancy is also limited. Results of one Swedish study showed an increased risk of pre-term delivery and pre-eclampsia for mothers who used snus during pregnancy.[45]

Uzbekistan and Kyrgyzstan

In addition to the potential for dependency, the literature identifies use of nasway in these countries as a risk factor for esophageal squamous cell carcinoma and oral precancerous lesions such as oral leukoplakia (precancerous lesions).[46] Lifetime Uzbek nasway users were more than five times as likely (OR = 5.2, 95% CI: 3.1–8.6) to develop oral leukoplakia as never users.[46]

Marketing and Production Practices of Industry

United Kingdom

Marketing of ST in the UK is informal, relying on point-of-sale displays, packaging styles, and affordability. Since most of the ST products in the UK are imported from India, they are marketed and sold to differing ethnic subgroups in the region.

Product brands and their associated packaging and displays follow recognizable themes:

- *Respect.* "Baba," the name of a zarda brand from India, is an honorific denoting respect; it means sir, father, grandfather, wise old man. References to age and wisdom may also be made through illustrations on packaging.
- *Health, medicinal plants.* "Tulsi," a gutka brand from India, is the name of the herb basil, which contains eugenol, a substance with analgesic and antiseptic properties. Basil is widely known across South Asia as a medicinal plant and is commonly used in Ayurvedic medicine to treat a range of conditions, including bronchitis, asthma, malaria, and arthritis.
- *Prosperity.* "Kuber," a khaini brand from India, is the name of the lord of wealth in Hindu tradition; he is also recognized within Buddhism and Jainism. Kuber is usually depicted as a fat, bejeweled man carrying a money bag.

Nordic Countries

As previously mentioned, all manufacturers of Swedish snus must adhere to the GothiaTek quality standard that was voluntarily adopted by the industry in the late 1990s.[33] Initial efforts to improve production standards began in the late 1960s when concerns were raised about the formation of ammonia and nitrate in snus, as well as other quality problems. In 1971, snus came under jurisdiction of the Swedish Food Act, requiring manufacturers to implement new quality control measures, which continued to be developed over several decades.[33]

The EU prohibits the sale of oral tobacco products—that is, moist snuff or snus—in EU countries such as Denmark and Finland, but allows these products to be sold in Sweden. Swedish snus is rarely used in Denmark, but it is acquired illicitly in Finland, particularly by that country's Swedish-speaking minority. The prohibition of snus sales within the EU has repeatedly been challenged by Swedish Match and by the Swedish Ministries of Trade and of Health and Social Affairs. Swedish Match dominates

the production in this region, and its market has not changed much in the last decade. Internet purchases are still possible, but most Internet-based vendors are located in Sweden and they market to other EU citizens.[47]

Point-of-sale advertising is largely unrestricted in Sweden but banned in Norway, where all tobacco products are stored behind closed shutters marked "Tobakk" (grey cabinet) or "Snus" (white cabinet). Media advertising of all tobacco products (on TV, radio, print media, and outdoor billboards) is banned or restricted in Sweden, Norway, and Iceland. Norway's comprehensive ban on tobacco advertising also bans indirect advertising, such as advertisements for non-tobacco products that depict tobacco or advertising using colors and designs that resemble tobacco brands.

Uzbekistan and Kyrgyzstan

Nasway is produced by cottage industries, or in some cases, is custom-made. Nasway originating from Pakistan is available for wholesale purchase on the Internet. No marketing data are available for Kyrgyzstan.

Current Policy and Interventions

The European Union

The health risks of tobacco use are well recognized within the EU, where initial tobacco control measures were introduced in 1987.[48] The EU is the only regional political and economic entity that has become a full signatory to the WHO Framework Convention for Tobacco Control (FCTC). At the beginning of the FCTC negotiations, the EU had already implemented a public information campaign and banned TV advertising of tobacco products and sponsorship by tobacco companies.[49] The EU tobacco product labeling requirements predate FCTC Article 11. Since the introduction of the FCTC, the EU has chaired the Intergovernmental Negotiating Body on Illicit Trade (FCTC Article 15). EU tobacco control activity is cross-cutting, also affecting taxation, illicit trade, and agricultural policies. As of 2013, two Nordic countries, Norway and Iceland, are not EU members but follow most of the EU tobacco regulatory framework.

The EU Tobacco Products Directive (EU Directive 2001/37/EC) was issued in 2001 and intended to be a model on which individual states could pattern their own tobacco regulations.[3] The Directive establishes warnings on packs, product traceability, annual reporting of ingredients, and maximum yields of tar, nicotine, and carbon monoxide in cigarettes, and prohibits use of the terms "mild" and "light." According to the Directive, text warnings are mandatory but pictorial warnings are optional (Table 10-6). Seven EU member states and three non–EU European states have adopted pictorial warnings for cigarettes.

In December 2012, the EU adopted a proposal to revise the Tobacco Products Directive that would further restrict the manufacture, sale, and presentation of tobacco products. The proposal maintains a ban on oral tobacco products, except in Sweden, and proposes major revisions such as a ban on characterizing flavors, prior notification for retailers intending to sell products across borders (such as Internet retailers) and for manufacturers intending to sell novel tobacco products, and mandatory pictorial health warnings for cigarettes but not ST products. The proposal is expected to be adopted by the EU in 2014 and go into effect in 2015–2016.

Table 10-6. EU Tobacco Products Directive: Regulations for cigarettes and smokeless tobacco in the 2001 Directive (2001/37/EC) and the December 2012 proposal

Legal control	Year	Cigarettes	Smokeless tobacco
Ingredients	2001	List of ingredients and their quantities, purpose, and health effects must be disclosed and made public	List of ingredients and their quantities, purpose, and health effects must be disclosed and made public
	2012 Proposal	Ban on characterizing flavors	Ban on characterizing flavors
Maximum yields information	2001	Maximum yields of tar, carbon monoxide, and nicotine covering at least 10% of the package	No maximum yields required
	2012 Proposal	Maximum yields are maintained, but labeling of this information is considered misleading and will be changed	No maximum yields required
Traceability	2001	Code identifying place, time, and date of manufacture	Code identifying place, time, and date of manufacture
	2012 Proposal	Fully implement tracking system with security features to easily identify authentic tobacco products and hinder illicit trade	Same as cigarettes, except ST products are granted a 5-year transitional period
Health warnings	2001	Two warnings: Front: One of two general warnings covering at least 30% of surface; Back: One of 14 rotating warnings covering at least 40% of surface	One warning: "This product can damage your health and is addictive." Warning covers at least 30% of surface
	2012 Proposal	Combined pictorial and text warning must cover 75% of front and back of the package	Health warning must be placed on both sides package, but size remains the same
Pictorial warnings	2001	Optional*	Optional
	2012 Proposal	Required	Optional

*As of 2011, pictorial warnings for cigarettes have been adopted voluntarily by seven EU members.
Sources: For information on the 2001 Directive: The European Parliament and the Council of the European Union 2001 (3). For information on the 2012 proposal: European Commission 2012 (72).

With respect to ST products, the Directive distinguishes between:

- *Tobacco products*: "products for the purposes of smoking, sniffing, sucking or chewing inasmuch as they are, even partly, made of tobacco," and
- *Tobacco for oral use*: "all products for oral use, except those intended to be smoked or chewed, made wholly or partly of tobacco, in powder or particulate form … particularly those presented in sachet portions … or in a form resembling a food product."[3]

Tobacco products "for oral use," namely snus and moist snuff, are prohibited within the EU at this writing (2013). The UK had previously banned these products following an attempt in the mid-1980s to introduce a new ST product (Skoal Bandits) that targeted adolescents in the UK.[50] Sweden was allowed to retain its use of snus, an oral moist snuff, at its accession to the EU.

The Directive's regulations differ for smoked tobacco and ST (see Table 10-6), most obviously with respect to requiring that packaging display health warnings. There have been no EU–wide proposals for pictorial warnings on ST products specifically, although some member states have proposed adopting pictorial warnings and increasing the size of warnings for cigarettes.

Reports and consultations from the UK have contributed to regional debates about the possible role of ST in helping smokers quit, and about appropriate public health responses to diversification of the ST market.[51,52] These efforts have collectively highlighted the need to develop a consistent and inclusive regulatory approach sufficient for all nicotine-containing products, whether medicinal, smoked, or smokeless.

United Kingdom

An example of a campaign to prevent the adverse health effects of ST use, an oral cancer prevention program, Open Up to Mouth Cancer, developed by Cancer Research UK, was introduced in a Bangladeshi community in the UK.[53] More than 1,300 participants were recruited, of whom 75 were urgently referred for further investigation. Participants with low education levels or who chewed paan with tobacco were more likely to be referred for further investigation. Four in 10 tobacco users attending one phase of the screening were recruited into a flexible community outreach service offering cessation support.[53] An evaluation of the campaign materials developed for this community demonstrated that accessing these materials improved participants' knowledge of oral cancer prevention and of the adverse effects of using smokeless tobacco.[54]

Regarding ST cessation interventions, the English National Health Service developed guidance for the Stop Smoking Service[55,56] that reflects advances in the evidence base. These guidelines advise that cessation services for ST users should be discretionary, and limited evidence suggests that behavioral support may be effective for some individuals.

Two studies have been published on cessation support for UK resident Bangladeshi ST users.[22,57] The first study compared a single session of brief advice and encouragement with weekly behavioral advice and access to nicotine replacement therapy (NRT) patches. The researchers found that the intervention providing advice and access to NRT was associated with more successful, although not statistically

significant, cessation with respect to cotinine-validated abstinence at 4 weeks. The second report, a prospective cohort study of a flexible community outreach service, found that NRT use, community recruitment, and living in a relatively less deprived area predicted short-term self-reported quit success. Wider dissemination of this service delivery model has continued to demonstrate similar outcomes and high levels of client satisfaction.[58]

The tobacco control plan for the UK as of 2011 is built around the WHO MPOWER principles and includes proposals for (1) harmonizing the regulation of smoked and ST products within the context of the EU Tobacco Products Directive, (2) implementing the Health Act (2009), and (3) calling upon the National Institute for Health and Clinical Excellence (NICE) to provide public health guidance to help people of South Asian origin stop using smokeless tobacco.[59] Although the UK was the third country in the EU to introduce pictorial warnings on cigarettes specifically, it was the first nation to introduce them on all tobacco product packaging.[60] The 2009 Health Act prohibits displays of tobacco products, whether smoked or smokeless, at point of sale, and is the first UK legislation to include both tobacco types. However, the timetable for implementing the Act has been relaxed, and small retail outlets, such as those selling ST products, will not be required to comply until 2015. The NICE Public Health guidance, published in 2012, proposes a systematic engagement with South Asian communities in the planning and implementation of smokeless tobacco cessation services.[61] While endorsing the current advice to adopt behavioral support for cessation attempts, the report notes that nicotine replacement therapy should be used for clients with demonstrable clinical need. The UK's tobacco control plan commits to further developing the Web-based Niche Tobacco Products Directory.

In addition, local initiatives have also been attempted, such as classifying spitting paan/khilli paan juice as criminal damage liable to a fixed-penalty enforcement.[62]

Nordic Countries

Prominent among the nongovernmental organizations in Sweden that have successfully advocated for tobacco control is Health Professionals Against Tobacco. This alliance of doctors, dentists, nurses, teachers, and psychologists has worked since 1992 to promote a tobacco-free Sweden through monitoring the political process, increasing awareness and availability of information material, and engaging in international cooperation.[63]

Although switching from cigarette smoking to snus use is sometimes presented as a preventive measure, the public health community has not supported it. No community programs have advised this switch, but an estimated 20% of general medical practitioners may advise individual patients to switch from smoking to snus.[64] However, rates of cessation and attempts to quit are lower among snus users than cigarette users.[65,66] Although limited research is available for snus-specific interventions, varenicline has been demonstrated to significantly aid snus cessation.[67]

Uzbekistan and Kyrgyzstan

Kyrgyzstan is an FCTC signatory; Uzbekistan is not. The two countries vary in their commitments to population protection, cessation promotion, provision of health warnings, and enforcement of bans on tobacco advertising. Kyrgyzstan has adopted specific national objectives for tobacco control and a tobacco control budget that funds a national unit for tobacco control, but Uzbekistan has undertaken neither of these initiatives.

In Uzbekistan, health warnings are required on cigarette packaging only. Tobacco advertising in the national media and outdoors is banned. Kyrgyzstan is reported to require health warnings on ST products. Legal mandates also control the percentage of the package these warnings will cover and specify the number and wording of health warnings as well as the fines for violations. Kyrgyzstan has a wider range of bans on tobacco advertising, promotion, and sponsorship than Uzbekistan.

Summary and Conclusions

Given that the European Region contains two populations with longstanding traditions of ST use—the Scandinavian countries of Sweden and Norway, and the large South Asian community that has immigrated to Europe, particularly the UK—the trajectory of ST use in this region is of vital importance.

European regional data on tobacco use are primarily focused on cigarette smoking, therefore additional information is needed on smokeless tobacco. The dataset cited in this chapter provides adult ST prevalence data for fewer than one-third of the European Region's countries. In addition to the paucity of data about adult prevalence, little information is available on youth ST use. From the available evidence, ST prevalence among adults varies from 0.1% in Switzerland to 17.0% in Sweden.

Swedish snus has been historically used in the Nordic countries, and additional products are imported from South Asia and used by communities of South Asian origin in the UK. In the European region, nasway (nasvay) is used primarily in Uzbekistan and Kyrgyzstan. In Denmark, Germany, and the UK, national companies produce twisted tobacco for oral use.

Swedish snus and South Asian ST products have demonstrably different health risk profiles, although the adverse health effects of snus products specifically manufactured according to the GothiaTek standard are largely unknown. With respect to preventing ST use, screening and diagnosing health consequences, and assisting chewers to quit, there is little coherent activity throughout the region. Prevention and cessation efforts have remained focused predominantly on smoking. The mandated requirement in Kyrgyzstan for health warnings on nasway is an example from outside the EU of tobacco control regulation that may have a wider geographical applicability.

This chapter has highlighted the role of the EU as a key player in leading tobacco control efforts within the European Region. Although the sale of moist snuff or snus is restricted in EU countries such as Denmark and Finland, it is allowed in Sweden. The prohibition of snus sales within the EU has been challenged by Swedish Match and by the Swedish Ministry of Trade and Ministry of Health and Social Affairs on numerous occasions. Identified gaps in surveillance activity have had a negative impact on

the development of coherent, inclusive, evidence-based tobacco control regulation within the EU. Characterizing some of these products as "niche" or marginal may preclude development of the desired evidence base.

In addition to European Union efforts, local initiatives can make important contributions to global tobacco control and prevention. For example, bilateral agreements could ensure that exported ST products comply with regulations of the importing countries. Three of the seven leading ST brands sold in the UK are manufactured and distributed by two Indian conglomerates. Implementation of bilateral arrangements might also benefit consumers in these conglomerates' domestic markets. The number of gutka brands available for purchase in the UK declined following a 2011 Indian Supreme Court order banning the use of plastic as a gutka packaging material,[68] thus restricting its export. In Sweden, there are no fines for throwing away cigarette butts and snus sachets on the streets, and these discarded items make up most of the litter on the streets; the environmental impact of this litter awaits appropriate investigation. In the UK, the 2009 Health Act demonstrates how ST products can be included in legislation along with smoked tobacco products simply by using the more general term "tobacco" to define these products. Lastly, in the UK the Niche Tobacco Products Directory illustrates the potential of a publicly available Web-based resource to strengthen the ST policy agenda.

References

1. World Bank and International Finance Corporation. Doing business: economy characteristics. Washington, DC: The World Bank; 2013. Available from: http://www.doingbusiness.org/data/exploreeconomies/economycharacteristics
2. Bittner B, Borsos J. Trends in the European tobacco sector. Second AGRIMBA-AVA Congress. Wageningen, The Netherlands: Wageningen University; 2011 [cited 2012 Aug 8]. Available from: http://www.aep.wur.nl/NR/rdonlyres/D3255A0B-D9AB-4EF3-93EE-EE059BA76DAF/141037/F117_Bittner.doc
3. The European Parliament and the Council of the European Union. Directive 2001/37/EC of the European Parliament and of the Council (5 June 2001) on the approximation of the laws, regulations and administrative provisions of the member states concerning the manufacture, presentation and sale of tobacco products. Official Journal of the European Communities. 2001, L194/26–34. Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2001:194:0026:0034:EN:PDF
4. Office for National Statistics (UK). Release: 2011 census, local characteristics on ethnicity, identity, language and religion for output areas in England and Wales. Reference tables: ethnic group by sex by age, table number LC2101EW. 2013 Jul 31 [cited 2014 Jan 30]. Available from: http://www.ons.gov.uk/ons/rel/census/2011-census/local-characteristics-on-ethnicity--identity--language-and-religion-for-output-areas-in-england-and-wales/index.html
5. World Health Organization. WHO report on the global tobacco epidemic, 2011. Country profile: United Kingdom of Great Britain and Northern Ireland. Geneva: World Health Organization; 2011. Available from: http://www.who.int/tobacco/surveillance/policy/country_profile/gbr.pdf
6. World Health Organization. The European tobacco control report. Copenhagen: World Health Organization, Regional Office for Europe; 2007 [cited 2012 Aug 8]. Available from: http://www.euro.who.int/__data/assets/pdf_file/0005/68117/E89842.pdf
7. Centers for Disease Control and Prevention. [Unpublished data from the 2007–2010 Global Youth Tobacco Surveys (GYTS).] Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; [no date] [cited 2012 Jan 25].
8. McNeill A, Pritchard C, Longman J, Leonardi-Bee J, Myles P, Aveyard P, et al. Smokeless tobacco in the UK—products, populations and policy. Summary of final report. Nottingham, UK: University of Nottingham, UK Centre for Tobacco Control Studies; 2010. Available from: http://www.ukctcs.org/ukctcs/documents/smokelessprojectreport.pdf
9. Sproston K, Mindell J, editors. Health Survey for England 2004. Volume 1: The health of minority ethnic groups. Leeds: The Information Centre; 2006.
10. Croucher R, Islam S, Jarvis M, Garrett M, Rahman R, Shajahan S, et al. Tobacco dependence in a UK Bangladeshi female population: a cross-sectional study. Nicotine Tob Res. 2002;4(2):171–6.
11. Croucher R, Awojobi O, Dahiya M. Smokeless tobacco scoping survey of the London borough of Tower Hamlets. London: Queen Mary University of London, Barts and the London School of Medicine and Dentistry; 2009.
12. Núñez-de la Mora A, Jesmin F, Bentley GR. Betel nut use among first and second generation Bangladeshi women in London, UK. J Immigrant Minor Health. 2007;9(4):299–306.
13. Forey B, Hamling J, Hamling J, Thornton A, Lee P. International smoking statistics: Sweden. A collection of worldwide historical data [Web edition]. Sutton, UK: PN Lee Statistics & Computing, Ltd.; 2009 [cited 2012 Sep 13]. Available from: http://www.pnlee.co.uk/Downloads/ISS/ISS-Sweden_111024.pdf
14. Helsedirektoratet. Tal Om Tobakk: 1973–2009. Oslo: Helsedirektoratet; 2010 [cited 2012 Sep 13]. Available from: http://www.helsedirektoratet.no/publikasjoner/tal-om-tobakk-1973-2009/Publikasjoner/tall-om-tobakk-1973-2009-nynorsk.pdf. Norwegian.
15. World Health Organization. WHO report on the global tobacco epidemic, 2011. Appendix VIII—Table 8.2: Crude smokeless tobacco prevalence in WHO member states. Geneva: World Health Organization; 2011. Available from: http://www.who.int/tobacco/global_report/2011/en_tfi_global_report_2011_appendix_VIII_table_2.pdf
16. Ministry of Health (Uzbekistan). Uzbekistan Health Examination Survey, 2002. Calverton, MD: Uzbekistan Ministry of Health, Analytical and Information Center; Uzbekistan Ministry of Macroeconomics and Statistics, State Department of Statistics; and ORC Macro; 2004. Available from: http://pdf.usaid.gov/pdf_docs/PNACX976.pdf
17. Usmanova G, Neumark Y, Baras M, McKee M. Patterns of adult tobacco use in Uzbekistan. Eur J Public Health. 2012;22(5):704–7. doi: 10.1093/eurpub/ckr125
18. Longman JM, Pritchard C, McNeill A, Csikar J, Croucher RE. Accessibility of chewing tobacco products in England. J Public Health (Oxf). 2010;32(3):372–8.

19. Croucher R. Smokeless tobacco in the UK: products, prevalence and profile [unpublished presentation]. UK National Smoking Cessation Conference, London, 2011 [cited 2012 Aug 8]. Slides available from: http://www.uknscc.org/uknscc2011_presentation_23.php?show=archive
20. International Agency for Research on Cancer. Smokeless tobacco and some tobacco-specific *N*-nitrosamines. IARC monographs on the evaluation of carcinogenic risks to humans. Vol. 89. Lyon, France: World Health Organization, International Agency for Research on Cancer; 2007. Available from: http://monographs.iarc.fr/ENG/Monographs/vol89/mono89.pdf
21. Croucher R, Dahiya M, Gowda KK. Contents and price of vendor assembled paan quid with tobacco in five London localities: a cross-sectional study. Tob Control. 2013 Mar;22(2):141–3. doi: 10.1136/tobaccocontrol-2012-050564
22. Croucher R, Pau AK, Jerreat M, Begum S, Marcenes W. Oral health of Bangladeshi women tobacco-with-paan users and self-reported oral pain following tobacco cessation. J Public Health Dent. 2003;63(4):235–9.
23. Norberg M, Malmberg G, Ng N, Broström G. Who is using snus?—Time trends, socioeconomic and geographic characteristics of snus users in the ageing Swedish population. BMC Public Health. 2011;11(Dec):929.
24. Galanti MR, Rosendahl I, Post A, Gilljam H. Early gender differences in adolescent tobacco use—the experience of a Swedish cohort. Scand J Public Health. 2001;29(4):314–7.
25. Euromonitor International. Country report: smokeless tobacco in Sweden. September 2012. Available by subscription from: http://www.euromonitor.com
26. Euromonitor International. Country report: smokeless tobacco in Norway. August 2011. Available by subscription from: http://www.euromonitor.com
27. The Northerner. Swedish snus [Internet]. Mechanicsburg, PA: Northerner Scandanavia, Inc.; 2012 [cited 2012 Oct 3]. Available from: http://int.northerner.com
28. Swedish Match. Ingredients in snus [Internet]. Stockholm: Swedish Match; [no date] [cited 2011 Jul 14]. Available from: http://www.swedishmatch.com/en/Our-business/Snus-and-snuff/Ingredients-in-snus/
29. Kesmodel D. Snus maker sets its sights on U.S. The Wall Street Journal; 2011 Jun 17 [cited 2012 May 21]. Available from: http://online.wsj.com/article/SB10001424052702304319804576389742932108046.html
30. Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Health effects of smokeless tobacco products. Brussels: European Commission, SCENIHR; 2008. Available from: http://ec.europa.eu/health/archive/ph_risk/committees/04_scenihr/docs/scenihr_o_013.pdf
31. McNeill A, Bedi R, Islam S, Alkhatib MN, West R. Levels of toxins in oral tobacco products in the UK. Tob Control. 2006;15(1):64–7.
32. Niche Tobacco Products Directory [Internet]. [cited 2011 Jul 14]. Available from: http://www.ntpd.org.uk
33. Rutqvist LE, Curvall M, Hassler T, Ringberger T, Wahlberg I. Swedish snus and the GothiaTek standard. Harm Reduct J. 2011;8:11. doi: 10.1186/1477-7517-8-11
34. Swedish Match. GothiaTek standards [Internet]. Stockholm: Swedish Match; [no date] [cited 2012 May 21]. Available from: http://www.swedishmatch.com/en/Snus-and-health/GOTHIATEK/GOTHIATEK-standard/
35. Stanfill SB, Connolly GN, Zhang L, Jia LT, Henningfield JE, Richter P, et al. Global surveillance of oral tobacco products: total nicotine, unionised nicotine and tobacco-specific *N*-nitrosamines. Tob Control. 2011;20(3):e2. Epub 2010 Nov 25. doi: 10.1136/tc.2010.037465
36. National Cancer Intelligence Network (United Kingdom). Oral cavity cancer: survival trends in England. London: National Cancer Research Institute, National Cancer Intelligence Network; 2010 [cited 2011 Jul 14]. Available from: http://www.ncin.org.uk/publications/data_briefings/oralcancer.aspx
37. Moles DR, Fedele S, Speight PM, Porter SR, dos Santos Silva I. Oral and pharyngeal cancer in South Asians and non-South Asians in relation to socioeconomic deprivation in South East England. Br J Cancer. 2008;98(3):633–5.
38. Lee PN. Summary of the epidemiological evidence relating snus to health. Regul Toxicol Pharmacol. 2011;59(2):197–214.
39. Boffetta P, Hecht S, Gray N, Gupta P, Straif K. Smokeless tobacco and cancer. Lancet Oncol. 2008;9(7):667–75.
40. Lee PN, Hamling J. Systematic review of the relation between smokeless tobacco and cancer in Europe and North America. BMC Med. 2009;7:36.
41. Piano MR, Benowitz NL, FitzGerald GA, Corbridge S, Heath J, Hahn E, et al; American Heart Association Council on Cardiovascular Nursing. Impact of smokeless tobacco products on cardiovascular disease: implications for policy, prevention, and treatment: a policy statement from the American Heart Association. Circulation. 2010;122:1520–1544. Epub 2010 Sep 13. doi: 10.1161/CIR.0b013e3181f432c
42. Hansson J, Galanti MR, Hergens MP, Fredlund P, Ahlbom A, Alfredsson L, et al. Use of snus and acute myocardial infarction: pooled analysis of eight prospective observational studies. Eur J Epidemiol. 2012;27(10):771–9.

43. Hergens MP, Alfredsson L, Bolinder G, Lambe M, Pershagen G, Ye W. Long-term use of Swedish moist snuff and the risk of myocardial infarction amongst men. J Intern Med. 2007;262(3):351–9. Erratum in: J Intern Med. 2007;262(5):590.
44. Boffetta P, Straif K. Use of smokeless tobacco and risk of myocardial infarction and stroke: systematic review with meta-analysis. BMJ. 2009;339(7718):b3060. doi: 10.1136/bmj.b3060
45. England LJ, Levine RJ, Mills JL, Klebanoff MA, Yu KF, Cnattingius S. Adverse pregnancy outcomes in snuff users. Am J Obstet Gynecol. 2003;189(4):939–43.
46. Evstifeeva TV, Zaridze DG. Nass use, cigarette smoking, alcohol consumption and risk of oral and oesophageal precancer. Eur J Cancer B Oral Oncol. 1992;28B(1):29–35.
47. Peeters S, Gilmore AB. How online sales and promotion of snus contravenes current European Union legislation. Tob Control. 2012. Epub 2012 Jan 21. doi: 10.1136/tobaccocontrol-2011-050209. Available from: http://tobaccocontrol.bmj.com/content/early/2012/01/21/tobaccocontrol-2011-050209
48. World Health Organization. The European report on tobacco control policy. Review of implementation of the Third Action Plan for a Tobacco-Free Europe 1997–2001. Copenhagen: World Health Organization, Regional Office for Europe; 2002 [cited 2012 Aug 15]. Available from: http://www.euro.who.int/__data/assets/pdf_file/0007/68065/E74573.pdf
49. Faid M, Gleicher D. Dancing the tango: the experience and roles of the European Union in relation to the Framework Convention on Tobacco Control. Brussels: Global Health Europe; 2011 [cited 2012 Aug 15]. Available from: http://ec.europa.eu/health/tobacco/docs/tobacco_tango_en.pdf
50. UK Parliament, House of Commons, Select Committee on Standards and Privileges. First report. Allegations relating to non-declaration of interests: the campaign relating to Skoal Bandits. London: UK Parliament; 1997 [cited 2011 Aug 30].
51. Royal College of Physicians. Harm reduction in nicotine addiction: helping people who can't quit. A report by the Tobacco Advisory Group of the Royal College of Physicians. London: Royal College of Physicians; 2007.
52. Medicines and Healthcare Products Regulatory Agency (UK). Public consultation: the regulation of nicotine containing products. Series No.: MLX 364. London: Medicines and Healthcare Products Regulatory Agency; 2010. Available from: http://www.mhra.gov.uk/Publications/Consultations/Medicinesconsultations/MLXs/CON065617
53. Nunn H, Lalli A, Fortune F, Croucher R. Oral cancer screening in the Bangladeshi community of Tower Hamlets: a social model. Br J Cancer. 2009;101(Suppl 2):S68–S72.
54. Croucher R, Islam S, Nunn H. Campaign awareness and oral cancer knowledge in UK resident adult Bangladeshi: a cross-sectional study. Br J Cancer. 2011;105(7):925–30. Epub 2011 Aug 23. doi: 10.1038/bjc.2011.317
55. Willis N, Croghan E, Chambers M. NHS stop smoking services: service and monitoring guidance 2009–2010. London: Department of Health (United Kingdom), National Health Service; 2009 [cited 2011 Jul 14]. Available from: http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_096887.pdf
56. Chambers M. NHS stop smoking services: service and monitoring guidance 2010–2011. London: Department of Health (United Kingdom), National Health Service; 2009 [cited 2012 Aug 15]. Available from: http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/@ps/@sta/@perf/documents/digitalasset/dh_109889.pdf
57. Croucher R, Shanbhag S, Dahiya M, Kassim S, McNeill A. Predictors of successful short-term tobacco cessation in UK resident female Bangladeshi tobacco chewers. Addiction. 2012;107(7):1354–8. Epub 2012 Apr 4. doi: 10.1111/j.1360-0443.2012.03819.x
58. Croucher R, Shanbhag S, Dahiya M, Kassim S, Csikar J, Ross L. Smokeless tobacco cessation in South Asian communities: a multi-centre prospective cohort study. Addiction. 2012;107(Suppl 2):45–52.
59. Department of Health (United Kingdom). Healthy lives, healthy people: a tobacco control plan for England. London: HM Government, Department of Health; 2011. Available from: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_124917
60. Action on Smoking and Health. 1 October 2008: Implementation of picture warnings on tobacco products; 2008 Sep 24 [cited 2012 Oct 3]. Available from: http://www.ash.org.uk/media-room/press-releases/1-october-2008-implementation-of-picture-warnings-on-tobacco-products
61. National Institute for Health and Clinical Excellence. Smokeless tobacco cessation: South Asian communities. NICE public health guidance 39. London: National Institute for Health and Clinical Excellence; 2012. Available from: http://www.nice.org.uk/nicemedia/live/13907/60914/60914.pdf
62. London Borough of Brent. Brent tackles illegal paan spitting on streets. Wembley, UK: The Brent Magazine. April 2010 [cited 2010 Jul 14]. Available from: http://www.brent.gov.uk/media.nsf/Files/LBBA-263/$FILE/The%20Brent%20Magazine%20issue%20101%20April%202010.pdf

63. European Agency for Safety and Health at Work. Health Professionals Against Tobacco, Sweden; [no date] [cited 14 July 2011]. Available from: http://hw2012.healthy-workplaces.eu/data/provider/health-professionals-against-tobacco
64. Boldemann C, Gilljam H, Lund KE, Helgason AR. Smoking cessation in general practice: the effects of a quitline. Nicotine Tob Res. 2006;8(6):785–90.
65. Furberg H, Lichtenstein P, Pedersen NL, Bulik C, Sullivan PF. Cigarettes and oral snuff use in Sweden: prevalence and transitions. Addiction. 2006;101(10):1509–15.
66. Toftgård M, Gilljam H, Tomson T. Pathways to smoking and snus use cessation: is spontaneous quitting underrated? Open Epidemiol J. 2010;3:20–3.
67. Fagerström K, Gilljam H, Metcalfe M, Tonstad S, Messig M. Stopping smokeless tobacco with varenicline: randomised double blind placebo controlled trial. BMJ. 2010;341:c6549.
68. Venkatesan J. Tobacco in plastic pouches: Supreme Court rejects plea. New Delhi: The Hindu; 2011. Available from: http://www.hindu.com/2011/02/18/stories/2011021864111100.htm
69. United Nations, Department of Economic and Social Affairs, Population Division. World population prospects: the 2010 revision. New York: United Nations; 2011. Available from: http://esa.un.org/unpd/wpp/index.htm
70. Centers for Disease Control and Prevention. Global Adult Tobacco Survey, 2008–2010. Percentage of adults who currently use smokeless tobacco. Global Tobacco Surveillance System data [Internet database]. Atlanta: Centers for Disease Control and Prevention; [no date] [cited 2012 Jan 25]. Available from: http://apps.nccd.cdc.gov/GTSSData/default/IndicatorResults.aspx?TYPE=&SRCH=C&SUID=GATS&SYID=RY&CAID=Topic&SCID=C443&QUID=Q469&WHID=WW&COID=&LOID=LL&DCOL=S&FDSC=FD&FCHL=&FREL=&FAGL=&FSEL=&FPRL=&DSRT=DEFAULT&DODR=ASC&DSHO=False&DCIV=N&DCSZ=N&DOCT=0&XMAP=TAB&MPVW=&TREE=0
71. Kishor S, et al. Prevalence of current cigarette smoking and tobacco use among women and men in developing countries. Forthcoming 2014 [cited 2012 Jan 25].
72. European Commission. Proposal for a Directive of the European Parliament and of the Council. COM(2012)788 2012/0366(COD). Brussels: European Commission; 2012. Available from: http://www.ec.europre.eu/health/tobacco/docs/com_2012_788-en.pdf