



**S t o c k h o l m • S w e d e n**

September 22-25, 2002

# 3rd International Conference on Smokeless Tobacco

*Advancing Science & Protecting Public Health*

## Summary Report

*Provided by:*



Tobacco Control Research Branch  
Behavioral Research Program  
Division of Cancer Control  
and Population Sciences





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## **Summary Report**

**Conference Hosts:**

National Cancer Institute  
Centers for Disease Control and Prevention  
Samhällsmedicin, Stockholm Centre of Public Health, Centre for Tobacco Prevention

**Honorary Host:**

National Institute of Public Health – Sweden

**Conference Co-Sponsors:**

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# Monday, September 23, 2002

## Opening Remarks

On behalf of the three principal conference-sponsoring organizations, **Dr. Samira Asma**, Centers for Disease Control and Prevention (CDC), United States; **Dr. Hans Gilljam**, Centre for Tobacco Prevention, Sweden; and **Dr. Scott Leischow**, National Cancer Institute (NCI), United States, welcomed attendees of the 3<sup>rd</sup> International Conference on Smokeless Tobacco. Following a statement of conference objectives, Drs. Gilljam and Leischow presented a brief overview of the growth of scientific inquiry into smokeless tobacco patterns of use, its consequences, factors related to use, and relationship to other tobacco use. Participants were urged to distinguish data from opinion, note what important data are missing, and consider how data might be better disseminated to those who need it for scientific, public health, and policy decisionmaking.

## Keynote Address

**Dr. Gunnar Ågren**, Director General, Swedish National Institute of Public Health, Sweden, gave the keynote address. He noted that 20 percent of the world's population is addicted to nicotine and that each tobacco product used seems to have its own constellation of adverse health consequences. He reviewed the trajectory of snus (moist oral snuff) use in Sweden from the 1960s when it was mainly used in the rural communities to the marketing shift in the 1980s when it became increasingly popular among young males and athletes. During the 1980s and 1990s, smoking rates declined from 36 percent to about 17 percent, while snus use remained relatively stable at about 17-20 percent of adult males. Dr. Ågren commented that there is little scientific evidence that links the decrease in smoking with snus use. There are data to suggest that most Swedish male smokers do not use a nicotine replacement product to quit smoking, while about 25 percent use snus. However, for Swedish women, whose smoking prevalence decreased at the same rate as men, snus use was not a popular method for quitting. Dr. Ågren concluded by stating that snus is not recommended by the Swedish National Institute of Public Health as a smoking cessation strategy because its health risks have not been sufficiently studied. He commented that he was pleased that the research community is attempting to develop a better understanding of every aspect of smokeless tobacco use.

## Panel 1: Global Perspectives of Smokeless Tobacco Use

Moderator: **Dr. Prakash Gupta**, Tata Institute of Fundamental Research, India

In the opening panel of the 3<sup>rd</sup> International Conference on Smokeless Tobacco, scientists from Africa, the Middle East, India, Europe, and the Americas presented summaries of smokeless tobacco use in their regions of the world. The presentations provided overviews of more than 20 smokeless, or noncombustible, tobacco products in use around the world and highlighted the variability of their prevalence in many countries, from 46 percent of the West Nile region population of Sudan to 3.4 percent of the U.S. population.

**Dr. Seppo Wickholm**, Centre for Tobacco Prevention, Sweden, discussed the European experience, particularly with the Swedish smokeless tobacco, snus. Snus, which is prevalent in

Scandinavian countries, is being suggested by some as a potentially reduced-harm alternative to smoking. Sweden had been exempted from the European Union (EU) ban on the advertising and sale of smokeless tobacco products when it was admitted to the Union. Because there has been very little investigation of the potential long-term adverse health effects of snus use, and because many studies on its relationship to oral (mouth) cancer are in question, Dr. Wickholm recommended that snus be further studied to determine the long-term health consequences of its use. In addition, he stated that it is unclear at this time as to how snus use impacts initiation and cessation of all tobacco products, including cigarettes, which is of paramount importance when evaluating its harm-reducing potential.

**Dr. Ahmed Ogwel**, Oral and Craniofacial Research Associates, Kenya, noted that there is a dearth of data about the scope and determinants of smokeless tobacco products in Africa and underdeveloped parts of the Middle East. Few African and Middle Eastern countries implement surveys and maintain surveillance data about smokeless tobacco use, patterns, and prevalence. Although it is on the rise, the use of smokeless tobacco in the African continent and the Middle Eastern regions of Europe and Asia is relatively low as compared to smoking, and almost exclusively a male behavior. Data on tobacco use are particularly important, given that half of Africa's populace is less than 15 years old and Africa is home to two-thirds of the world's poorest countries. Dr. Ogwel presented conclusions from his research, which found a correlation between the popularity of nasally used tobacco and head and neck cancers in the regions of Kenya with the highest rates of smokeless tobacco use. In addition, he commented that despite the wealth generated by many nations in the Middle East, smokeless tobacco use surveillance remains minimal, demonstrating the low prioritization of attention paid to smokeless tobacco use. He identified that an emerging concern in the Middle East relates to immigrant populations who retain smokeless tobacco use behaviors begun in their country of origin as they temporarily or permanently migrate to their new host country.

**Dr. Mihir Shah**, Government Dental College and Hospital, India, reviewed the extensive use of several types of smokeless tobacco in Asia and the Pacific. He noted that a mixture of areca nut, lime, and chewing tobacco is widely used in Southeast Asia, a densely populated region in which 20 percent of the world's population resides. Betel quid use, where tobacco and other substances are rolled in a betel leaf, is most prevalent in the Philippines and Micronesia. Pan masala and gutkha are especially popular in India. Moreover, Dr. Shah commented that India, which has some of the highest rates of smokeless tobacco use in the world, has 100 million smokeless tobacco users, of which 30 million are women and 20 million are between the ages of 10 and 24 years. He further emphasized that India also has the highest rate of oral cancer in the world and that Indian smokeless tobacco users suffer from three times the oral cancer incidence of nonusers.

**Dr. Ricardo Granero**, Research Unit, ASCARDIO, Venezuela, presented smokeless tobacco use data from the Americas, including North, South, and Central America. Smokeless tobacco use, which in the Americas dates back to the indigenous populations of North and South America, has traditionally been associated with rural elderly populations, but the 2000 Global Youth Tobacco Survey (GYTS) results revealed that a much larger proportion of youth are using noncombustible tobacco products. In the United States, data demonstrated that smokeless tobacco use is most prevalent among Alaska Natives at approximately 30 percent. Southern men have the lowest cessation rates of all U.S. smokeless tobacco users. Canadian use has climbed from 1.1 percent in 1988 to 4.2 percent in 2002. In Venezuela, a form of smokeless tobacco called "chimo" is gaining popularity among teens aged 13-15 years. Tobacco use other than cigarette smoking has risen above 15 percent among males, and 60 percent of them tried chimo for the first time before age 10 years. In the Americas, there are many barriers to the understanding and monitoring of

smokeless tobacco use, including poor surveillance systems, few programs focusing on use of smokeless tobacco, lack of genetic and behavioral data about risk factors for use, and little government investment, either political or financial, in the issue.

**Dr. Shahid Anwar**, Leeds Dental Institute, England, presented the unique issues and circumstances that migrant populations bring to the problem of smokeless tobacco use in their host countries. Dr. Anwar commented on the need to standardize the definition of what constitutes a migrant, in view of successive generations—born in their host country—who could retain a sense of cultural identity and customs. Most research focuses on indigenous populations' use of smokeless tobacco. Little data exist about such practices among migrant groups in their host country. Many questions remain when attempting to tease out the type of smokeless tobacco and pattern of use among different population groups. Tobacco control measures have been met with limited success. In Australia and New Zealand, an initiative to ban the sale of smokeless tobacco products does not appear to have precluded their use, at least partly because laws exist that permit importation of up to 1 kilogram of product per adult for personal consumption. Smokeless tobacco use is prevalent among migrant populations to Kuwait and the United Arab Emirates as well as to Pakistan. By contrast, there is no known smokeless tobacco use in Japan. Migrants to Georgia, Poland, Belgium, and the United Kingdom have brought their smokeless tobacco practices to these countries. The amount used has increased due to the migrants' greater earning capacity in these countries.

**Dr. Saman Warnakulasuriya**, King's College Dental Institute, England, characterized smokeless tobacco use as an addictive and harm-causing behavior, widespread among adults worldwide. Children in many of these countries also can easily access and use these various products, making regulation and legislation a priority. Carcinogenicity of smokeless tobacco at sites of prolonged contact, such as in the oral cavity, is documented. Historically, however, researchers and health professionals have not recognized smokeless tobacco use as an important public health issue, thus contributing to the dearth of information about the prevalence and patterns of use and health effects thereof. Furthermore, smokeless tobacco products are promoted aggressively throughout the world. Dr. Warnakulasuriya advocated for the inclusion of smokeless tobacco use cessation strategies and services in all comprehensive tobacco cessation programs and in primary healthcare sectors.

During the discussion, participants brought up CDC's and the World Health Organization's (WHO) funding of existent and new surveillance efforts worldwide. In addition, an attendee suggested the creation of a Global Youth Tobacco Survey (GYTS) module to assess smokeless tobacco product use and associated behaviors. Another participant suggested that obtaining research from the tobacco industry might strengthen nontobacco industry surveillance systems.

## **Panel 2: Smokeless Tobacco Addictions**

Moderator: **Dr. Karl-Olov Fagerström**, Fagerström Consulting AB, Smokers Information Centre, Sweden

**Dr. Jack Henningfield**, Pinney Associates and The Johns Hopkins University, United States, discussed the addictive nature of nicotine in smokeless tobacco products, which is a key consideration when addressing the issues surrounding their use. He emphasized that the pH levels of smokeless tobacco products are manipulated to optimize the speed and amount of nicotine delivered to the user. The pH levels are primarily altered in this manner in order to promote the



use of some products as starter products while enabling others to satisfy the needs of highly addicted users. A lower pH reduces oral nicotine absorption, which makes starter products milder and helps the new user to tolerate the product. It is important to determine the pattern of use of all smokeless tobacco products in all populations in order to define the level of addictiveness and dependence. The primary end outcome should be to reduce the addictiveness and therefore the users' desire to maintain use of the product. Dr. Henningfield recommended that tobacco products be altered to make the nicotine less available in the body.

**Professor Torgny Svensson**, Karolinska Institutet, Sweden, presented data about the potential effectiveness of a nicotine vaccine that would allow the formation of antibodies, which would disable the ability of nicotine delivered to the brain to produce its pleasurable effects. The nicotine vaccine is being further explored and validated in research being conducted in Sweden. The vaccine would block reinforcing effects of nicotine in the user's brain. An additional benefit among female users is the potential to prevent nicotine from reaching fetuses of pregnant smokers. A vaccine also could help prevent relapse in former smokers. Given that research has demonstrated that 73 percent of those participating in smoking cessation clinical trials do not quit or remain abstinent, the development of a vaccine lends a promising approach to help harder to reach smokers. New research suggests that nicotine and tobacco involve not only the reward system in the brain, but also those regions of the brain involved in decisionmaking and behavior control. Data suggest that co-abuse with alcohol may, in part, be the result of genetic predispositions to ethanol and nicotine reward response systems in the brain.

**Dr. Maria Rosaria Galanti**, Centre for Tobacco Prevention, Sweden, presented data about snus uptake in Swedish youth from both longitudinal and cross-sectional studies. In a cohort study begun in Stockholm in 1998 with 3,000 Swedish fifth graders, smoking and smokeless tobacco use were assessed through the eighth grade. The researchers found that 49 percent of the boys and 31 percent of girls had tried snus and 56 percent of boys and 59 percent of girls had tried smoking by the eighth grade. The same study also demonstrated that parental snus use increases the likelihood that their child will use snus. In a 2001 national survey, 20 percent of respondents who were 15 years old reported getting snus from parents, with or without their knowledge, while only 3 percent of the youth obtained cigarettes from parents. Dr. Galanti's research found that paternal snus use is a strong predictor of children's use, primarily among boys, and that peer use also is a strong predictor. However, little support was found in the cohort study to classify snus as being a gateway to cigarette smoking. Smoking typically preceded snus use, and among cigarette-starters the proportion still using tobacco in the eighth grade was three times higher than among snus-starters. Building on data that show low rates of snus use among girls, Dr. Galanti proposed this gender specificity as one important area for future research on determinants and prevention of smokeless tobacco use in youths.

**Dr. Bo Söderpalm**, Göteborg University, Sweden, presented data about the long-term health consequences of nicotine use through smokeless tobacco products. Dr. Söderpalm demonstrated the relationship between alcohol and smoking through data showing that 90 percent of alcoholics are smokers, and that among nonalcoholics, the tobacco use becomes increasingly concurrent with a pattern of alcohol use approaching clinical alcoholism. Research has demonstrated that in 50-60 percent of cases, alcoholism has a genetic basis, as has nicotine addiction, and that the genetic vulnerability to these disorders may be partly shared. The evidence that alcohol and nicotine attach to the same substrate in the brain may help to explain why their use is codependent among many users. Nicotine and alcohol act together to increase dopamine release in the mesolimbic system of the brain. In a laboratory study using rats, the nicotinic receptors were implicated in regulating the desire to use alcohol. The researchers found that when nicotine receptors were blocked, the rats chose water over ethanol; dopamine release levels were not

elevated. Dr. Söderpalm also presented some of the long-term neural and behavioral responses to nicotine use, such as increased sensitivity of postsynaptic receptors in the reward structures of the brain and, after exposure to nicotine, an increased preference for ethanol. He concluded that neural activities in the brain's mesolimbic system should be considered in the development of medical treatments for nicotine use and that basic science research efforts must soon address the urgency of this enormous public health problem.

### **Panel 3: Health Effects of Smokeless Tobacco Use**

Moderator: **Dr. Newell Johnson**, Guy's, King's, and St. Thomas' Dental Institute, England

**Dr. Newell Johnson** opened this panel by stating that smokeless tobacco use has long contributed to high rates of oral (mouth) cancer in many cultures throughout the world, from the Pacific Islands to India and neighboring countries, to republics formed from the former Soviet Union, to Africa, Sweden, and the United States. These products can include many other ingredients, but all include tobacco and are almost always used by mouth. Smokeless tobacco used in the developed world includes about 30 carcinogens, but one of the most important chemical classes is the tobacco-specific nitrosamine (TSNA) class. Dr. Johnson commented that in Sudan, for example, TSNA levels are extremely high and cause high rates of oral cancer. By contrast, he stated that in Sweden TSNA levels are quite low and recent studies suggest little, or no, excess oral cancer risks. Following Dr. Johnson's remarks, conference attendees briefly discussed the relationship of smokeless tobacco to oral cancer risks, but also expressed the need to consider other types of smokeless tobacco-related health problems.

**Dr. Olof Nyrén**, Karolinska Institutet, Sweden, presented Swedish data describing the relationship of neoplasms and carcinogenicity. The exclusion of fire-cured tobacco decreases the availability of TSNA to the smokeless tobacco user. Dr. Nyrén found that Western-processed snuff makes fewer TSNA available to users than toombak (snuff) does to its users. He commented that the data in animal studies in Sweden are not strong enough to prove a positive correlation between snuff use and oral cancer. Research conducted by Johansson and colleagues found an insignificant effect of snuff use on squamous cell neoplasms. In addition, Hirsch found an excess of lip cancer when snuff and HSV-1 are coincubated. Dr. Nyrén presented Swedish epidemiological, population-based data that showed no correlation between smokeless tobacco use and occurrence of oral cancer, where snus use is high but oral cancer rates are low. However, he also acknowledged data from the United States, analyzed by Winn and colleagues, that found four times the increased risk of oral cancer, particularly a fiftyfold increase in cancer of the gum and buccal mucosa (the sites where snuff is habitually held) in North Carolina snuff users as compared to nonusers. Moreover, in India, Sudan, and Pakistan, a positive relationship between incidence of oral cancer and snuff use has been established with the odds ratios exceeding 8.

**Dr. Gunilla Bolinder**, Karolinska Institutet, Sweden, discussed the cardiovascular health effects of smokeless tobacco use. Nicotine produces its cardiovascular effects primarily through stimulation of the ganglia in the sympathetic nervous system and in the adrenal medulla. Study findings reported by Dr. Bolinder in 1992 demonstrated that the smokeless tobacco users exhibited high rates of both systolic and diastolic measurements of blood pressure. An 11- to 14-year followup study conducted by Dr. Bolinder with 135,000 middle-aged Swedish men discovered that smokeless tobacco users have a significantly increased risk of dying from coronary heart disease compared to nonusers. There also is evidence that implicates smokeless tobacco use in the development of adult onset, type II diabetes. Nicotine causes

sympathoadrenergic stress, which results in fatty acid deposition in adipose tissue and the release of cortisol, thereby increasing weight and size. However, smokeless tobacco users did not exhibit an increased risk of suffering from artherosclerosis as is prevalent in smokers. Dr. Bolinder stressed that future research efforts should investigate the relationship of smokeless tobacco use to other cardiovascular diseases, such as angina, heart attack, hypertension, arrhythmia, sudden death, and vasospastic disorders. In addition, research should be conducted to determine the relationship between use and pregnancy outcomes, including sudden infant death syndrome and fetal nicotine addiction.

**Dr. Prakash Gupta**, Tata Institute of Fundamental Research, India, presented data on behalf of **Dr. R. Sreevidya**, Tata Memorial Centre, India, from research on pregnancy outcomes in Indian women. Maternal smoking clearly causes negative health effects in infants and children, but offspring health effects related to maternal smokeless tobacco use are less clear. Smokeless tobacco use is common among women and is socially acceptable in Indian society, accounting for the moderate to high prevalence among women in many parts of India. The pregnant women included in the study were, on average, 24.6 years of age, had less than 10 years of formal education, and were generally of low socioeconomic status. The data from this population-based study of pregnant women, 17 percent of whom were smokeless tobacco users, demonstrated detrimental health effects to the offspring that were related to maternal smokeless tobacco use. Their babies were more likely to be stillborn, or have a shorter gestation period and low birth weight, factors that contribute to infant illness and death.

**Dr. Maria Teresa Canto**, National Institute of Dental and Craniofacial Research, United States, reviewed the oral health effects of smokeless tobacco use from a clinical perspective. The most common clinically observed lesion is leukoplakia, which is benign but needs to be closely monitored because some may develop into malignant tumors. Leukoplakias diminish and disappear with smokeless tobacco cessation, making the link between use and their formation clearly evident. In contrast to smoking, smokeless tobacco-related cancers and other lesions frequently develop at the site at which the bolus of oral tobacco is placed. Dr. Canto also commented that more studies are needed to explore the variations in smokeless tobacco use and the associated morbidity and mortality evident in different populations, including those defined by race/ethnicity, socioeconomic status, and geographic region. Additional research with different populations could reveal distinct differences in the metabolism and patterns of use; for example, data on African-American smokers have shown increased cotinine levels when compared to other populations, despite smoking equal amounts of cigarettes. Moreover, as research has established an understanding of the effects of concurrent use of alcohol and cigarettes, studies about smokeless tobacco and alcohol or other substances should be conducted to determine if a synergistic relationship exists.

**Professor Claes-Göran Östenson**, Karolinska Hospital, Sweden, shared research about oral moist snuff use and its correlation to the risk of developing adult onset, type II diabetes. If current trends persist, the world population with type II diabetes will rise to 220 million people by 2010. This dramatic trend is attributed to shifting global dietary habits and activity levels among populations with traditionally low risk for developing this disease. Professor Östenson presented the results of his cross-sectional, population-based study with 3,128 Swedish men aged 35-55 years without known manifestation of the disease, but half of whom had a family history of type II diabetes. A survey was administered to obtain data about the cigarette smoking and oral snuff use of the respondents; 492 of the men were current oral snuff tobacco users and 376 were former users. The relative risk for developing diabetes among the snuff users who used three or more containers per week was 2.6. Additionally, exclusive users of oral moist snuff are at four times the risk of nonusers for developing type II diabetes. Professor Östenson concluded,

“Tobacco use may exert diabetogenic effects on both insulin secretion and action through increasing plasma catecholamine levels.” Further studies are needed to examine the precise mechanisms that contribute to the relationship between tobacco use and type II diabetes.

**Tuesday, September 24, 2002**

## **Worldwide Marketing of Smokeless Tobacco**

**Dr. Michelle Roland**, Centers for Disease Control and Prevention, United States, presented *Smokeless NOT Harmless*, a 5-minute video produced for this conference and cosponsored by the National Cancer Institute, Centers for Disease Control and Prevention, and Centre for Tobacco Prevention in Sweden. The video looks back at the marketing strategies used to sell smokeless tobacco over the past century. She commented that, like a virus, smokeless tobacco marketing has spread around the world, from Venezuela to India, to Sweden, and beyond. Fortunately, counter-marketing efforts are giving young people the truth about these deadly, addictive products.

### **Panel 1: Industry Marketing and Public Perceptions**

Moderator: **Dr. Örjan Åkerberg**, Chairman, Tobacco Committee, FDI/World Dental Federation, Sweden

**Mr. Paul Nordgren**, Swedish National Institute of Public Health, Sweden, provided an overview of the history and current state of snus use in Sweden and the evolution of the marketing strategies of the formerly government-operated Swedish Tobacco Company, now privately owned and renamed Swedish Match. Mr. Nordgren reported that snus was traditionally used by rural elderly men in Sweden. However, when use rates declined during the years after World War II, the tobacco company revived its marketing efforts in the 1970s and began targeting young, urban men and male athletes. The company’s slogan, “Snus is fine,” illustrates its strategy to attract young, white-collar, sophisticated users. During the 1980s, new marketing strategies emphasized the use of snus as an easy alternative to smoking in situations where smoking is prohibited. Most recently, the main focus has been to market snus as a means for smoking cessation or smoking reduction. Consequently, the public perceives snus as a harmless or harm-reducing product. With the tobacco control advances achieved in the 1990s that severely restrict advertising and promotion options, Swedish Match has had to rely heavily on unpaid publicity. The effectiveness of this strategy is reflected in recent trends. While cigarette smoking has decreased in the past decade, snus use has remained relatively stable with about 15-20 percent of the male population reporting daily use.

**Dr. Surendra Shastri**, Tata Memorial Center, India, reported that India’s smokeless tobacco companies market their products in a similar manner as in the United States. For example, products are glamorized through the use of sports figures and social events in commercials and print advertising. The most widely used product, gutkha, an indigenous form of smokeless tobacco, also has gained in popularity in most parts of the subcontinent and among South Asians residing in England. With its sweet flavor and portable, colorful packaging that features the faces of smiling children, the product appeals to youth and is used by millions under the age of

18 years. A large smokeless tobacco company sponsors the Bollywood Awards, the Indian equivalent of the U.S. Academy Awards, in an effort to promote its product as glamorous. Although an advertising ban was enacted in 2001 for gutkha (in the state of Maharashtra), the tobacco companies continue to display product banners at religious festivals. In addition, a survey conducted to assess public opinion about a proposed tobacco-promotion restriction bill found that 90 percent of respondents supported restrictions on tobacco advertising and sponsorship of sporting and religious events. However, Dr. Shastri noted that this might pertain mainly to smoking and further research into the attitudes associated with smokeless tobacco use need to be conducted. The appearance and direct marketing in India of the Swedish moist oral snuff product, Click, is creating a new set of emerging perceptions about smokeless tobacco acceptability among the Indian public. Swedish Match, the company that produces Click, encourages uptake of this product in India with slogans and visual advertisements portraying the product as causing less harm than other smokeless tobacco products used in India. Dr. Shastri also noted that Swedish Match offers trips to Sweden for Indian journalists so that they may see how healthy Swedish men use snus, in order to prompt journalists to write positive stories about the Swedish product.

**Dr. Alan Blum**, University of Alabama Center for the Study of Tobacco and Society, United States, gave an illustrated presentation highlighting the major American advertising campaigns over the past 3 decades for smokeless tobacco. He showed numerous images of promotional ephemera, celebrities, and artifacts that he has documented from attendance at dozens of events sponsored by the U.S. Smokeless Tobacco Company (USSTC, maker of Skoal and Copenhagen), including rodeos, motor sports, country music concerts, Hispanic cultural festivals, and activities on college campuses. The coining of the term “smokeless” by USSTC in the 1970s, meant to imply both a safe alternative to cigarettes as well as a reduction in smoking, greatly enhanced the company’s sales. Accordingly, Dr. Blum called for replacing the term “smokeless” with “oral mucosal tobacco” as a step toward diminishing the deceptiveness inherent in the marketing of noncombustible oral tobacco products.

**Dr. Ali Idris**, Toombak Research Centre, Sudan, provided an overview of the differences of traditional versus tobacco industry-produced smokeless tobacco products. Traditional tobacco snuff, such as toombak and shammah, is highly prevalent in Africa and the Western and Southern parts of Arabia. These products, prepared by traditional means without the benefit of standards or regulation, are of significantly low cost compared to cigarettes and are therefore becoming increasingly available for consumption by millions. Indeed, these products are utilized generously as symbols of cultural values in weddings and ritual ceremonies. In addition, traditional tobacco products’ health effects are understudied and largely undocumented in developing countries. These types of tobacco products, mostly consumed without producing smoke, present a daunting challenge to tobacco control and prevention efforts. The fact that this issue has historically been overlooked represents a substantial limitation of tobacco control intervention in the region. Paradoxically, as antismoking campaigns intensify, traditional products are increasingly considered harmless and/or inexpensive, and appear to circumvent restrictive smoking regulations based on tobacco smoke exposure. The lack of a comprehensive tobacco control policy for smokeless tobacco, including regulation, and the absence of funding for surveillance and programs, are expected to further contribute to rising prevalence, because the public has little understanding of smokeless tobacco products and the ramifications of their use.

## Panel 2: Regional and Global Policy Interventions

Moderator: **Dr. Anja Ainamo**, University of Helsinki, Finland

**Mr. Kari Paaso**, the European Commission, Luxembourg, spoke about the genesis and implementation of the directive that banned smokeless tobacco in the EU. In 1989, the first EU directive on tobacco control was enacted. It imposed mandatory tobacco warning labels on products and limited the amount of tar in cigarettes. This directive was amended in 1992, introducing, among other measures, the prohibition of oral tobacco from being sold on the EU market. The ban applied to all other tobacco products for oral use, except those smoked and chewed. Sweden was granted an exception to this ban when it became a Member State of the Union in 1995. When preparing the ban, the EU identified smokeless tobacco use with increased oral cancer, cardiovascular diseases, and other similar detrimental effects to health. The EU also identified smokeless tobacco as very addictive and appealing to young people. The EU, for internal market reasons, considered a Union-wide ban because some EU Member States had already introduced a ban covering their territories.

**Dr. Cathy Backinger**, National Cancer Institute, United States, gave the presentation on the Irish experience with smokeless tobacco on behalf of **Dr. Bernard McCartan**, Trinity College, Ireland, who was unable to attend the conference. The history of the Irish experience is unique in that a portion of smokeless tobacco products (those sold in individual use packets) were banned in 1985 by the Irish Minister of Health in reaction to the U.S. Tobacco Company's (UST) attempt to introduce its products on the Irish market. Following a challenge by UST, in 1988 the ban was extended to include all smokeless tobacco products, including loose snuff and chewing tobacco, and it remains in effect to this day. In 1994, the EU enacted a directive that prohibited the sale of snuff but not chewing tobacco. It was reported that there is no intention to consider lifting the EU ban.

**Mr. William Onzivu**, World Health Organization, Switzerland, presented an overview of the treaty, known as the Framework Convention for Tobacco Control (FCTC), on behalf of **Dr. Vera Luiza da Costa e Silva** (WHO, Switzerland), who could not be present at the conference. The FCTC aims to protect present and future generations from the devastating health, social, environmental, and economic consequences of tobacco consumption, as well as exposure to tobacco smoke, by creating a framework for international cooperation and legally binding rules for tobacco control to be implemented by participating members. It also envisages the development of protocols to implement specific measures of the treaty. The FCTC is set for adoption at the 56<sup>th</sup> World Health Assembly to be held in May 2003 in Geneva. The final FCTC draft specifically denotes that smokeless tobacco products and use are included under the jurisdiction of the treaty. The treaty calls for policies regarding advertising bans, restrictions on sales to minors, elimination of the illicit tobacco trade, implementation of taxes, and promotion of and treatment for cessation, among other policies. (In May 2003, the World Health Assembly adopted the FCTC.)

**Ms. Judith Wilkenfeld**, J.D., Campaign for Tobacco-Free Kids, United States, reported on the case of the USSTC and the Federal Trade Commission (FTC). In February 2002, USSTC asked the FTC to issue an advisory opinion that allowed the company to make advertising claims "based on the fact that smokeless tobacco products are considered to be a significantly reduced-risk alternative to cigarette smoking." The debate about who will control the reduced-risk messages and what authority will evaluate and regulate such claims originates

in the issues raised by this petition. For the past 50 years, the FTC has made policy about tobacco product claims, despite its lack of in-house scientific expertise and the proper regulatory authority over the actual product. This disparate locus of control over the product and its claims weakens the institution's ability to make comprehensive, informed decisions and proper enforcement of set rules. Ms. Wilkenfeld expressed her opinion that the FTC lacks the regulatory authority and scientific expertise needed to evaluate these claims. In support of this argument, Ms. Wilkenfeld presented documents and advertisements from USSTC demonstrating their flouting of FTC advertising regulations banning youth-focused advertising. Some of the ads for Rooster smokeless tobacco feature a rooster saying, "Where's the chicks?" and "Cock-a-doodle Freakin' Do." In addition, many photos of young men engaged in extreme sports appear in Skoal ads, an obvious nod to a teen audience, Ms. Wilkenfeld pointed out.

**Mr. Mitch Zeller**, United States, discussant, expounded on key principles that were recommended for guiding policy development. These included the idea that it is a smokeless tobacco company's obligation to submit all data to a regulatory agency prior to marketing if it seeks to make health claims; that the burden of scientifically substantiating any claims is a company's responsibility; and that companies must demonstrate that any reductions in exposure to toxins will lead to meaningful reductions in risk.

### **Panel 3: Smokeless Tobacco Cessation**

Moderator: **Dr. Margaret Walsh**, University of California, San Francisco, United States

**Dr. Ayda Yurekli**, World Bank, United States, discussed lessons learned from global economic interventions in tobacco control and their implications for curbing smokeless tobacco prevalence. Dr. Yurekli stated that smokeless tobacco use has reached epidemic proportions in the developing world, with the poorest countries reporting some of the highest prevalence, including India, former Soviet Union republics, and South Pacific islands. Studies showed that in the developed world, Swedish and American (U.S.) young adult males reported daily smokeless tobacco use in significant numbers, 30 percent and 12 percent, respectively. In light of data demonstrating that youth decrease consumption of snuff and chew in response to price increases, Dr. Yurekli recommended a substantial increase in taxes on smokeless tobacco products to combat youth prevalence. The tax increase on smokeless tobacco products would be feasible in that it is presently such a small share of the price that the price would not be substantially raised. Other policies that show promise in reducing youth prevalence include increasing the minimum age to purchase smokeless tobacco from 18 to 19 years, which will reduce consumption by an estimated 25 percent, and implementing strong licensing policies for vendors of tobacco products, which is estimated to reduce consumption by approximately 9 percent. In addition, Dr. Yurekli presented advertising data from the tobacco industry that show a 121 percent increase in spending on coupons for their products from 1998 to 1999, from \$11 million to \$24 million, while newspaper advertisements increased by only 3.3 percent in the same time period, indicating a shift toward price-based incentives. She concluded that the smokeless tobacco use epidemic is disproportionately affecting the poorest countries, which emphasizes the need for more country-specific data to inform the development of tailored policies. She also noted that tax increases and youth prevention and reduced access to smokeless tobacco products should be a part of comprehensive tobacco control programs.

**Dr. Elbert D. Glover**, West Virginia University School of Medicine, United States, reviewed the pharmacological smokeless tobacco cessation studies. Dr. Glover acknowledged what is known

about smokeless tobacco addiction; smokeless tobacco users are exposed to higher levels of nicotine than the average smoker, the bioavailability of the nicotine in all tobacco products is pH-dependent, and tobacco use often leads to addiction and dependence. He and his colleagues conducted a literature review that found only six studies that addressed pharmacological smokeless tobacco cessation. Upon review, Dr. Glover concluded that, overall, nicotine replacement therapy (NRT) to date has shown little effectiveness. However, use of bupropion with smokeless tobacco users has shown promise in a few studies; therefore, further research is warranted. He recommended that all new pharmacological cessation strategies should be tested in clinical trials with smokeless tobacco users, and that more financial resources should be allocated for investigation and surveillance of smokeless tobacco use.

**Dr. Herbert Severson**, Oregon Research Institute, United States, provided detailed descriptions of numerous behavioral interventions with smokeless tobacco users. Several unique attributes and circumstances characterize smokeless tobacco users; for example, almost all are male, there is a high association with sports, and it is often co-used with cigarettes. Most importantly, the appearance of oral lesions, or a direct manifestation of the health effects of use, typically appear much earlier than the serious, but clinically less visible, health consequences of smoking, thereby providing the clinician with a unique opportunity to diagnose and intervene against the underlying cause. He emphasized the effectiveness of the use of an oral exam to motivate users to quit. This has broad implications for interventions worldwide, in that it can be a cost-effective, easily implemented public health strategy to reduce smokeless tobacco use.

**Dr. Aira Lahtinen**, Finnish Dental Association, Finland, reviewed the state of youth smokeless tobacco cessation in Finland. As a Member State of the EU, Finland has banned smokeless tobacco. However, according to a national survey, smokeless tobacco is rapidly gaining popularity among Finnish boys, with 5 percent using daily and 15 percent using occasionally. Dr. Lahtinen presented the intervention that was provided to smokeless tobacco users and used by oral health professionals during the study. A special issue of the *Finnish Dental Journal* about snuff was mailed to dentists, hygienists, and assistants. In addition, an educational packet about smokeless tobacco, which consisted of 19 presentation transparencies and a cessation brochure, was offered for ordering through the Finnish Dental Association. These materials were ordered by the oral health professionals and several teachers. The materials advocated for a reduction in smokeless tobacco use prior to the user's quit day, keeping a smokeless tobacco use diary, and maintaining permanent abstinence from smokeless tobacco. Dr. Lahtinen and her research colleagues sent a followup questionnaire and received a 45 percent response rate from dentists and hygienists who received the educational packet. The survey results indicated that dental hygienists used materials the most, with teachers second. Health personnel, teachers, and parents are considered by the public to be the best sources for smokeless tobacco information. Dr. Lahtinen concluded that penalties for using smokeless tobacco imposed by sports organizations and schools can help discourage the rise in use, and that clinicians, particularly oral health professionals, are effective interventionists with youth.

**Dr. Åsgeir R. Helgason**, Centre for Tobacco Prevention, Sweden, presented data from 694 smokers and 55 snus-using callers to the Swedish tobacco cessation quitline. Compared with smokers using no nicotine substitute, those attempting to quit with the help of snus were not significantly more likely to be abstinent from smoking at 12 months followup. At followup, 33 percent of male snus users and 58 percent of female snus users were abstinent from the product. The women were more likely to use NRT to quit snus and four individuals who used NRT for 5 weeks or more were all abstinent at the 12-month followup interval. Dr. Helgason concluded that snus should not be recommended as an aid for smoking cessation because it is



clearly inferior to NRT. In addition, NRT in combination with cessation advice was effective for snus users trying to quit.

**Dr. Jon O. Ebbert**, Mayo Clinic, United States, discussant, summarized the conclusions of the presentations. He noted that randomized controlled trials are needed utilizing bupropion and high-dose nicotine patch therapy as smokeless tobacco cessation aids. Dr. Ebbert remarked that, as demonstrated by the 50 percent smoking quit rate among Swedish women in Dr. Helgason's study, the combination of providing quitline support and NRT might also be effective for smokeless tobacco users. Clinical interventions, such as Dr. Severson presented, show a modest success rate for oral health professionals' attempts to encourage cessation among their patients. In addition, Dr. Ebbert remarked that systems interventions, such as advertising bans and reducing youth access, could reduce global use. He also emphasized the common theme in all presentations as the need for further research to investigate such questions as to how NRT can be improved to be more effective, and how alike and dissimilar smokeless tobacco users are around the world, while adjusting for the great variation of products and patterns of use.

## Wednesday, September 25, 2002

### Panel 1: Smokeless Tobacco Products--Chemistry and Constituents

Moderator: **Dr. Mirjana Djordjevic**, National Cancer Institute, United States

**Dr. Mirjana Djordjevic**, National Cancer Institute, United States, highlighted the fact that there are more than 3,000 identified compounds in cured tobacco. Several of these compounds have been assessed for their carcinogenicity, including TSNAs, which are formed from their precursor alkaloids and nitrate/nitrite during tobacco growing, curing, processing, product manufacturing, and storage. The concentrations of TSNA in smokeless tobacco vary significantly. The levels of the nicotine-derived 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK), the most potent tobacco carcinogen in laboratory animals, range from trace levels in Swedish snus to almost 8,000 parts per million in Sudanese toombak. Dr. Djordjevic commented that the acidity/basicity of most snuff is a very important feature in that the higher the pH, the higher the level of free nicotine that is available to be absorbed in the mouth. Furthermore, both pH and nicotine are positively associated with the levels of cancer-causing TSNAs in conventional moist snuff brands. She concluded that several factors, including the type of tobacco, climate in which the tobacco was grown, curing conditions, manufacturing, and storage, may significantly affect the chemical composition of the product and, subsequently, its addicting/toxic/carcinogenic potential.

**Dr. Ali Idris**, Toombak Research Centre, Sudan, presented a comparison between the Sudanese snuff product, toombak, and the Swedish snuff product, snus. Dr. Idris pointed out that several factors, including the type of tobacco species, climate in which it is grown, fermentation, storage, and type and nature of additives and manufacturing, can change the chemical composition, level of absorption and addiction potential of a snuff product, and the use behavior. Toombak, an unregulated or standardized moist snuff product, is prepared by hand mixing fermented and aged coarse tobacco powder (species *Nicotiana rustica*) with a saturated aqueous solution of sodium bicarbonate. Snus, produced under regulated standards, is factory-manufactured dark Kentucky or Virginia tobacco processed into moist snuff. The two products differ by consistency, nicotine

content, pH level, carcinogen level, types of additives, and types of marketing and promotion. Toombak contains significantly higher levels and a wider range of nicotine than snus, 8.36-104.4 mg/g dry weight and 12.4-15.1 mg/g dry weight, respectively, and a more basic pH than snus, 9.0-11.5 and 7.5-8.0, respectively. Toombak also has been found to contain high levels of TSNAs, particularly N<sup>7</sup>-nitrosornicotine (NNN) and NNK at 20-560 times the amount found in Swedish snus. He commented that the unusually high levels of TSNAs found in toombak and levels of addiction are thought to play a major role in the initiation of cancer in toombak users. In addition, he remarked that Swedish snus users exhibit much lower incidence of oral cancer than toombak users. Dr. Idris concluded that the difference in the induction of carcinogenesis between toombak and snus users could be attributed to differences in tobacco species, fermentation, aging, packaging, marketing, and promotion, as well as in levels of nicotine and pH, and levels and types of TSNAs. Dr. Idris urged international health organizations to help regulate toombak as a step toward elimination of its use.

**Dr. Prakash Gupta**, Tata Institute of Fundamental Research, India, presented constituent information about traditional and manufactured products prevalent among school personnel in the Northeastern states of India. From February to September 2001, the study surveyed 3,794 school personnel from eight Northeastern states of India: Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura. Study results demonstrated that while men in most of these states smoke at significantly higher rates than women, smokeless tobacco use is comparable among men and women, with women reporting more use than men in some states. The smokeless tobacco products most widely used in all of India are available in many forms, ranging from user-assembled, where the user mixes his own ingredients; custom made, where the user orders the combination of ingredients from a vendor at a kiosk; and commercially manufactured, where the products are manufactured and sold in local or large commercial markets. Dr. Gupta noted that a multinational snuff product from Sweden, Click, has also been introduced into the Indian smokeless tobacco market. He stated that the most popular form of smokeless tobacco among smokeless tobacco users in all regions of India is a mixture of flaked tobacco and a few drops of lime (calcium hydroxide solution). Another popular handmade form of smokeless tobacco is the betel quid, where the tobacco is mixed with other ingredients, such as lime and areca nut, which are rolled in a betel leaf. In addition, several tobacco pastes, powders, and types of snuff are manufactured with spices and other food substances (such as molasses) to give the products flavor, and to be appealing for extended periods of time in the mouth. Moreover, a few of the pastes are used as dental cleaning products. Dr. Gupta concluded that all of the tobacco products studied have demonstrated adverse health effects.

**Dr. Gregory Connolly**, Massachusetts Department of Public Health, United States, provided examples of new smokeless tobacco products that are diverse, and some that appear more similar in packaging and design to nicotine medications than to traditional tobacco products. These include products that are packaged in medicinal-appearing forms, such as a nicotine lozenge that is made in part of compressed tobacco powder, Ariva, which is manufactured by the U.S. company, Star Scientific. He provided an overview of the newly released cigarettes with claims of reduced carcinogens (Omni, Advance) and claims of reduced nicotine (Quest), as well as the heated rather than burned cigarettes, such as Accord and Eclipse. Cigarettes with claims of reduced carcinogen have been marketed not as safe, but as safer than traditional tobacco industry-produced cigarettes, and the low-nicotine or nicotine-free cigarettes (such as Quest) are advertised as similar to NRT (“step your way to nicotine free”), in that users should start with their low-nicotine version and progress to smoking the nicotine-free version. Two new oral mucosal smokeless tobacco products also are on the market—Stonewall, manufactured by Star Scientific, a moist oral snuff with low-nitrosamine claims; and Exalt, moist snuff sachets that do not require the user to spit, made by the Swedish snus gothiatek process. Dr. Connolly stated that

an increasingly common marketing strategy implemented by U.S. manufacturers of these products is to position them for use by continuing smokers in situations where smoking is prohibited or inconvenient, such as on airline flights or in the workplace. He stated, “Such promotion of dual-product use could increase the health risks of tobacco use by delaying smoking cessation.” He also emphasized that modified cigarettes, such as Philip Morris’ upcoming product, SCOR (selected constituent reduction), which is essentially a Marlboro with some chemical alterations, pose the gravest threat to inhibiting cessation because smokers may perceive these cigarettes as presenting a safer and more pleasurable way to continue smoking.

**Dr. Joseph Guttenplan**, New York University Dental and Medical Schools, United States, reported on the carcinogenicity and mutagenicity of smokeless tobacco. Smokeless tobacco use is a significant risk factor for oral and pharyngeal cancers, which together represent the seventh most common cause of cancer death worldwide. Oral and pharyngeal cancers are twice as prevalent in developing countries than developed countries and occur more often in men than women. Smokeless tobacco users can be exposed to 10 times the level of TSNAs that smokers are exposed to. Chemical analyses have revealed that snuff contains toxins in addition to TSNAs that damage genetic material. The processes for curing tobacco may significantly alter the carcinogenicity and bioavailability of tobacco carcinogens. Smokeless tobacco extract is mutagenic in bacteria, mouse oral cavity, and in a surgical model in rats, but simple application of smokeless tobacco or its extracts to the oral cavity of rodents has yielded equivocal results. Dr. Guttenplan also stated that there is a great need for developing an experimental model for induction of oral carcinogenesis by smokeless tobacco. Published studies on this model are scarce.

## **Panel 2: Reducing Risk/Harm? Science, Ethics, and Public Health**

Moderator: **Dr. Harri Vainio**, Unit of Chemoprevention, International Agency for Research on Cancer, France

**Dr. Scott Tomar**, University of Florida, College of Dentistry, United States, reviewed the published scientific literature about the oral health effects of Swedish snus and U.S. moist snuff. To conduct this review, Dr. Tomar searched the Medline database, CDC’s smoking and health database, and several government materials. Of potential significance to the reliability of the research, Dr. Tomar pointed out that Swedish Match (tobacco company) and/or the Swedish Tobacco Research Council supported 8 of the 12 Swedish studies retrieved in the search, and the tobacco industry-funded Smokeless Tobacco Research Council supported 2 of the 17 U.S. studies. The Swedish and U.S. companies do not disclose brand-specific information on chemical constituents or ingredients in their products, leaving much scientific discovery to be done. The known oral health effects of Swedish snus and U.S. snuff include formation of oral mucosal lesions (leukoplakia), dental caries, and periodontal disease. Epidemiological studies generally revealed a high prevalence of leukoplakia in users of both Swedish snus and U.S. moist snuff. Most Swedish studies reported dose-response relationships between the duration of snuff use and the appearance of lesions and a greater likelihood of lesion development associated with loose snuff use than portion bag. Moreover, most lesions disappear after cessation. In the United States, specific brands were associated with increased lesion development, such as the case with Copenhagen where approximately 60 percent of users develop oral lesions, which is in contrast to the 5 percent prevalence of oral lesions among Hawken users. Swedish and U.S. studies were consistent in suggesting an increased risk of developing gingival recession (receding gums) where

the tobacco is held in the mouth, and that neither Swedish snus nor U.S. snuff is likely to cause gingivitis.

**Dr. Deborah Winn**, National Cancer Institute, United States, conducted a review of the published scientific literature about the relationship to cancer of Swedish snus and U.S. tobacco product use. Findings suggest that in the United States, smokeless tobacco use increases the risk of developing oral cancer four to six times, where confounding by smoking can be ruled out. In Sweden, there is no overall association between smokeless tobacco and oral cancer. Risks were not increased with greater levels of use, but there was a risk among nonsmokers, based on one of two recent studies. Dr. Winn stated that, “More information about levels of carcinogens in smokeless tobacco and snus is needed to help clarify potential oral cancer risks.”

**Mr. Clive Bates**, Action on Smoking and Health, United Kingdom, provided a rationale for the use of smokeless tobacco as a strategy to reduce the prevalence of smoking. He stated that smokeless tobacco reduces the hazards associated with cigarette smoking by one or two orders of magnitude. Mr. Bates remarked that when one considers the health effects from cigarette smoking, including cancer, respiratory health effects, cardiovascular disease, and passive smoke exposure, the decreased amount of cancers and other diseases incurred from smokeless tobacco use result in less harm. Consequently, Mr. Bates argued for open-mindedness about the inclusion of smokeless tobacco in harm-reduction strategies for individuals and maintained that there could be positive implications at individual and population levels. He pointed to data from a Swedish study that revealed that 33 percent of Swedish men in the study chose to use snus to quit in contrast with 17 percent who chose NRT products as an indication that snus may be preferred among smokers as a means of quitting smoking. Mr. Bates conceded that this perceived preference could be offset by several potential unintended consequences of utilizing a smokeless tobacco product to quit cigarettes, such as more young people wanting to initiate smokeless tobacco use because it appears to be safer than smoking and/or smoking cessation rates becoming stagnant. He also recommended standards for the characteristics of smokeless tobacco products that would be allowed on the market.

**Dr. Gregory Connolly**, Massachusetts Department of Public Health, United States, discussed the data and implications of smokeless tobacco being recommended and used as a substitute for cigarettes. Dr. Connolly pointed to the conclusions of an Institute of Medicine report, which recommends that claims be fully regulated, health and behavior effects be monitored, studies on the individual and population effects be conducted, and consumers be fully informed of the risks associated with use. He stressed that the tobacco industry should admit that its conventional products cause disease and addiction before it is allowed to expound new health-benefit claims. He also reported that there are few data to support the premise that snus use contributed to the reduction in smoking prevalence in Sweden. In the United States, 20 percent of snuff users also are daily cigarette smokers, and adult male cigarette smokers are 2.5 times more likely to have switched from snuff to cigarette smoking than vice versa. Dr. Connolly stated, “The marketing of oral snuff in Sweden and the United States may undermine proven measures to curb smoking and promote youth initiation into smoking as well as adults, combining use of snuff and cigarettes, resulting in a negative impact on the public health.”

**Dr. Lynn Kozlowski**, Pennsylvania State University, United States, addressed the issue of ethical standards in providing honest health-relevant information to the public, while taking into account human rights. To illustrate these points, he played an audio tape recording of a mock debate between a physician and a scientist about the ethical implications of smokeless tobacco use as a substitute for smoked tobacco. Several points were raised, including the immense health consequences of cigarette smoking as compared to smokeless tobacco use and the implications of

recommending the use of products that cause some disease and death among its users. The tension between recommending an addictive product to replace another addictive product also was revealed in the conversation, as well as the public health impact of such practices. Dr. Kozlowski emphasized that the arena of public health communications should be held to the same ethical standards as are applied to scientific research.

**Mr. Lars Ramström**, Institute for Tobacco Studies, Sweden, presented data about the Swedish experience of snus as a substitute for smoking. The prevalence of daily smoking among Swedish men is 15 percent and among women, 19 percent, while the prevalence of daily snus use is 20 percent among men and only 2 percent among women. The combined use of cigarettes and snus occurs in 2 percent of men. Among men who have made an attempt to quit daily smoking, snus was the most common cessation aid, used by 55 percent, while 36 percent used nicotine gum. However, among women who have made an attempt to quit daily smoking, NRT was the most popular form of smoking cessation aid, with 55 percent using nicotine gum, 42 percent using nicotine patch, and only 15 percent using snus (sum of percentages >100 since some respondents had indicated use of more than one aid). Mr. Ramström also pointed out that men who used snus as a cessation aid had the greatest success rate in quitting smoking at 65 percent, compared to 50 percent for nicotine gum users. In addition, male primary snus users have a lower rate of starting daily smoking at 20 percent, compared to “all men” at 40 percent. Mr. Ramström concluded his talk by stating that the use of snus as a substitute for smoking seems to have been one of the factors contributing to Sweden’s low smoking prevalence and, accordingly, low rates of tobacco-related diseases.

**Dr. Dorothy Hatsukami**, University of Minnesota, United States, reported that smokeless tobacco has been described as having the potential to be used in several ways as a harm-reduction tool for cigarette smokers. This includes smokeless tobacco use as a method of cessation, as a means to reduce the number of cigarettes smoked, and as a product to be used in situations where smoking is not allowed. The rationale behind the use of smokeless tobacco as a potential harm-reduction product is drawn from the epidemiological data on both smokers and smokeless tobacco users that demonstrate fewer tobacco-related health consequences associated with smokeless tobacco use compared to cigarette use. Moreover, Dr. Hatsukami pointed to data that indicate a lower rate for developing addiction and less-severe physical dependence with smokeless use, as compared with smoking, possibly due to its slower absorption rate. In addition, smokeless tobacco users may have higher rates of cessation than smokers, as evidenced in clinical trials. Furthermore, smokeless tobacco may be more accessible for the uninsured or those with lower incomes because it costs less per day than NRT for the same level of nicotine. Dr. Hatsukami stated that despite these promising implications, the impact of using smokeless tobacco in these ways is relatively unknown. The toxicity of smokeless tobacco products varies by brand and across countries, and depending on the toxicity, smokeless tobacco can lead to significant health problems. Dual use of tobacco products may lead to more rather than less harm. To date, limited research data are available that address the feasibility and impact of this approach. Dr. Hatsukami stated, “Further examination is needed to determine the feasibility of using smokeless tobacco as a means of quitting cigarette smoking.”

### ***Discussants’ Responses to Reducing Risk/Harm Presentations***

Moderator: **Dr. Scott Leischow**, National Cancer Institute, United States

**Dr. Gunilla Bolinder**, Clinical Proficiency Centre, Karolinska Institutet, Sweden, stated that the reduction in smoking prevalence in Sweden may not be largely attributed to use of snus, as

evidenced by data demonstrating that women have experienced similar reductions in smoking prevalence as men but without increased snus use. By contrast, it is most likely that the concerted efforts of the Swedish government and public health organizations have contributed greatly to this reduction. She cited the reduced prevalence of smoking in Sweden over the past 30 years, falling from 45 percent to 19 percent, while snus use has remained relatively constant, going from 15 percent to 20 percent during the same time period. Dr. Bolinder emphasized that conclusive scientific evidence does not exist to support the notion of the utility of smokeless tobacco products for smoking cessation. She also stated that because smokeless tobacco products are intended for pleasurable use, nicotine replacement products should be the first choice for a person trying to quit tobacco, and that NRT products should be improved upon and made less costly so that snus is not the less-expensive alternative.

**Dr. Prakash Gupta**, Tata Institute of Fundamental Research, India, synthesized the evidence presented in the sessions about risk and harm reduction. He commented on the weakness of the evidence supporting the claim that snus contributed significantly to the reduction in smoking prevalence in Sweden, and emphasized the efficacy of the vigorous smoking prevention and cessation efforts enacted by the Swedish Ministry of Health. In addition, he remarked that advocating for smokeless tobacco use as a safer alternative to smoking may undermine tobacco use cessation efforts, in that it provides an excuse to continue tobacco use, a scientifically proven unhealthy behavior. Dr. Gupta identified the lack of scientific trials and data that could indicate to what extent smokeless tobacco users could benefit from using current NRT products to quit smokeless tobacco. He emphasized that steps taken by the tobacco control and public health communities should not be dictated by the tobacco industry. He also stressed the importance of considering the serious impact on public perceptions by claiming that one kind of smokeless tobacco is safer than another, which may be the case in Sweden and India.

**Mr. David Sweanor**, Non-Smokers' Rights Association, Canada, defined risk and harm reduction as strategies "to reduce the adverse physical, social, and mental health consequences of a behavior without requiring abstinence, in order to reduce the impact in a humanistic way while still facilitating abstinence." He stated that the harm incurred by cigarette smoking is so horrendous, and use is so persistent, as to warrant additional methods of reducing harm, supplementary to advising cessation. This would include far greater access to medicinal nicotine for a wider range of indicated uses, including long-term use, and a role for some forms of oral tobacco products to reduce the risks currently incurred by the smoker and people otherwise exposed to cigarette smoke.

## **Where Do We Go From Here? Developing a Research Agenda**

Moderator: **Dr. Hans Gilljam**, Centre for Tobacco Prevention, Sweden

**Dr. Ali Idris**, Toombak Research Centre, Sudan, expressed concern that the tobacco control community may not be using the most appropriate terminology for smokeless tobacco products. As alternatives to the current usage of the terms "smokeless tobacco" or "spit tobacco," he suggested the terms noncombustible, unburned, and nonsmoked. He also remarked that a clear distinction should be made between snuff and chewing tobacco products. The two products differ in many respects: tradition and means of practice, ethnic and geographical distribution, types of tobacco, composition and manufacturing processes, toxicity and carcinogen content and types, as well as sites of use, types of cancer, and modes of carcinogenesis. He gave examples for snuff, which can be classified and termed by its location and aspects of use: nasal, oral, spit, mucosal,

and dipping tobacco. Snuff is predominantly used in the southern parts of the United States, Northern Europe, and Africa, while chewing tobacco is predominantly used in Asia or by Asian immigrants in other parts of the world. Therefore, use of the term “smokeless tobacco” obfuscates important differences among products and patterns of use, and it should be changed.

**Dr. Maria Teresa Canto**, National Institute of Dental and Craniofacial Research, United States, summarized the known and recently investigated health effects of smokeless tobacco use, such as cardiovascular disease, heart attack, pregnancy complications, type II diabetes, oral cancer, leukoplakia, and periodontal disease. She stressed the need to specifically address differential oral health effects produced by the use of the various types of smokeless tobacco products.

**Dr. Karl-Olov Fagerström**, Fagerström Consulting AB, Smokers Information Centre, Sweden, remarked on certain unique aspects of the Swedish experience with smoked and smokeless tobacco. He commented that although Sweden has enjoyed a significant reduction in smoking prevalence, Swedish efforts should focus on recalcitrant smokers. Although evidence from Swedish and U.S. clinical trials suggests that NRT has not yet proven optimally effective for quitting smokeless tobacco among all users who wish to quit, he asserted that other findings suggest that NRT may not be good enough at aiding highly dependent smokeless users; therefore, using NRT and bupropion in combination may also increase the efficacy of both pharmacological interventions. Dr. Fagerström provided examples of key questions that need to be investigated before smokeless tobacco cessation can be adequately addressed, such as, “Is the motivation to quit smokeless tobacco different than for smokers?” and “Does dependence on smokeless tobacco products differ from that of smoked products?” Research also should be conducted about the effectiveness of laws that govern access, as well as the pricing strategies, social influences, and health effects of smokeless tobacco use and associated quitting behaviors.

**Dr. Dorothy Hatsukami**, University of Minnesota, United States, discussed the complex issues and implications surrounding the debate on harm reduction. The Institute of Medicine report, *Clearing the Smoke*, states that the “best means to protect individual and public health from tobacco-related harm are to achieve cessation, prevent initiation, and relapse” and that “a comprehensive and authoritative national tobacco control program, with harm reduction as one component, is necessary to minimize adverse effects from tobacco.” Although this report recognizes that smokeless tobacco causes harm, is addictive, and may potentially serve as a gateway to cigarette smoking, it does not rule out smokeless tobacco as a potential reduced-exposure product. Dr. Hatsukami presented a formula described in the report that can be used to assess harm produced by reduced-risk products:  $\text{Total Harm} = \text{Harmfulness (per use)} \times \text{Intensity of exposure (per user)} \times \text{Prevalence (of use)}$ . To utilize this formula, several variables must be known. *Harmfulness* is determined by identifying the toxic constituents present in the potential reduced-exposure products, the biomarkers that can be used to measure exposure to these toxicants, the relationship between disease outcomes and exposure, and interactions between genetic susceptibility to disease and exposure to tobacco-related toxic constituents. She also raised key issues about determining the *Intensity* of tobacco exposure, which includes examining the context of an individual’s use of smokeless tobacco. Knowing the context of use is important in determining what factors influence the extent of tobacco toxin exposure and disease development: Is smokeless tobacco used alone or with cigarettes; where does smokeless tobacco use fall in the progression toward quitting cigarettes; how does past history of cigarette use affect the risk for disease from smokeless tobacco use? The *Prevalence* of use includes examining the effects of potential reduced-exposure products on the initiation of all tobacco products or the continued use of tobacco products. Dr. Hatsukami remarked that the impact on the public health, and the benefits or disadvantages of framing smokeless tobacco products as safer or reduced-risk as compared to cigarettes, are unknown. She also emphasized the potential need to modify

epidemiological strategies that can appropriately assess the prevalence as well as attribute the cause of diseases among users that use more than one type of tobacco product, concurrently or sequentially. Dr. Hatsukami stated that determining how potential reduced-exposure products will be regulated and monitored is crucial to evaluating their associated impact on health outcomes and all tobacco use behavior.

**Dr. Robert Mecklenburg**, Northrop Grumman Information Technology, United States, stated that public health smokeless tobacco programs and policies must become comprehensive and better balanced. Dr. Mecklenburg stated that this would necessitate at least four strategies: 1) ensure that all adverse physical effects from smokeless tobacco use are considered, 2) ensure that adverse mental effects are considered, 3) ensure that adverse social consequences on nonusers are considered, and 4) ensure that the public's perceptions about smokeless tobacco use and its effects closely match reality. He remarked that focusing solely on oral cancer would be as remiss as limiting concerns about cigarette smoking to only lung cancer. He also emphasized that being dependent on smokeless tobacco to avoid experiencing deficits in cognition, emotion, and performance is in its own right a serious mental health problem. In addition, long-term smokeless tobacco adverse effects on fetal, child, and youth development should be assessed, and tobacco company influences on numerous social institutions and ethical issues need more attention. Tobacco myths must be countered by using interesting, relevant, and culturally appropriate means.

**Dr. Scott Tomar**, University of Florida, College of Dentistry, United States, discussed the biological consequences of exposure to the chemical constituents in smokeless tobacco, such as TSNAs. He suggested the creation of standards for permitted concentrations of chemical constituents, NNK, NNN, and other genotoxins, and standard testing methods to assess carcinogenesis. He commented that manipulating the pH of moist snuff products affects nicotine absorption and dosing, which is a key method used by smokeless tobacco manufacturers to foster nicotine addiction among its consumers. Dr. Tomar concluded that it is crucial to determine who is using new products and how the products should be regulated.

**Dr. Witold Zatonski**, Department of Health, and The Marie Skłodowska-Curie Memorial Cancer Centre and Institute of Oncology, Poland, discussed the need for a global approach as well as regional approaches. Oral cancer is the leading cause of cancer death in India, and the incidence of lung cancer is on the rise. In countries such as Poland, smoking is a more pressing problem than oral tobacco use. By contrast, smoking prevalence in Sweden and Finland is decreasing, while smokeless tobacco use in the form of snus remains stable.

### ***Open Discussion***

Participants commented about the topic of terminology, saying that in many cases the audience being addressed determines the speaker's choice of a particular term. Another participant noted that "smokeless tobacco" is a description coined by the tobacco industry to imply innocuousness, as was the case with the term "environmental tobacco smoke," which also was created by the tobacco industry. One attendee commented that the approach to the harm-reduction issue presented at this conference was very Euro-centric, and that the tobacco control community should consider the international implications when considering and framing this issue. A participant pointed out that epidemiological studies are often planned for smokeless tobacco users who are exclusive users (i.e., not also smokers), which might act as both a positive and negative confounder. Other participants remarked that the field of tobacco control should be informed by research about the forces that drive consumer behavior.



## Closing Remarks

**Dr. Robert Mecklenburg**, Northrop Grumman Information Technology, United States

Dr. Mecklenburg remarked that at the close of the Battle of Britain, Winston Churchill said, “This is not the end, nor is it the beginning, but it is the end of the beginning.” That quote also could describe current trends after assessing the state of the science and public health practices related to smokeless tobacco. Whereas smokeless tobacco was hardly a concern a quarter of a century ago, it is now receiving its due attention, primarily because it has been caught up in a lively debate concerning harm-reduction strategies. In addition, smokeless tobacco problems are now widely recognized as global. The WHO has been taking the initiative in recent years, joining a long-standing concern by nongovernment organizations. Also, the devastation resulting from the use of many smokeless products has brought sharp attention to traditional tobacco products.

In the opening session, an overview was presented of significant advances over recent decades in the science and art of smokeless tobacco prevention and control. In 1991, the 1<sup>st</sup> International Conference established that there was cause for concern, and that the issue had many dimensions. In 2000, the 2<sup>nd</sup> International Conference updated the science and refined the topics. Patterns of use, health consequences, addiction, and social forces driving the use of smokeless tobacco were organized into an interrelationship, primarily by following a U.S. National Institutes of Health biobehavioral model for nicotine addiction and tobacco-related cancers. The conference also made obvious the fact that reporting out on the science was not enough; there was a need to identify the questions not answered so that future research could be concentrated on the data most needed.

Thanks to the thoughtful suggestions by many speakers at this, the 3<sup>rd</sup> International Conference, researchers are in a much better position to move ahead. Numerous lessons have been learned concerning smokeless tobacco use worldwide. Traditional tobacco products are prepared and used in many ways and identified by many names. The smokeless tobacco industry is a growth industry, as evidenced by its marketing strategies to boys and young men, and it is capitalizing on traditional tobacco products by producing them in more convenient, attractive packages and then cleverly promoting them. The smokeless tobacco situation around the world is deteriorating; that is, over time more people are becoming tobacco-dependent and more adverse health consequences will occur.

Dr. Mecklenburg said that there is no time for wishful thinking; a comprehensive, long-range plan is needed that identifies all of the essential areas of knowledge needed to guide both researchers and the public. A consensus of opinion at this conference suggests that a plan should include at least eight key components:

1. A standard lexicon is needed. Terminology is confusing and incomplete. This week, many names are new to many participants. Conference participants could not agree on a name for the unburned class of tobacco products. NCI and CDC have begun product identification; such work should continue and more people should be involved.
2. Standard biomarkers and survey questions are needed. It is evident that information is lacking about smokeless tobacco use, effects, marketing, etc., in vast areas of the world. Monitoring systems and feedback loops are needed. CDC’s Office on Smoking and

Health has taken the initiative for global surveys, but the current instrument includes little about smokeless tobacco.

3. A global smokeless research agenda is needed. This is a critical issue, and the information presented at this conference provides an excellent basis for the development of an agenda, which should be a priority so that funding organizations and investigators can be guided by it as soon as possible.
4. Research information should be easily available worldwide and handy access to the literature is mandatory. At times, certain citations originate from studies that do not have statistical strength, are openly or quietly funded by the tobacco industry, or have other weaknesses and biases. Citations should be independently evaluated with their quality assigned. Perhaps an A, B, C strength-of-evidence rating, such as that used for the Tobacco Use and Dependence clinical practice guideline, should be adopted.
5. A global listserv is needed. This conference demonstrated that there is an excellent pool of knowledge and talent around the world. Distance need not be a problem if contemporary Internet technology is used. A well-organized global system for day-by-day communication would be invaluable.
6. A forum is needed for scientific exchanges of information, to define research and public health priorities, and for individuals active in smokeless tobacco issues in one way or another to meet one another as conference participants. Such meetings are vital to promoting the collaborations so often needed across international borders, encompassing specialties of concern. The 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> International Conferences accomplished this end. Ideally, it is envisioned that an international conference would be convened triennially, a year before the triennial World Conference on Tobacco Or Health. Such a conference schedule would allow the entire community of tobacco prevention and control workers to become updated about progress in smokeless tobacco research.
7. A global resource development system is needed, but this is not simply a funding issue. Capacity-building of every kind is needed so that distinguished specialists are available for consultation in every culture and on every continent where smokeless tobacco is used.
8. A global science-transfer system is needed. Researchers, public health workers, healthcare providers, educators, and those who guide the public through policymaking, business enterprises, and community leadership, all need to understand why there is concern, and they all should have immediate access to sound scientific facts. At the moment, the public and those who are public opinion leaders seem not to be hearing much about smokeless tobacco, except messages shaped by the tobacco industry. What is needed is independent, reliable information that serves the public's interest.

Dr. Mecklenburg concluded by recounting that over a half century ago, René Dubois coined the phrase, "Think globally. Act locally." He said that each participant in this conference lives in a unique world and has unique opportunities to act, and he felt confident that each would continue to seek truth, spread knowledge, and protect and promote the public's well being.



# Appendices



## Concurrent Session I. Smokeless Tobacco Surveillance

### **Global Tobacco Surveillance—Office on Smoking and Health (OSH)/ Centers for Disease Control and Prevention (CDC)**

*Charles W. Warren, Ph.D., Office on Smoking and Health, Centers for Disease Control and Prevention, Atlanta, Georgia, United States*

This presentation will report on the global tobacco surveillance effort being undertaken by the Office on Smoking and Health, CDC. OSH works with international partners to provide technical and scientific support to countries in the development of their tobacco control programs. Part of this work includes surveillance activities. CDC and its partners are developing a global surveillance system that includes: the Global Youth Tobacco Survey (GYTS), the Global School Personnel Survey (GSPS), a regional reporting system, and the NATIONS system. The GYTS tracks tobacco use among youth across countries using a common methodology and core questionnaire. Seventy-six countries have completed the GYTS, 45 other countries are currently in the field, and more than 20 other countries will be trained on the GYTS during the remainder of 2002. The GSPS assesses school policy and curriculum regarding tobacco use on school property. The GSPS collects data on the prevalence of tobacco use among adults. More than 10 countries have conducted the GSPS. The region system and NATIONS will provide cross-country reporting on a broad range of tobacco-related topics: prevalence, laws and regulation, advertising, and economics. This global surveillance system is intended to enhance the capacity of countries to design, implement, and evaluate their tobacco control and prevention programs. Funding for this effort has been provided by: Centers for Disease Control and Prevention/Office on Smoking and Health, Canadian Public Health Agency, National Cancer Institute, UNICEF, and the World Health Organization--Tobacco Free Initiative.

### **School Students: Global Youth Tobacco Survey (GYTS)**

*Ricardo Granero, M.D., MH.Sc., Ph.D., Magda Sánchez, Giovanna Homes, and Olga de López, Centro Cardiovascular Regional Centro Occidental ASCARDIO, Barquisimeto, Venezuela*

To face the issue of tobacco addiction in the era of globalization, there is a need for valid data that would allow inter- and intra-country comparisons aimed at the design of preventive strategies targeting “the global youth,” while taking into consideration local peculiarities. Chimó is a tobacco-based paste traditionally used among people in rural areas.

**Method:** This is a cross-sectional, school-based, two-stage cluster sample survey designed to produce a representative sample of students in grades 6 to 9 at the state or national level. The instrument seeks information on students’ attitudes, knowledge, and behaviours related to tobacco use; and exposure to environmental tobacco smoke, prevention programs, mass media, and marketing issues. It also seeks information on measures to control tobacco sales.

**Results:** The schools’ response rate was 85.7 percent, the students’ response rate was 93.3 percent, and the overall response rate was 80.0 percent. A total of 1,834 students participated. At least 2 out of every 10 males and 1 out of every 10 female students reported the use of any type of tobacco product in the previous 30 days. Two out of 10 students have had at

least one cigarette in their life, and the difference between male and female was very small. The prevalence of students who never smoked cigarettes decreased with grade: 85 percent in grade 6 to 62 percent in grade 9, with 11.5 percent in grade 9 reporting having at least one cigarette in the last month. Chimó use is common in males (13.5 percent), and from grades 6 to 8 surpasses cigarette use, and in grade 6, 10 out every 100 students use chimó, while 7 in every 100 students smoke cigarettes.

Conclusions: Contrary to what was the general belief among educators and health care personnel, this data indicate that smokeless tobacco use by youth is widespread and therefore a very important public health issue that needs to be addressed.

### **Youth Tobacco Surveillance in Northeastern States of India, 2001**

*Dhirendra N. Sinha, M.D., M.S., Ph.D., School of Preventive Oncology, Patna, India*

The Global Youth Tobacco Survey (GYTS) is a worldwide collaborative surveillance initiative that includes government and nongovernment organizations under the leadership of the World Health Organization-Tobacco Free Initiative and the U.S. Centers for Disease Control and Prevention (CDC). The GYTS was designed to enhance the capacity of countries to design, implement, and evaluate tobacco control and prevention programs.

Methods: The GYTS is a self-administered survey, with a standard methodology (two-stage probability selection) that applies a core questionnaire and country addition to a representative, school-based sample of students, aged 13-15 years. In India 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup> grade standard students are in age group 13-15 years. Northeastern states of India, are Assam, Arunachal Pradesh, Manipur, Meghalay, Mizoram, Sikkim, Tripura, and Nagaland. The first cluster was composed of 250 selected schools (out of 6,350 schools) from eight sites (states) in northeastern states of India. The second cluster was a randomly selected class in each school. Altogether 479 classes/sections were surveyed. All students in a class were eligible for the survey. Out of 19,951 eligible students, 16,932 responded (84.5 percent). The survey was carried out from January to September 2001.

Results: Data are presented from eight northeastern states of India. Every use of any tobacco product was reported, with 68 percent (47-81 percent) among boys, and 48 percent (32-72 percent) among girls. Nearly 75 percent of students reported to use their first tobacco product before the age of 10 years. Current use of any tobacco product ranged from 36 percent to 63 percent (median: 52 percent; boys: 57 percent, girls: 41 percent), with high rates of oral tobacco use at 37 percent (range 25–50 percent) and smoking at 23 percent (range 20-35 percent). Smokeless tobacco use included sada (tobacco leaf and lime mixture), tamol and tobacco mixture, gutkha (industrially manufactured tobacco product), tuibur and hidakphu (watery tobacco), and tobacco containing tooth powder and paste. Dependence among current smokeless tobacco users was reported as 48 percent (range 39-81 percent). Exposure to cigarette gutkha and bidi advertisements was reported high (more than 75 percent of user students had seen a lot of protobacco ads in different media). Most of the students (more than 75 percent) reported that they have not been taught in school about the dangers of smoking. Current use of tobacco was associated with parental use, tobacco use by friends, attitude on tobacco use by others, exposure to a lot of media advertisements, knowledge on harmful effects of smoking and passive smoking, and tobacco use by school personnel.

Conclusions: Results from the GYTS administered in the northeastern states of India is alarming. Due to the high prevalence of tobacco use coupled with very high levels of environmental

tobacco smoke exposure, young students in the region are at relatively greater risk for tobacco-related premature deaths. Also a contributing factor is being a bordering state of India with the added disadvantages of supplies of smuggled tobacco/tobacco products at relatively low costs and the additional tobacco advertisements reaching these young students from across the borders. Prevailing insurgency in the region and other sociopolitical factors prevent implementation of tobacco taxation. This needs further indepth study and urgent intervention.

Recommendations: New initiatives by the Indian government (Union as well as State) on tobacco control certainly bring a new hope, but there is an urgent need for intensive intervention.

GYTS Northeastern states of India, 2001, was coordinated by Dr. Dharendra N. Sinha, School of Preventive Oncology, Patna, and Dr. Prakash C. Gupta, TIFR, Mumbai.

### **Smoking Prevalence and Tobacco/Swedish Snus Sales in Sweden, Norway, Denmark, and Finland, 1970 to 2000**

*Brian Wicklin, M.S., Statistical Bureau VECA, Stockholm, Sweden*

Introduction: This paper reviews the results of the survey about smoking and use of moist snuff, domestic consumption of smoking tobacco and moist snuff, prices, taxes, and attempted smuggling, etc., in Sweden, Norway, Denmark, and Finland, 1970-2000. No attempt has been made at testing hypotheses about any casual relationships that may or may not be evident in the statistics.

Definitions adopted and source material used: The real tobacco of a cigarette is calculated at 0.65 grams, and of cigars or cigarillos at 2 grams. This method of measurement has drawbacks when analyzing time series data, because the composition of tobacco in manufactured products is different over the years.

For practical reasons, the more convenient statistics of “tax paid sales for retailing” have been used in estimating domestic consumption of tobacco products instead of the idealistic and more desirable “production plus imports less exports plus/minus statistical adjustments.” Incidentally, this is the best-practice method of estimating domestic tobacco consumption in national accounting in most countries. The domestic consumption estimates on a per capita basis are obtained by dividing the annual tax paid sales figures by the population aged 15+ years at year-end. This is a useful indicator in measuring the overall impact of tobacco intake on the health of the reference population.

Daily smokers are defined as smokers who have smoked any kind of smoking tobacco at least once a day. Smoking prevalence refers to the frequency rate of daily smokers and is expressed as a percentage. The number of individuals in the population who have smoked any kind of smoking tobacco at least once a day is divided by the reference population (smokers as well as nonsmokers) and multiplied by 100. Daily users of moist snuff refer to the percentage of the reference population who use moist snuff at least once a day.

The estimates of smoking prevalence and the daily users of moist snuff are based on sample surveys of self-declare replies to questionnaires. The surveys give reliable results of the situation surveyed, but they are not designed to reveal information about the behavioral patterns of the respondents. The results are expressed as frequency rates of smoking and use of moist snuff in the reference population and its subgroups (e.g., age, sex, socioeconomic status, nationality, etc.).



The highlights of the Nordic statistics of smoking 1970-2000: Smoking prevalence among adults in Sweden has reached a record low 19.1 percent. Thus, Sweden has defended its record-breaking position from 1997 onwards of keeping adult smoking prevalence below the World Health Organization targeted goal of reducing daily smoking to less than 20 percent. The record-breaking 19.3 percent smoking prevalence for Sweden (age group 16-84 years) in 2000 can be compared with 23 percent for Finland (age group 15-64 years), 30 percent for Denmark (age group 13+ years) and 32 percent for Norway (age group 16-74 years).

The reduction in smoking prevalence is higher among men than women in Sweden. This is primarily due to a rise in the proportion of men who have quit daily smoking rather than to a rise in the proportion of newcomers. However, men have increasingly taken up to using Swedish snus. Women have difficulty in quitting. The decline in smoking prevalence among women is less than 1 percent per year 1980-2000. Moist snuff usage has reached new heights in Sweden. It is now higher than cigarette intake measured in terms of real tobacco content. The decline in per capita cigarette tobacco intake was from 1,061 grams in 1970 to 590 grams in 2000, while moist snuff intake per capita increased from 405 grams in 1970 to 796 grams in 2000. Seen in a different way, 19 percent of adult males (aged 16-84 years) in Sweden used moist snuff on a daily basis in 1997 compared with 17 percent in 1970, while only 17 percent of adult males were daily smokers in 2000 compared with 29 percent in 1970.

The statistics convey two significant changes: First, the decline in smoking prevalence among adults in Sweden to a record low 19.1 percent is a noteworthy achievement. Second, the shift in demand from cigarette smoking to moist snuff among adult males in Sweden needs to be underlined.

Concluding Remarks: Two of the main aims of this research were to check the overall quality of the data as seen through the statistical lens and to raise questions that would require more research in the future. Statistical diversity is shaped by national requirements, political needs, and costs involved in compiling. From this diversity one has to create harmonized concepts that are relevant to the subject area before gathering data. Smoking is an important area of research that requires statistical attention. After all, the aim of statistics is to provide timely, reliable, and comparable data.

### **A Prospective Longitudinal Study of Tobacco Habits Among Ice Hockey-Playing Boys**

*Margot Rolandsson, R.D.H., R.D.H.T., M.Sc., Karlstad University, Karlstad, Sweden*

The aim of the investigation was to follow up tobacco habits and actual sporting activities among the boys who participated in the earlier study by Rolandsson and Hugoson (2000), and to examine whether knowledge of the harmful effects of tobacco and whether tobacco behaviour patterns and/or the choice of tobacco had changed among the participants. The study was conducted 3 years after the original study. Data were collected using a questionnaire.

Of the 183 boys in the aged 15-22 years who participated in the study, 26.8 percent were tobacco users, 19.7 percent snuff users, 6.0 percent both snuff users and smokers, and 1.1 percent smokers. Compared with the original study, a further 16.4 percent of the boys had started to use tobacco. The use of tobacco increased in all age groups except amongst 19 year olds where tobacco use was unchanged. The age group 17-22 years included boys who were both snuff users and smokers. In equivalent age groups, an increase in tobacco use between the ages of 17 and 19 years could be shown compared with the original study.

Among the 132 boys who still played ice hockey, 25.8 percent used tobacco, and of these 18.2 percent used snuff, 6.1 percent used snuff and smoked, and 1.5 percent smoked. A significant difference ( $p < 0.008$ ) could be shown between boys who used snuff and boys who did not use snuff depending on whether the boys participated in a sport other than ice hockey. Snuff usage was thus not as widespread among boys who participated in other sporting activities.

From the results of this and previous studies, it can be deduced that the environment in which ice hockey is practiced can, in itself, constitute a risk for tobacco usage becoming established among ice hockey-playing adolescents (2000, 2001).

### **Patterns of Tobacco Use in Northern Sweden: Interaction Between Smoking and Snus Use in Northern Sweden**

*Brad Rodu, D.D.S., Birgitta Stegmayr, Ph.D., Salmir Nasic, M.S., and Kjell Asplund, M.D., Ph.D., University of Alabama at Birmingham, Birmingham, Alabama, United States*

The prevalence of cigarette smoking among men in Sweden is among the lowest in the world, while smoking rates among women are comparable to other developed countries. Within Sweden, smoking prevalence among men is lowest in the two northern counties (Vasterbotten and Norrbotten). The purpose of this study was to examine the patterns of cigarette smoking and snus among men and women in Vasterbotten and Norrbotten counties.

Subjects consisted of 2,998 men and 3,902 women age 25-64 years who participated in cross-sectional surveys in 1986, 1990, 1994, and 1999 as part of the Northern Sweden MONICA Project. Subjects were asked detailed questions about current and historical tobacco use. Other health-related and demographic information was also collected. Current smoking prevalence among men was 23 percent in 1986, but was only 14 percent in 1999, compared to 27 percent and 22 percent among women, respectively. In the same years the prevalence of snus use was 22 percent and 30 percent among men, and 0.6 percent and 6 percent among women. For all years, the prevalence of ex-smoking among men was higher than that among women (30 percent versus 22 percent). When current and past use of snus was excluded, the prevalence of ex-smoking was lower among men than among women (31 percent versus 19 percent). While the prevalence of ever-tobacco use (smoking or snus) in men was consistently about 65 percent, the prevalence of ever-smoking was only 50 percent. Thus, snus accounts for about one quarter of ever-tobacco use among men. The use of snus may have had a positive impact on smoking cessation among men in Northern Sweden, and perhaps on ever-smoking rates as well.



## Concurrent Session II. Health Effects

### **Epstein-Barr and Human Papilloma Virus in Snuff-Induced Lesions of the Oral Mucosa**

*Lars Sand, Ph.D., D.D.S., National Health Service, Uppsala, Sweden*

Epstein-Barr virus (EBV) and human papilloma virus (HPV) have been associated with benign as well as malignant oral lesions. We examined 43 patients with snuff-induced lesions and 22 control patients with clinically healthy oral mucosa for the presence of HPV and EBV. PCR was performed on fresh frozen oral biopsies with degenerate consensus primers for HPV and with nested primers for EBV. None of the 43 snuff-induced lesions or the 22 control biopsies is HPV positive. Seven of the 43 (16.3 percent) snuff-induced lesions and one of the 22 (4.5 percent) controls were positive for EBV. The snuff-induced lesions were classified according to clinical severity, grade 1 lesions being the least severe and grade 4 the worst. Eleven percent of grade 2 lesions, 15.8 percent of grade 3 lesions, and 20 percent of grade 4 lesions were EBV positive. Neither EBV nor HPV seem to be associated with snuff-induced lesions.

### **Snuff-Induced Cancer in Sweden**

*Jan M. Hirsch, Ph.D., L.D.S., Uppsala University and Public Dental Health, Uppsala, Sweden*

Earlier studies regarding the carcinogenic potential of Swedish snuff have revealed an increased risk in oral cancer development among snuff users (Ahlbom, Wynder), and also animal studies have indicated an association between the use of Swedish snuff and oral cancer. However, prospective epidemiological studies have not confirmed that the use of Swedish snuff increases the risk of oral cancer. Oral cancer is considered a multifactorial disease and the global use of various types of smokeless tobacco is an important risk factor. The use of smokeless tobacco is not only a concern for the Scandinavian countries, but also especially for developing countries such as India and Sudan, and the risks that follow the use of smokeless tobacco should not be underestimated. All types of smokeless tobacco, including Swedish snuff, contain carcinogenic tobacco-specific nitrosamines.

We presented four clinical cases of Swedish snuff users with a clear association between snuff exposure and oral cancer, where the placement of the quid coincided with the tumours. These four patients were all men and the average duration of the snuff habit among these men was 60 years. Even though epidemiological and statistical data cannot confirm an association between the use of Swedish snuff and oral cancer development, the risk must not be neglected, and it is our duty to inform our patients about this small but clearly existent risk.

### **Lung Cancer in Europe: The Polish and Swedish Experiences**

*Witold Zatonski, M.D., Ph.D., The Maria Sklodowska-Curie Memorial Cancer Centre and Institute of Oncology, Warsaw, Poland*

From the beginning of the 20<sup>th</sup> century, cigarette smoking has become one of the most common human habits. By the end of the 20<sup>th</sup> century, the number of cigarette smokers dramatically

increased to millions, and that this had extraordinary consequences to the world of public health. Active inhalation of cigarette smoke, which contains 4,000 chemical substances (more than 40 carcinogenic), changed the patterns of cancer all over the world.

Lung cancer became the number one cancer killer of the human population. Lung cancer is a good model to understand the epidemiology, because it is a disease that occurs nearly exclusively among cigarette smokers. In Poland, more than 95 percent of lung cancer is caused by inhalation of cigarette smoke. Among nonsmokers (including tobacco snus users) it is as rare as it used to be 100 years ago. Polish men (as well as men from Hungary and other Central European countries) in the 1990s had the highest risk for lung cancer. To the contrary, in Sweden, men's lung cancer rate has always been the lowest in Europe (and developed countries). At present, it is several times lower than in Poland. At the same time, among Polish and Swedish women, the current levels and time trends in lung cancer mortality are identical.

It seems that these differences are understandable by analyzing the exposition of both populations to tobacco smoke. Smoking among Swedish and Polish women is quite similar. Both Polish and Swedish women use tobacco in the form of cigarettes almost exclusively. Use of snus by Swedish women is very rare (0.5-1.5 percent) and in Poland women use cigarettes exclusively. In fact in the male population of Poland and Sweden, frequency of tobacco use is very similar. However, dramatic differences exist in the form of tobacco use. In Poland, men use tobacco exclusively in cigarette form (burning). In Sweden, only half of the men use tobacco in cigarette form and the other half use snus.

### **How One Smokeless Tobacco Manufacturer Designed Products to Cause Addiction Among Youth**

*Gregory Connolly, D.M.D., M.P.H., Massachusetts Department of Public Health, Boston, Massachusetts, United States*

This presentation will review internal tobacco industry documents from an Oklahoma court case that shows how one smokeless tobacco company developed a graduation strategy that involved the design of low-nicotine starter snuff products to be widely promoted to youth. The intent of the strategy was to “graduate” new users up to higher, more addictive nicotine brands as dependence progressed. The campaign was very successful with the rates of snuff use increasing eightfold among 17 to 19 year olds from 1970 to 1990. Based on this research, agencies such as the U.S. Food and Drug Administration should regulate tobacco products to prevent manufacturers from manipulating nicotine in a way that harms the public health.

## **Concurrent Session III. Interventions/Health Promotion**

### **Sports Venues as a Tool for Spit Tobacco Education and Public Awareness**

*Paul M. Turner, Jr., National Spit Tobacco Education Program, Oral Health America, Chicago, Illinois, United States*

Major League Baseball, Minor League Baseball, Little League Baseball, and motor sports venues have been used effectively in the United States to educate youth that spit tobacco is not a safe alternative to smoking and smokeless does not mean harmless. Professional baseball players have been lectured to on the problems associated with spit tobacco use and have been made to realize their importance as role models for our youth. Professional athletes have been used in school and community education programs with a great deal of success. Youth baseball clinics have been the catalyst for educating youth about the problems associated with spit tobacco use. Many public awareness events such as pregame on-the-field activities, exhibits, television, radio, and news releases have been tools that have impacted the attitude of the public about spit tobacco products.

Motor sports pilot projects in Georgia, Kentucky, and West Virginia have demonstrated that this venue is an excellent way to attract the attention of our youth as well as adults. In fact adult users of spit tobacco are drawn to the racecar and receive educational encounters like no other venue or exhibit. During the presentation participants will be able to learn what works and what doesn't work and also share their own experiences.

### **Smokeless Tobacco and Children in India: Prevention Through Entertainment**

*Padmini Somani, M.Sc., Salaam Bombay Foundation, Nariman Point, Mumbai, India*

In India, there is some awareness about the health risk of smoking and it is socially unacceptable for children to smoke. But smokeless tobacco (gutka, khaini, mashairi, and snuff) is consumed casually, perceived as harmless, and freely offered socially. There is no social taboo to smokeless tobacco, and children perceive it to be a normal "adult thing" to do. Most children develop the habit of chewing tobacco between the ages of 12 and 16 years.

Salaam Bombay Foundation (SBF) has independently conducted extensive innovative programs to educate children on the health hazards of tobacco consumption. The aim is to educate, inform, and build refusal skills. The secondary purpose is to spread the message to adults through the hearts and minds of children. Entertainment, street theatre, music, and art are used extensively to talk about the problem. Children are more open to receiving these messages outside the classroom environment. They feel important when they make their own decision that tobacco consumption has serious implications on one's life. The entertaining skits and projects aim to enable children to make the correct decision.

SBF runs the Theatre Against Tobacco project. This project has already reached 100,000 children from private/ public schools, orphanages, reformatory homes, and street shelters. Our new project Super Army has a multi-intervention approach for inculcating, coping, and refusal skills, conceived on a research study about attitudes of children by the SBF and Ormax. We will present

some of our findings. The presentation will include a short case study of the projects followed by a discussion on the use of comedy and entertainment as a vehicle to enable children to say no to tobacco.

### **Tobacco Knowledge—Smoking and Snuff Cessation: A Part of the New Curriculum in Dental Hygienist Education at The Karolinska Institutet**

*Birgitta Söder, R.D.H, M.Sc., M.D., Seppo Wickholm, D.D.S., and Nadja Bjurshammar, R.D.H., Institute of Odontology, Karolinska Institutet, Stockholm, Sweden*

The most frequent tobacco use in Sweden consists of smoking and use of oral moist snuff. As a logical consequence of this knowledge and skills in terms of prevention and cessation must cover both habits. Dental hygienists are able to diagnose and make the patients aware of the oral effects of using oral moist snuff and dental hygienists are in a position to give advice. The aim of this presentation is to describe the course in the curriculum for dental hygienists covering the oral and general effects of smoking and use of oral moist snuff. Every year 40 students start the dental hygienist program of 120 university points. Lectures and seminars covering topics such as oral and general health effects, aspects of nicotine addiction, physical addiction of nicotine, managing nicotine addiction, dialogue technique, and cessation counseling are included in the schedule. Tobacco prevention will now presume corresponding to 5 weeks full-time studies.

In addition to being part of the obligatory program, dental hygienists will obtain a certificate at the successful completion of the studies. Including this course in the curriculum, dental hygienists will be better equipped to deal with the effects of tobacco use and to advise patients accordingly. Dental hygienists are well placed as counselors in tobacco prevention since they meet the patients regularly.

### **Intervention in Smokeless Tobacco Use Among the Rural Indian Population**

*Mira Aghi, Ph.D., Independent Consultant, New Dehli, India*

The use of smokeless tobacco is very common in India. The betel quid chewing habit and its variant predominate. Almost all habituees of betel quid use it with tobacco.

In a house-to-house screening survey conducted in three rural Indian districts, tobacco users aged 15 years and above—10,577 in Ernakulum, Kerala; 10,253 in Srikakulum, Andhra Pradesh; and 9,824 in Bhavnagar, Gujarat—were interviewed. The interviewees were asked about their tobacco habit(s) and its dynamics in terms of how the habit was formed, what made them continue it, and what would make them give it up. Investigations revealed almost no knowledge of the ill effects of tobacco on health existed among the population. In fact, they believed that it had healing powers. We educated them using participatory- and user-driven approaches. Everyone received information, which was visually reinforced and which highlighted the association of chewing tobacco with oral precancerous lesions and oral cancer, in a one-to-one, as well as a group mode. They were also educated on the advantages and disadvantages of giving up the habit along with individualized ways of quitting the habit. They also received information on withdrawal symptoms and their effective management. Those who gave up the habit were motivated to stay away from it and to act as leaders to help others give up the use of tobacco.

Two measurements were done to assess complete cessation and reduction. These measurements were done for all the tobacco uses, smoking as well as smokeless. In Kerala 10.2 percent of men and 14.9 percent of women stopped the smokeless tobacco habit completely, and 25.8 percent and 31.25 percent of men and women, respectively, reduced it. In Andhra, Pradesh the total stoppage of the smokeless tobacco habit was 23.6 percent with a reduction of 24.4 percent, whereas in Gujarat, the total stoppage was 21.1 percent and reduction was 17.2 percent. This finding was further substantiated in statistically significant regressions of already existing lesions and the reduction in the incidence of new lesions among the smokeless tobacco users. The data clearly demonstrates that intervention can lead to health benefits.

### **Tobacco Use: Economic Consequences on Vulnerable Populations**

*Shoba John, M.S.W., Debra Efroymsen, M.P.H., and Shailesh Vaite, M.S.W.,  
King George V Memorial, Mumbai, Maharashtra, India*

The abstract throws light on the economic consequences of tobacco use on two disadvantaged population groups—the street children and the pavement-dwelling families on the streets of Mumbai, India’s commercial capital. Two separate surveys that are being conducted among these groups explore the nature and extent of tobacco use and its direct and indirect impact on their income and expenditure patterns. Past surveys among street children have indicated the gutkha (flavored smokeless tobacco) use to be alarmingly high with the incidence of oral precancerous lesions in this subgroup as high as 25 percent. Its consequence in terms of decreased spending on food and entertainment and increased medical cost is being explored in the study. The study describes how the tobacco expenditure reduces food-purchasing ability, exacerbating malnutrition and hunger. The children’s attempts to postpone their hunger needs in response to strong addiction and resultant replacement of food with tobacco, deteriorates their work stamina and therefore adversely affects their earning capacity. The pavement dwellers in Mumbai, mostly migrants from the rural belts, present a plethora of smokeless tobacco use, diverse in form and consumption pattern. Tobacco use drains the family income not only in terms of increased medical cost, but also in reduced spending on nutritional food, children’s education, and potential investment. A reduction in spending on children’s education, a fall out of tobacco use and related illnesses, perpetuates the cycle of poverty. Prevention policies emerge to be crucial in breaking this cycle. These groups are price-sensitive, and so taxation and pricing policies play a vital role in reducing affordability. Child protection policies need to include effective restrictions on sale to minors. The policy efforts need to be enhanced by local initiatives in building awareness among these highly potential tobacco users, especially by involving peer educators.

### **A Snuff-Dipping Cessation Program for Snuff Dippers with Long and Extensive Snuff Exposure**

*Mats Wallström, D.D.S., Gunilla Bolinder, M.D., Ph.D., and Jan M. Hirsch, D.D.S., Ph.D.,  
Göteborg University, Göteborg, Sweden*

**Aims:** To develop and evaluate a cessation program for chronic snuff dippers. A long and extensive exposure to smokeless tobacco has a negative impact on oral and general health and an increased risk for tumour development, cardiovascular disease, and gum disease. Smokeless tobacco users also are strongly addictive to nicotine, and cessation programs in conjunction with nicotine replacement therapy are few.



Design: Prospective open, uncontrolled study using 4 mg-nicotine chewing gum. A biopsy taken from the snuff lesion at first visit in order to establish the severity of the mucosal changes and to help the patient quit smokeless habits abruptly.

Setting: A smokeless tobacco cessation setting on an individual basis. Participants: 50 snuff dippers with a minimum consumption of 100 grams of smokeless tobacco per week.

Measurements: Efficacy and compliance were evaluated at 2 and 6 weeks, and 3, 6, and 12 months.

Findings: The success rate after 6 months was 48 percent continuous abstainers and after 12 months 40 percent. The compliance was high.

Conclusion: The results show that this snuff-dipping cessation program is very successful and the figures can be compared with similar smoking cessation program rates.

## Poster Abstracts

### **Traditional Healers and Smokeless Tobacco Control in Rural South Africa**

*O.A. Ayo-Yusuf, M.Sc., D.H.S.M., K. Peltzer, and J. Mufamadi, University of Pretoria, School of Dentistry, Pretoria, South Africa*

The importance of the role of cultural and contextual factors in substance use and misuse is increasingly being recognized. Smokeless tobacco has been found socially acceptable among indigenous people of South Africa, mainly for ceremonial and medicinal purposes. A significant proportion of the rural South African population seeks the services of traditional healers. This presents the traditional healer with unique opportunities to contribute to general health of the public. African traditional healers not only have change brokering skills, but they are also accessible, affordable, culturally appropriate, and acceptable, thereby fulfilling the major criteria for an effective service delivery.

The purpose of this presentation is to present findings of a qualitative study designed to explore traditional healers' knowledge and beliefs about smokeless tobacco and health, and also to discuss the relevance of a collaborative smokeless tobacco control programme involving indigenous health practitioners. Preliminary findings suggest that a significant number of the traditional healers interviewed could identify a negative health effect of use of smokeless tobacco. Some were of the opinion that the industrialized products have additional ingredients that cause these negative effects. Therefore, home-made products are preferred. Many of them reported that they do not prescribe "internal" use of smokeless tobacco to their clients. We conclude that involvement of traditional healers in smokeless tobacco control may provide for a culturally responsive strategy for smokeless tobacco control among illiterates in under-served communities with little or no access to organized health services.

### **Telephone Counseling with Spit Tobacco Users**

*Raymond Boyle, Ph.D., Nico Pronk, Ph.D., and Chris Enstad, Health Partners Research Foundation, Minneapolis, Minnesota, United States*

We conducted a study to determine if brief counseling by telephone would be accepted and efficacious among adult smokeless tobacco users in Minnesota. Subjects were recruited from a nonprofit health plan and the wider community. A total of 421 study packets were mailed to eligible smokeless tobacco users. Completed instruments were received from 221 smokeless tobacco users who were randomized into either telephone counseling or a quitting manual-only control group. There were no significant differences at baseline. Overall these subjects had above average education and income: 83 percent had some college, and 68 percent reported household incomes greater than \$45,000. We were able to collect followup data from 95 percent (210/221) of subjects at 3 months and 197 provided complete data for the outcome variables. Overall, 31 percent (61/197) reported no smokeless tobacco or cigarette use in the past 7 days. A significantly higher proportion of subjects randomized to the intervention quit tobacco compared to the control group (41.8 percent versus 20.2 percent,  $\chi^2=10.8$ ,  $p<.001$ ). A significant dose response was found between the number of calls and the likelihood of quitting tobacco at 3 months ( $\chi^2=6.38$ ,  $p<.012$ ). No demographic or tobacco use variables were associated with

quitting. This brief intervention was successful. We conclude that adult male smokeless tobacco users were receptive to counseling by telephone.

### **Daily and Life Course Contexts of Chewing Tobacco Use in the United Kingdom's Bangladeshi Community: Focus Group Findings**

*Ray Croucher, M.A., Ph.D., Sharif Islam, M.Sc., Rubina Rahman, B.A., and Sharmin Shajahan, B.Sc., Queen Mary's School of Medicine and Dentistry, London, United Kingdom*

Little is known of the health behaviours of the multiply-deprived East London Bangladeshi community, of whom 59 percent of men and 52 percent of women either smoke or chew tobacco. This study explored daily and life course influences on tobacco chewing in paan. Eight single-sex focus groups involving 38 women and 21 men were recruited from this community. The groups were facilitated by bilingual (Sylheti/English) moderators using a topic guide focusing on tobacco use in the context of the participants' daily lives. Discussions were audio-recorded for transcription, translation, and thematic analysis.

Key themes included migration patterns, social support, role models, routine of tobacco consumption, and indicators of dependence. Responses varied by generation and gender, although tobacco chewing in paan was generally related to continuing traditional routines. Triggers initiating tobacco chewing in paan were mediated through environmental, social, and health-related factors. Tobacco cessation attempts were triggered by an awareness of the health risks, changing personal circumstances, and the context of the religious festival of Ramadan. Implications for tobacco cessation interventions were identified.

Focus-group methodology helped participants discuss the context of tobacco use and cessation. Identifying important transitions for individuals was significant in establishing patterns of exposure to chewing tobacco risks. Recognizing the impact of these factors on chewing tobacco will aid tobacco cessation interventions. Further study of these processes is recommended.

### **Residential (Inpatient) Treatment for Spit Tobacco Users: A Pilot Program**

*Lowell C. Dale, M.D., J.O. Ebbert, M.D., K.S. Vickers, Ph.D., T.R. Gauvin, M.S., K.M. Eberman, M.S., N.E. Bunge, M.S., and R.D. Hurt, M.D., Mayo Clinic Nicotine Dependence Center, Rochester, Minnesota, United States*

Successful treatment of spit tobacco use may require more intensive approaches than currently used for many patients with this addiction. Our objective was to develop and implement a pilot residential (inpatient) treatment program for spit tobacco users modeled after the successful residential program at the Mayo Clinic for cigarette smokers. In each spit tobacco 8-day program, a multidisciplinary team provided individual and group counseling in addition to sessions on behavioral treatment, addiction, relationships, diet, exercise, family issues, medical implications of spit tobacco use, stress management, and relapse prevention. An oral examination by a periodontal specialist, dental prophylaxis with counseling on oral health care, and photographs of any oral lesions were provided at admission to all subjects. Nicotine replacement therapy using patches and gum was adjusted to achieve 100 percent replacement of baseline venous nicotine levels. Bupropion SR and snuff substitutes were provided to control withdrawal symptoms and maintain abstinence. Twenty-four adult ( $\geq 18$  years of age) males who had used spit tobacco for at least 1 year were enrolled and completed the program. Median age was 39 years [interquartile range (IQR):33-69]. Median spit tobacco use was 3.5 cans/pouches per week (IQR: 2-7). Mean

baseline serum nicotine level was  $30.5 \pm 10.8$  (SD) ng/ml; mean baseline serum cotinine level was  $468.6 \pm 158.1$  (SD) ng/ml. Of the 17 participants who have completed the 1-year followup phase of the study, the 1-year biochemically confirmed (urine anabasine of  $\leq 2.0$  ng/ml) point prevalence tobacco abstinence rate was 47 percent (8/17). A residential treatment program for spit tobacco users may be effective for those with difficulty maintaining tobacco abstinence with outpatient treatment. More research needs to be conducted to determine if higher abstinence rates with spit tobacco outpatient clinical programs can be achieved utilizing the high-dose nicotine replacement and/or bupropion used in this inpatient program.

### **Images of Male Peer Snuffers Among Adolescent Girls in a Swedish Cohort**

*Maria Rosaria Galanti, Ph.D., Seppo Wickholm, D.D.S., Asgeir R. Helgason, M.D., Ph.D., Ann Post, and Hans Gilljam, M.D., Ph.D., Centre for Tobacco Prevention, Karolinska Institutet, Stockholm, Sweden*

In contrast to cigarette smoking, the use of the Swedish variety of oral snuff (snus) is almost exclusively a male behavior, both among adults and among adolescents. The reasons for this marked gender-specific preference are not clear. A possible explanation is that women neglect snus use because it lacks the esthetical appeal that has been attached to cigarette smoking.

We tested this hypothesis in a cohort of Swedish children, who between fifth and eighth grades reported on their tobacco use in an annual survey. In the sixth grade, the subjects were asked to state whether each of the following qualities applied to male peers of an age who make use of snus: popular, mature, nervous, not proficient in school, autonomous, defiant, wise, successful in sports, disgusting. In the reports of 1,199 girls, negative perceptions were more common than positive ones. For instance, 79 percent stated that a boy using snus is disgusting, and 68 percent believed that he has poor school performance, but only 8 percent and 13 percent, respectively, thought he looked wise or mature. However, about one-third of the respondents perceived him as popular, and 28 percent perceived him as successful in sports.

In logistic regression analysis of all girls and of never users of snus in the sixth grade ( $n=1,110$ ), no single item was associated significantly either with progression in use (27 percent progressed) 2 years later, or with the probability to remain a never user (74 percent). In particular, appraisals of snuffers as either popular or disgusting were not predictive of subsequent snus initiation or progression. Adjusting for overall tobacco use and parental education did not change the results.

The social image of male snuffers among Swedish girls in early adolescence is predominantly negative. However, lack of glamour and other negative perceptions are not clearly linked to own later behavior.

### **Role of Snus in Smoking Cessation and Smoking Reduction Among Swedish Men**

*Hans Gilljam, M.D., Ph.D., and Maria Rosaria Galanti, Ph.D., Centre for Tobacco Prevention, Karolinska Institutet, Stockholm, Sweden*

**Aims:** To assess to what extent snus has been used as an aid to stop smoking among Swedish smokers.

**Design:** A random telephone retrospective survey of Swedish smokers and ex-smokers.

Setting: Survey conducted in November-December 2000.

Participants: A national sample of 1,000 former and 985 current daily smokers aged 25-55 years.

Measurements: Smoking status, date, and method of quitting by self report.

Findings: Thirty-three percent of former smokers and 27 percent of current smokers had ever used snus. The difference was larger among men (55 percent versus 45 percent,  $p=0.003$ ). Current smokers who used snus smoked on average fewer cigarettes per day than nonusers of snus. The mean duration of abstinence among former smokers was not influenced by snus use. Conditionally by age, education, and use of nicotine replacement therapy, there was an increased probability to be a former rather than a current smoker with ever use (OR 1.72, 95 percent CI=1.30-2.28) or current use (OR 1.81, 95 percent CI=1.31-2.53) of snus. Having used snus at the latest quit attempt increased the probability of being abstinent by about 50 percent (OR 1.54, 95 percent CI=1.09-2.20).

Conclusions: Our study suggests that by using snus, Swedish male smokers may increase their overall chances of abstinence. However, 71 percent of the men in this sample who quit smoking did so without using snus and the duration of abstinence was not affected by snus use. This suggests that snus is not a necessary component of smoking cessation at the population level. Snus use was very rare among women.

### **Lung Cancer in Austria and Sweden: Is There an Influence of Snus Consumption?**

*Ernest Groman, M.D., University of Vienna, Vienna, Austria*

In Sweden the tobacco marketing situation has been different from Austria in several aspects, and Sweden has become one of the first developed nations to see a significant decline in tobacco mortality. This decline has been associated with changing consumers' preferences and regulatory policies that have contributed to a partial shift in nicotine intake from the most hazardous forms (cigarettes) to less hazardous forms (snus and nicotine replacement medications).

Nicotine consumption in Sweden decreased by nearly 20 percent as smokeless tobacco and nicotine replacement product use has increased. Of the current nicotine consumption, approximately 50 percent of nicotine was provided by nonsmoke sources (namely snus and nicotine medication) by the turn of the century. Tobacco mortality in Sweden has decreased following the decline of smoking prevalence. A first descriptive analysis of Swedish and Austrian data shows the following situation:

- The age and gender distribution of the Swedish and Austrian populations are very similar.
- Lung cancer mortality rates attributed to smoking are lower in Swedish men compared to Austrian men.
- All cancer mortality attributed to smoking is lower in Swedish men compared to Austrian men.
- Vascular mortality attributed to smoking is lower in Swedish men compared to Austrian men.
- Just 0.9 percent of Swedish women use snus (1995/1996).

The best harm reduction strategy for current smokers, after abstinence, is medical nicotine. Swedish snus offers harm reduction compared to cigarettes. Sweden might be considered a real-world experiment in harm reduction.

## **Review of Ariva: A Compressed Powdered Tobacco Product**

*Hanh Nguyen, Ph.D., B. Lynch, and James Dus, GlaxoSmithKline, Parsippany, New York, United States*

The Ariva tablet, also referred to as a Cigalett, is a compressed powdered tobacco product that is marketed for use when smoking is not possible. The Cigaletts are individually packaged in a 10-piece (see through), child-resistant blister card, and employ sophisticated tablet processing technology, which is a hallmark of pharmaceutical manufacture. According to the package label, tablets are meant to be used in situations when smoking is not possible. There are no specific instructions or limitations for use on the label. Chemical and physical testing demonstrated that Ariva had relatively consistent piece weights and yielded, via assay, reproducible nicotine content. The typical Cigalett weighed 280 mg and contained approximately 1.3 mg nicotine. Ariva had an alkaline pH of 8.4, which was significantly higher than cigarette tobacco's pH of 5.6. Moreover, Ariva demonstrated a buffering capacity, sufficient to control the pH of human saliva. Elemental analysis yielded calcium and potassium levels that are markedly higher than normally expected in plant material. On a per-Cigalett basis, the determined calcium content was 7.5 percent, consistent with what would be expected if calcium and potassium buffer salts were used as pH-adjusting additives. Polymer analysis of cigarette tobacco (Marlboro versus Ariva) demonstrated a significant difference between the two products. Ariva contained significantly more of 20 and 40+ kilodalton polymers. Though the identity of the polymers was not determined, the presence of these high-weight polymers would suggest deliberate design, possibly to slow table dissolution and facilitate buccal absorption of nicotine. As highlighted herein, Ariva's design features, as well as the technologies employed, are intrinsic to ethical product manufacture. In short, Ariva appears to have characteristics and usage of both a tobacco-containing food and ethical drug product.

## **Analysis of Tobacco-Specific Nitrosamines in Snuff by LC-MS/MS Detection**

*Alexandre Paccou, Christer Jansson, and Bengt-Göran Österdahl, National Food Administration, Uppsala, Sweden*

Tobacco-specific nitrosamines are carcinogenic compounds that can be found in all types of tobacco products on the market. A method has been developed for the detection of the four different tobacco-specific nitrosamines (NNN, NNK, NAT, and NAB) in snuff, using LC-MS/MS detection.

Three methods of extraction (dichloromethane, ethyl acetate, and buffer pH 3.9) have been compared. The setting of the LC-MS/MS was optimized for each compound and different mobile phases were tested on the HPLC.

Analysis by LC-MS/MS can often be affected by matrix effect, which means enhancement or suppression of the signal detected due to the matrix, compared to the same compound in solvent. Matrix effect was studied by standard additions to the samples analyzed. Results of matrix effect showed a suppression of about 15 percent for all compounds. Of the three extraction methods tested, extraction with ethyl acetate gave the best recoveries.

Validation of the method was performed on different Swedish moist snuff and also on Swedish dry snuff and American moist snuff. Recoveries were more than 85 percent for all compounds. The detection limit of the method was 10 ng/g snuff for NNN, NNK, and NAT and 5 ng/g for NAB.

Today, all the snuffs of the Swedish market have about the same amount of tobacco-specific nitrosamines, but the amount of TSNAs in the Sweden moist snuff has decreased 85 percent in the last 15 years.

### **Plasma Nicotine Levels and Pharmacological Effects of Moist Snuff in Humans**

*Wallace Pickworth, Ph.D., Richard Nelson, Jack Henningfield, Ph.D., and Reginald Fant, National Institute on Drug Abuse, Baltimore, Maryland, United States*

The purpose of this study was to examine the effects of four commercial brands of smokeless tobacco popular in the United States (Copenhagen, Skoal Cherry, Skoal Wintergreen, Skoal Bandits) on plasma levels of nicotine, subjective and physiologic measures. A nontobacco mint snuff, Oregon Mint Snuff, was used as a control in this within-subject study. Smokeless tobacco users (n=10) participated in five experimental sessions. After baseline measures were collected, 2 gm of each of the products (two pouches of Skoal Bandits) were kept in the mouth for 30 minutes. During the time that the product was in the mouth and for 65 minutes afterwards, blood samples, cardiovascular, subjective, and EEG measures were collected. Plasma levels of nicotine rapidly increased to levels as high as 25 ng/ml (Copenhagen) and the increase was associated systematically with changes in heart rate, EEG arousal, and subjective measures of product strength, head rush, and feeling alert. Furthermore, the absorption of nicotine and the resultant effects were related to the pH of aqueous suspensions of the products. Specifically, products with higher (alkaline) pH delivered more nicotine than lower pH products. Through their substantial delivery of nicotine, these products have significant abuse potential and adverse health effects.

### **How Does Parental Tobacco Use Influence Adolescents' Use of Snus?**

*K. Ingvar Rosendahl, Centre for Tobacco Prevention, Karolinska Institutet, Stockholm, Sweden*

**Background:** There are few observational studies on cross effects of parental use of cigarette and smokeless tobacco on offspring's behaviors.

**Methods:** Cohort study of 2,232 children recruited in the fifth grade with followup in the eighth grade. Information from parents on their own tobacco use and socio-demographic characteristics was collected at baseline and in the seventh grade.

**Results:** Parents' cigarette smoking (especially mother's) was associated with adolescents' current smoking (OR = 2.5; CI=1.6 – 3.8 for mother's daily smoking versus nonsmoking) and combined use of cigarettes and snus, the Swedish variety of smokeless tobacco. Father's use of snus was associated with adolescents' current exclusive use of snus (OR = 2.4; CI=1.2 – 5.1 for father's daily use versus nonuse) and combined use of cigarettes and snus, but not with exclusive cigarette use. The overall prevalence of current smoking was lower among children whose fathers used snus than among those whose fathers smoked cigarettes. Boys whose father had quit smoking and currently used snus were less likely to smoke compared with sons of fathers who were exclusive current or former smokers.

**Conclusions:** In a context of declining smoking trends and negative social acceptance of smoking, the use of smokeless tobacco among significant adults may increase the overall rate of tobacco experimentation among adolescents. However, it may also promote the transition from the product perceived as most harmful to the one perceived as less harmful.

## **Smokeless Tobacco Products and Tobacco Harm Reduction**

*Tore Sanner, Ph.D., Institute for Cancer Research, Montebello, Oslo, Norway*

The use of smokeless tobacco has been suggested as a means for harm reduction in the case of cigarette smokers. In the present communications, it is argued that the health damage caused by the use of smokeless tobacco may be greater than acknowledged today. Most epidemiological studies on health risk have been carried out on men who started to use snuff when they were between 20 and 25 years old. In the 1970s and 1980s, the use of snuff became more common among young men. It is not known whether the adverse health effects may be greater among men who start to use snuff when they are 15 to 18 years old than among men who start to use snuff at a later age. In the case of smoking, the risk of adverse health effects increases with decreasing age of smoking initiation. Both IARC and U.S. National Toxicology Program in the 9<sup>th</sup> Report on Carcinogens have classified snuff as a human carcinogen. It has been argued that the snuff used in Sweden does not cause cancer. However, this conclusion can't be drawn on the basis of available data. Few studies are available concerning cardiovascular diseases among snuff users. Increased blood pressure in relation to the use of snuff has been demonstrated. One Swedish study has shown significantly higher cardiovascular mortality among snuff users than among nonsmokers, while other studies have been equivocal. A recent paper from Sweden demonstrated that the snuff users have a higher risk of diabetes than smokers. It has also been argued that the success of reduction in cigarette smoking among males in Sweden is due to the availability of snuff. However, this is not supported by available data.

## **Smokeless Tobacco Use in Eastern India**

*Urmi Sen, M.Sc., Ph.D., Chittaranjan National Cancer Institute, West Bengal, India*

Kolkata is a major metropolis in India and the cosmopolitan population comprises people from all of Eastern India. A recent survey shows that there are 35.7 percent smokeless tobacco male users compared to 40 percent male smokers, and 18.7 percent female smokeless tobacco users compared to a meager 0.5 percent female smokers. A variety of indigenous smokeless tobacco products are used. The most common product used by females is betel leaf with tobacco and lime, and the most common product for males is khaini, which is raw, ground, crude, dried tobacco taken with lime. However, refined tobacco known as gutkha sold in attractive pouches is now becoming popular both among adolescents and adults. Eighty-six percent are daily users and unlike smokers, very few tend to give up use of smokeless tobacco products. Compared to smokers, age of initiation has been found to be higher for chewers. A higher percentage of lesser-educated people belonging to the low socioeconomic groups with poor income are addicted to the use of smokeless tobacco products because they are cheap. The motivation for chewing is mostly by self and also by friends. Opinion surveys show that more than 50 percent of users are agreeable to quitting knowing the health hazards of smokeless tobacco use. Despite a ban on advertisements of tobacco products in the mass media, the manufacturers of smokeless tobacco are using surrogate advertisements to promote their products. There is a high incidence of oral cancer in Kolkata. It is the second highest cancer among males after lung cancer. The health effects of smokeless tobacco use and cessation measures undertaken would be discussed in detail.



### **Self-Help Smokeless Tobacco Cessation: A Comparison of Three Conditions**

*Herbert H. Severson, Ph.D., Ed Lichtenstein, Judy Andrews, and Laura Akers, Oregon Research Institute, Eugene, Oregon, United States*

There has been a paucity of research evaluating interventions to help smokeless tobacco users quit. This study is the first, large-scale randomized trial evaluating two levels of self-help intervention with adult smokeless tobacco users. Smokeless tobacco users were recruited and randomized to one of two interventions (n=1,069). In the Manual Only (MAN) condition, the user received a self-help guide only, while in the Assisted Self-Help (ASH) condition, users also received videotape and two phone calls from project phone counselors. Subjects recruited to an additional quasi-experimental condition (n=584) received a manual and video (MV) but no phone counseling. Subjects were assessed at 6 weeks, 6 months, and 12 months after intervention. Followup data at 6 months showed that subjects in the ASH condition had a significantly higher point prevalence quit rate than subjects in the MAN or MV conditions (21.1 percent versus 16.5 percent and 15.9 percent,  $p < .05$ ), but at the 12-month followup, the abstinence rates for subjects in both the ASH and MAN conditions were similar and were better than subjects in the MV condition. The sustained abstinence at 12 months favored subjects in the ASH condition (12.9 percent), but the magnitude was modest over other conditions (9.7 percent and 8.7 percent). Subjects in the ASH condition reported higher use of the manual and used more of the recommended techniques than subjects in other conditions. Phone counseling may be more effective in getting participants to use the recommended techniques for quitting. The study demonstrated that low-cost and low-intensity interventions done by mail and phone could help a sizable proportion of smokeless tobacco users to quit. The use of the mail and phone is a cost-effective opportunity to provide services to smokeless tobacco users in diverse geographic locations without professional staff or group/individual meetings. Implications of this research are discussed in terms of dissemination and cost effectiveness.

### **Evaluation of an Interactive Computer-Based Spit Tobacco Cessation Program**

*Herbert H. Severson, Ph.D., Chris Williams, and John Seeley, Oregon Research Institute, Eugene, Oregon, United States*

An interactive computer-mediated intervention designed to assist spit tobacco users in quitting was evaluated. Adult male daily users of spit tobacco were recruited from Oregon and Mississippi via radio and print ads. Prior to completing the program, subjects were administered a baseline questionnaire that gathered information on demographic characteristics, tobacco use patterns, readiness to quit, computer usage, and a three-item depression screener.

The Chewer's Choice is an interactive cessation program that utilizes a baseball metaphor to create a user-friendly personalized approach for quitting. As subjects work their way around the base paths, they create an individualized quit program tailored to their tobacco use characteristics. After finishing the program, consumer satisfaction measures were collected and subjects received a full-color printout of their personal game plan for quitting based on choices made in the program.

Subjects were contacted by mail at 1- and 3-month followup to determine if they had been able to quit snuff or chewing tobacco. Data has been collected on more than 160 subjects. The end point measure was no use of tobacco in the past 7 days at followup assessments. At 1 month, 31 percent of the subjects reported no tobacco use, and at 3 months, 38 percent of subjects reported abstinence using an intent to treat model of analysis. The program evaluation was also very positive with high ratings on measures of consumer satisfaction. We will present baseline

predictor variables that are related to cessation outcomes and estimated cost analysis of disseminating the program for general use.

The interactive program appears to hold promise as an alternative delivery system for spit tobacco cessation. Such programs offer low-cost, ongoing, tailored interventions that can be delivered when there is no alternative therapy. This self-help program offers a unique aid for quitting smokeless tobacco and could provide a public health intervention to this underserved population of tobacco users.

### **An Educational Film on “Gutkha”: A Popular Smokeless Tobacco Product of India**

*Mihir N. Shah, B.D.S., M.D.S., Ph.D., Department of Periodontia, Government Dental College and Hospital, Ahmedabad, Gujarat State, India*

Gutkha is a quantitatively and qualitatively consistent, commercially available, inexpensive preparation of dry chewing tobacco, areca nut, and lime. It is freely available in ready-to-eat attractive polyethylene pouches at kiosks/shops at every nook and corner of India. Gutkha may be kept in the mouth or chewed with its juice, which may be swallowed or spit. There are about 200 brands of gutkha available in the Indian market costing between 1 and 6 U.S. pennies. Approximately 35 million people are regular users of gutkha in India. As per rough estimates, the total annual gutkha sales exceed U.S. \$8 billion (Source: AIPMTMA) in India with a growth rate of 25 percent per annum with exports all over.

India has the highest oral cancer rate in the world. Over the last few months, many of the State Governments of India have banned the sale, manufacture, distribution, and storage of gutkha in their territories. But the Central/Union Government still has not drafted or moved any legislation to ban or stop gutkha sale in India.

Data available at the six cancer registries in India, compiled by the National Cancer Registry Programme of the Indian Council of Medical Research, suggests that about 20 percent of cancer of the oral cavity and pharynx in males is caused by chewing tobacco.

Chewing tobacco has a greater social acceptance compared to the consumption of alcohol in India. Due to this factor, and the prevailing poverty, widespread illiteracy, and unemployment in youth, the public health education programmes have lacked the desired penetration and have not yielded favourable results. This film (edited version) will give international viewers a glimpse of the gutkha scenario in India. An attempt has been made to enlighten viewers on the prevalence, attitudes, and consequences of the chronic gutkha habit. The complete version of this film is shown to high school and college students of Gujarat State to dissuade them from picking up the gutkha habit.

### **Betelnut Quid—A Favorite in Micronesia**

*Karen Siener, M.P.H., R.D.H., and Valerie Whipps, Ministry of Health, Palau, Micronesia*

Chewing betelnut mixed with different forms of tobacco is more prevalent in some jurisdictions in Micronesia than cigarette smoking. Recent CDC-funded youth tobacco surveys show that more than 50 percent of high school students currently chew betelnut with tobacco. The practice is common among males and females. Children may start as young as 5 years of age and may use it throughout their lifetime. Traditionally, betelnut quid is a mixture of the nut from the areca palm tree (areca catechu), the leaf of the pepper betel (piper betel), and lime (calcium hydroxide). More

recently, tobacco, in the form of cigarette, chew, or twist, is added. There are variations between and within jurisdictions in the combination of ingredients chewed.

This addictive mixture, chewed throughout the day, carries several health risks. Use is associated with oral cancer, precancerous oral lesions, debilitating submucous fibrosis, periodontitis, severe gingival recession, exacerbation of asthma, and other conditions. This presentation will address the growing prevalence rates, culturally ingrained custom, health risks, needed research, and interventions being implemented to curb the habit of adding tobacco products to betelnut quid.

### **Seven-Year Followup of Smoking Cessation with Smokeless Tobacco**

*Ken Tilashalski, D.M.D., Brad Rodu, D.D.S., and Philip Cole, M.D., Dr.P.H.,  
University of Alabama at Birmingham, Birmingham, Alabama, United States*

This study was a 7-year followup of a single-intervention smoking cessation trial using smokeless tobacco as a nicotine substitute. Followup was complete on 62 of 63 original subjects who had been classified according to tobacco use status 1 year after the intervention (*American Journal of Medicine* 1998; 104:456-458). Of the 16 subjects who had quit smoking using smokeless tobacco at 1 year, 12 were smoke free at 7 years. For all 16 subjects, there were 106 person years (py) of followup, 97 (92 percent) of which were smoke free. Of six subjects who had quit smoking at 1 year by a means other than smokeless tobacco, four were smoke free at 7 years. This entire group had 42 py of followup, 34 (81 percent) of which were smoke free. Of the 41 subjects who were smoking at 1 year, 12 had quit smoking by the 7-year mark. Total followup for this group was 284 py, of which 26 (9 percent) were smoke free. Although the study is small, the long-term success rate compares favorably with other such studies.

### **Oral Snuff and Chewing Tobacco as Risk Factors for Oral Cancer**

*Margaret M. Walsh, M.S., Ed.D., J. Ellison, S. Gansk, U. Isong, and J. Weintraub,  
University of California, San Francisco, California, United States*

Each year there are approximately 30,000 new cases of oral and pharyngeal cancer and an estimated 7,800 deaths per year in the United States (American Cancer Society, 2001 ). In 1986, a Report of the Advisory Committee to the U.S. Surgeon General concluded, “the scientific evidence is strong that the use of smokeless tobacco products can cause cancer in humans. The association between smokeless tobacco use and cancer is strongest for cancer of the oral cavity.” (USDHHS, 1986) The evidence of a carcinogenic effect of moist snuff and chewing tobacco also known as spit (smokeless) tobacco, also has been considered sufficient by the International Agency for Research on Cancer (1985). Recently the U.S. Smokeless Tobacco Company (USSTC) has challenged this conclusion. The purpose of this review is to assess 12 studies cited by USSTC that were published in the past 10 years regarding the association of smokeless tobacco and oral cancer (FTC request, [www.usmokelesstobacco.com](http://www.usmokelesstobacco.com), February 2002, Attachment. B, p.3). These epidemiological studies have a common problem as they fail to provide an adequate number of subjects using smokeless tobacco without the confounding history of smoking and/or heavy alcohol use. Many studies did show a positive association between smokeless tobacco and oral cancer, but only a few attained statistical significance, due at least in part to small sample size. To separate the smoking and smokeless tobacco risk, an adequate number of smokeless tobacco users who are nonsmokers must be represented. To describe the risk of modern smokeless tobacco products to cigarettes, a large registry for oral cancer with precise definitions of smokeless tobacco exposure (and potential confounding factors) will need to be maintained over several years.

## **Tobacco Habits and Periodontal Status Focused on Use of Oral Moist Snuff in Young Adults in Sweden**

*Seppo Wickholm, D.D.S., Birgitta Söder, R.D.H., Ph.D., Per-Östen Söder, D.D.S., Ph.D., and Björn Klinge, D.D.S., Ph.D., Karolinska Institutet, Stockholm, Sweden*

The use of tobacco in Sweden consists of smoking and use of oral moist snuff. The use of oral moist snuff is widespread especially among males. The aim of the study was to determine patterns and habits of tobacco use among young adults in Sweden. Of the 500 subjects who participated, 238 were males and 262 were females, with a mean age of 35.6 ( $\pm 2.4$ SD) years. Clinical registrations included plaque index (PII), gingival index (GI), calculus index simplified (CIs), and number of teeth with pockets  $\Rightarrow$  5mm. The participants also answered a questionnaire about their tobacco habits. PII for oral moist snuff users were 0.72 ( $\pm 0.08$ SE) and for smokers 0.72 ( $\pm 0.03$ SE). GI for oral moist snuff users were 1.2 ( $\pm 0.09$ SE) and for smokers 1.2 ( $\pm 0.04$ SE). There were no significant differences between oral moist snuff users and smokers regarding CIs and PD  $\Rightarrow$  5mm.

Oral moist snuff was regularly used by 5.6 percent of the participants. Of the oral moist snuff users, 82 percent were males and 18 percent were females. Males used in mean 3.9 ( $\pm 0.8$ SE) cans of oral moist snuff per week and females in mean 2.5 ( $\pm 0.6$ SE) cans. The duration in mean of oral moist snuff use was among males 12.4 ( $\pm 1.7$ SE) years and among females 8.0 ( $\pm 2.9$ SE). Of the population studied, 2.2 percent had quit oral moist snuff use in mean 3.2 ( $\pm 1.0$ SE) years ago after having used in mean 1 can per week for 15 years. Thirty-six percent of the participants were smokers and 23.2 percent were ex-smokers. 6.9 percent of the ex-smokers were regular oral moist snuff users. Of smokers under study, 3.9 percent combined in mean 9.7 ( $\pm 2.3$ SE) cigarettes per day with use of oral moist snuff in mean 3.1 ( $\pm 1.5$ SE) cans per week. The intake of nicotine is equivalent with 31.7 regular cigarettes per day.

Conclusion: Use of oral moist snuff seems to have insignificant influence on oral hygiene or periodontal health. Some smokers combine smoking with oral moist snuff use with a high intake of nicotine as the result.

## **Lung Cancer Risk: Smoking and the Use of Snus in Sweden and Norway, 1960-1997**

*Brian Wicklin, M.Sc., Statistical Bureau VECA, Stockholm, Sweden*

Introduction: The statistics that describe the changes in pattern of tobacco use and age standardized lung cancer incidence in Sweden between 1960 and 1997 (1998) are studied in this report. The statistics have been compiled from official sources.

The consumption figures are expressed in terms of tobacco intake per person, 15+ in accordance with the standards established by the World Health Organization (WHO).

The lung cancer incidence per 100,000 persons refers to the number of new cases of lung cancer detected in a year, divided by the mean population, multiplied by 100,000. The incidence rates are age adjusted to a standard population from latest available census in Sweden and Norway, respectively. The aim of the age adjustments is to reduce the risk of age-specific structural changes from influencing the incidence rates over time. In other words, the age distribution of the standard population is assumed to remain unchanged over a specified time period. Although a time period of 30-40 years could be considered to be relatively long in general terms, it is probably too short a time for structural changes in the age distribution to have a significant impact

on incidence rates. Nevertheless, the age standardization eliminates the risk of a changing age structure influencing the incidence rate during the time period 1960-1997.

In analyzing the data, three time intervals are specified; 1960-1962, 1980-1982, and 1995-1997. The referral is to a 3-year, moving average for each of the time periods.

**Description of the trends in development:**

**Smoking Prevalence:**

The smoking prevalence rate is declining more rapidly in Sweden than in most other European countries. In 1997, Sweden was the first country in the World to reach the WHO goal of reducing adult smoking prevalence below the 20 percent level. Sweden has lowered this rate to a record low level of 19.3 percent in 1999.

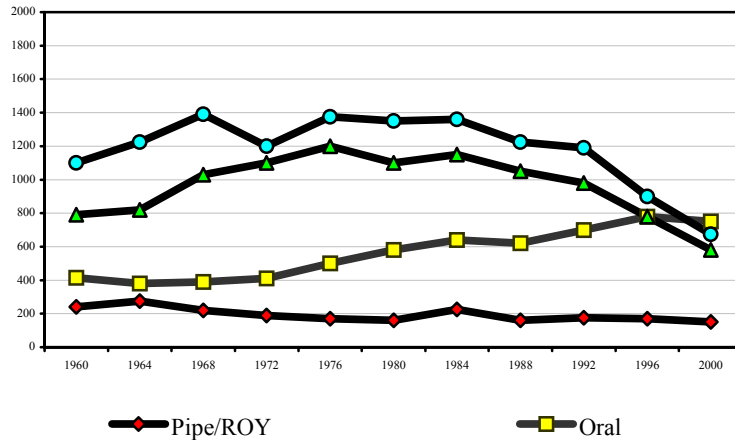
Adult males (aged 16-84 years) have succeeded in reducing smoking prevalence more rapidly between 1980 and 1999 (35 percent to less than 20 percent) compared to adult females (28 percent to 23 percent). This rapid decline in smoking prevalence rates for males is closely associated with the increased usage of Swedish snus (moist snuff). According to the latest survey on smoking prevalence (Swedish Office of National Statistics), men who have given up smoking and started using Swedish snus (Swedish smokeless tobacco) as an alternative to smoking, had increased from 200,000 in 1980 to about 340,000 in 1997 (latest available figures).

**Lung Cancer Incidence:**

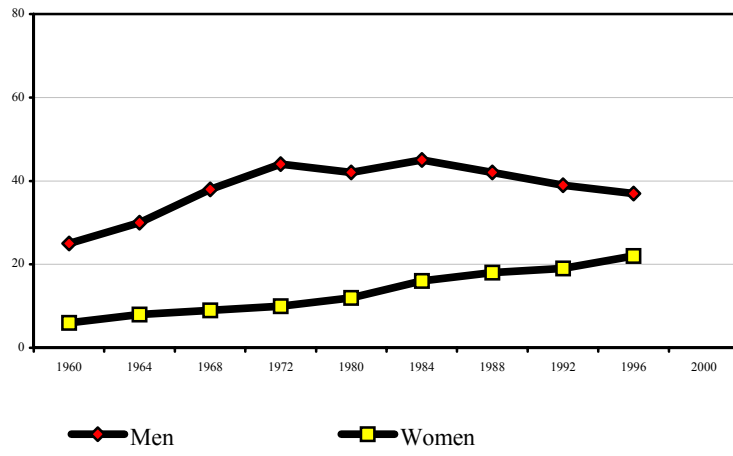
The lung cancer incidence in Sweden for men increased from 26 percent to 46 percent between the early 1960s and 1980s, and decreased to 38 percent in the late 1990s. Lung cancer incidence for women had increased continuously from 6 percent to 21 percent over the years from the early 1960s to late 1990s.

**Figure 1. Changing pattern of tobacco intake in Sweden 1960-1997**

*Tobacco intake grams per person 15+*



**Figure 2. Age Standardized Lung Cancer Incidence in Sweden 1960-1997**  
*Per 100,000 persons*







Stockholm • Sweden

September 22-25, 2002

# 3rd International Conference on Smokeless Tobacco

## *Advancing Science & Protecting Public Health*

### Agenda

(Subject to Change)

Sunday, September 22, 2002

1300 hrs (1:00 p.m.)	Registration	<i>Auditorium Foyer</i>
1400 hrs (2:00 p.m.)	Exhibit Session Setup Poster Session Setup	<i>Gallerian Platon-Sokrates</i>
1800 hrs (6:00 p.m.)	Informal Icebreaker Social <i>Sponsored by: Centre for Tobacco Prevention GlaxoSmithKline Novartis Pharmacia</i>	<i>Panorama</i>
	<i>Hans Gilljam Centre for Tobacco Prevention Stockholm, Sweden</i>	
	Sponsoring Organization Exhibits/Materials Display (open for viewing for the duration of the conference) <i>Centers for Disease Control and Prevention FDI World Dental Federation GlaxoSmithKline National Cancer Institute National Institute on Drug Abuse Novartis Oral Health America Pharmacia</i>	<i>Gallerian</i>





Monday, September 23, 2002

0730 hrs (7:30 a.m.)                      Registration Desk                      Auditorium Foyer

0830 hrs (8:30 a.m.)                      Opening Remarks                      Auditorium

*Samira Asma*  
*Centers for Disease Control and Prevention*  
*Atlanta, Georgia, USA*

*Hans Gilljam*  
*Centre for Tobacco Prevention*  
*Stockholm, Sweden*

*Scott Leischow*  
*National Cancer Institute*  
*Bethesda, Maryland, USA*

Keynote Address

*Gunnar Ägren*  
*Director General*  
*Swedish National Institute of Public Health*  
*Stockholm, Sweden*

Outline of the Conference

*Cathy Backinger*  
*National Cancer Institute*  
*Bethesda, Maryland, USA*

*Michelle Roland*  
*Centers for Disease Control and Prevention*  
*Atlanta, Georgia, USA*

0930 hrs (9:30 a.m.)                      Break

1000 hrs (10:00 a.m.)                      Global Perspective of Smokeless Tobacco Use                      Auditorium

Moderator:

*Prakash Gupta*  
*Tata Institute of Fundamental Research*  
*Mumbai, Maharashtra, India*

European Experience

*Seppo Wickholm*  
*Centre for Tobacco Prevention*  
*Stockholm, Sweden*

Africa and the Middle East

*Ahmed E.O. Ogwel*  
*Oral and Craniofacial Research Associates*  
*Nairobi, Kenya*

Asia and the Pacific

*Mihir N. Shah*  
*Government Dental College and Hospital*  
*Gujarat State, India*

Americas

*Ricardo Granero*  
*ASCARDIO*  
*Barquisimeto, Venezuela*



Monday, September 23, 2002 (continued)

Alaska and the Arctic Region  
*To Be Determined*

Migrant Populations  
*Shahid Anwar*  
*Leeds Dental Institute*  
*Leeds, England*

Discussant:  
*Saman Warnakulasuriya*  
*King's College London*  
*London, England*

1200 hrs (12:00 noon)

*Lunch Buffet*  
Poster Session  
(1200 – 1245 presentations; 1245 – 1330 viewing only)

*Panorama*  
*Platon-Sokrates*

1330 hrs (1:30 p.m.)

Smokeless Tobacco Addictions  
Moderator:  
*Karl-Olov Fagerström*  
*Fagerström Consulting AB*  
*Smokers Information Centre*  
*Helsingborg, Sweden*

*Auditorium*

Dynamics of Nicotine Addictions  
*Jack Henningfield*  
*Pinney Associates*  
*Bethesda, Maryland, USA*

Addiction at the Micro Level  
*Torgny Svensson*  
*Karolinska Institutet*  
*Stockholm, Sweden*

“Snus” Uptake In Youths: Trajectories and Determinants  
*Maria Rosaria Galanti*  
*Centre for Tobacco Prevention*  
*Stockholm, Sweden*

Behavioral “Toxicology” of Chronic Nicotine:  
Consequences of Nicotine-Induced Behavioral Disinhibition  
*Bo Söderpalm*  
*Göteborg University*  
*Göteborg, Sweden*

Discussant:  
*William Corrigall*  
*National Institute on Drug Abuse*  
*Bethesda, Maryland, USA*



Monday, September 23, 2002 (continued)

1500 hrs (3:00 p.m.)	<i>Break</i>	<i>Auditorium Foyer</i>
1530 hrs (3:30 p.m.)	<p>Health Effects of Smokeless Tobacco Use <i>Session Sponsored by: The Swedish Heart Lung Foundation</i> Moderator: <i>Newell Johnson</i> <i>GKT Dental Institute</i> <i>London, England</i></p> <p>Neoplasms and Cancer <i>Olof Nyren</i> <i>Karolinska Institutet</i> <i>Stockholm, Sweden</i></p> <p>Cardiovascular Health Effects of Smokeless Tobacco Use <i>Gunilla Bolinder</i> <i>Karolinska Hospital</i> <i>Stockholm, Sweden</i></p> <p>Pregnancy and Reproductive Outcomes <i>Prakash Gupta</i> <i>Tata Institute of Fundamental Research</i> <i>Mumbai, Maharashtra, India</i></p> <p>Oral Health Effects of Smokeless Tobacco Use <i>Maria Teresa Canto</i> <i>National Institute of Dental and</i> <i>Craniofacial Research</i> <i>Bethesda, Maryland, USA</i></p> <p>Moist Snuff Use and Risk of Type 2 Diabetes <i>Claes-Göran Östenson</i> <i>Karolinska Hospital</i> <i>Stockholm, Sweden</i></p> <p>Discussant: <i>Deborah Winn</i> <i>National Cancer Institute</i> <i>Bethesda, Maryland, USA</i></p>	<i>Auditorium</i>
1700 hrs (5:00 p.m.)	<i>Recess</i>	
1800 hrs (6:00 p.m.)	<p>Evening Event <i>Stockholm City Hall Reception and Dinner</i> <i>Björn Klinge</i> <i>Karolinska Institutet</i> <i>Huddinge, Sweden</i> <i>Hosted by: City of Stockholm</i> <i>Stockholm County Council</i></p>	<i>Auditorium</i>

Tuesday, September 24, 2002

0730 hrs (7:30 a.m.)	Registration Desk	<i>Auditorium Foyer</i>
0830 hrs (8:30 a.m.)	Worldwide Marketing of Smokeless Tobacco <i>Michelle Roland</i> <i>Centers for Disease Control and Prevention</i> <i>Atlanta, Georgia, USA</i>	<i>Auditorium</i>
	Industry Marketing and Public Perceptions Moderator: <i>Örjan Åkerberg</i> <i>Region Västra Götaland</i> <i>Mariestad, Sweden</i>	
	Swedish Snus <i>Paul Nordgren</i> <i>Swedish National Institute of Public Health</i> <i>Stockholm, Sweden</i>	
	Smokeless Tobacco Marketing and Public Perception In India <i>Surendra Shastri</i> <i>Tata Memorial Hospital</i> <i>Mumbai, India</i>	
	A Safer Form of Arsenic? The Dynamic Marketing History of Smokeless Tobacco <i>Alan Blum</i> <i>Center for the Study of Tobacco and Society</i> <i>University of Alabama</i> <i>Tuscaloosa, Alabama, USA</i>	
	Traditional Products Versus Tobacco Industry Products <i>Ali M. Idris</i> <i>Toombak and Smoking Research Centre</i> <i>Khartoum, Sudan</i>	
	Discussant: <i>Gregory Connolly</i> <i>Massachusetts Department of Public Health</i> <i>Boston, Massachusetts, USA</i>	
1000 hrs (10:00 a.m.)	<i>Break</i>	<i>Auditorium Foyer</i>
1030 hrs (10:30 a.m.)	Concurrent Sessions	
	I. Smokeless Tobacco Surveillance Moderator: <i>Terry Pechacek</i> <i>Centers for Disease Control and Prevention</i> <i>Atlanta, Georgia, USA</i>	<i>Auditorium</i>
	1. Global Youth Tobacco Surveillance—Office on Smoking and Health, Centers for Disease Control and Prevention <i>Wick Warren</i> <i>Centers for Disease Control and Prevention</i> <i>Atlanta, Georgia, USA</i>	

Tuesday, September 24, 2002 (continued)

2. School Students: Global Youth Tobacco Survey  
*Ricardo Granero*  
*ASCARDIO*  
*Barquisimeto, Venezuela*
3. Youth Tobacco Surveillance of Northeastern States of India, 2001  
*Dhirendra Sinha*  
*School of Preventative Oncology*  
*Patna, India*
4. Smoking Prevalence and Tobacco/Swedish “Snus” Sales in Sweden, Norway, Denmark, and Finland, 1970 to 2000  
*Brian Wicklin*  
*Statistical Bureau, VECA*  
*Hässelby-Stockholm, Sweden*
5. A Prospective Longitudinal Study of Tobacco Habits Among Ice-Hockey Playing Boys  
*Margot Rolandsson*  
*Karlstad University*  
*Karlstad, Sweden*
6. Patterns of Tobacco Use in Northern Sweden: Interaction Between Smoking and Snus Use in Northern Sweden  
*Brad Rodu*  
*University of Alabama at Birmingham*  
*Birmingham, Alabama, USA*

II. Health Effects

*Platon*

Moderator:

*Anja Ainamo*  
*University of Helsinki*  
*Helsinki, Finland*

1. Epstein-Barr and Human Papilloma Virus in Snuff-Induced Lesions of the Oral Mucosa  
*Lars Sand*  
*Uppsala Adademiska Sjukhus*  
*Uppsala, Sweden*
2. Snuff-Induced Cancer in Sweden  
*Jan M. Hirsch*  
*Uppsala University and Public Dental Health*  
*Uppsala, Sweden*



Tuesday, September 24, 2002 (continued)

3. Habit of Chewing or Smokeless Tobacco Habits in Pakistan and Associated Oral Lesions  
*Rehana Maher*  
*Sinah Post-Graduate Medical Centre*  
*Karachi, Pakistan*
4. Lung Cancer in Europe: The Polish and Swedish Experiences  
*Witold Zatonski*  
*The Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology*  
*Warsaw, Poland*
5. How One Smokeless Tobacco Manufacturer Designed Their Products To Cause Addiction Among Youth  
*Gregory Connolly*  
*Massachusetts Department of Public Health*  
*Boston, Massachusetts, USA*

III. Interventions/Health Promotion

*Sokrates*

Moderator:

*Karl-Olov Fagerström*  
*Fagerström Consulting AB*  
*Smokers Information Center*  
*Helsingborg, Sweden*

1. Sports Venues as a Tool for Spit Tobacco Education and Public Awareness  
*Paul Turner*  
*National Spit Tobacco Education Program*  
*Oral Health America*  
*Chicago, Illinois, USA*
2. Smokeless Tobacco and Children In India: Prevention Through Entertainment  
*Padmini Somani*  
*Salaam Bombay Foundation*  
*Nariman Point, Mumbai, India*
3. Tobacco Knowledge–Smoking and Snuff Cessation: A Part of the New Curriculum in Dental Hygienist Education, at The Karolinska Institutet  
*Birgitta Söder*  
*Karolinska Institutet*  
*Huddinge, Sweden*
4. Intervention in Smokeless Tobacco Use Among the Rural Indian Population  
*Mira Aghi*  
*Independent Consultant*  
*New Delhi, India*



Tuesday, September 24, 2002 (continued)

5. Tobacco Use—Economic Consequences on Vulnerable Populations

*Shoba John*  
*CPAA, King George V Memorial*  
*Mumbai, Maharashtra, India*

6. A Snuff-Dipping Cessation Program for Snuff Dippers With Long and Extensive Snuff Exposure

*Mats Wallström*  
*Göteborg University*  
*Göteborg, Sweden*

1200 hrs (12:00 noon)

*Lunch Buffet*

*Panorama*

Exhibits and Poster Session Displays (viewing only)

*Gallerian*

1330 hrs (1:30 p.m.)

Regional and Global Policy Interventions

*Auditorium*

Moderator:

*Anja Ainamo*  
*University of Helsinki*  
*Helsinki, Finland*

European Legislation and Smokeless Tobacco

*Kari Paaso*  
*Commission Europeenne*  
*Plateau de Kirchberg, Luxembourg*

The Irish Legislative Precedent

*Cathy Backinger*  
*National Cancer Institute*  
*Bethesda, Maryland, USA*  
*(Presenting for Bernard McCartan, Trinity College, Dublin, Ireland)*

Framework Convention on Tobacco Control (FCTC)

*Vera Luiza da Costa e Silva*  
*World Health Organization*  
*Geneva, Switzerland*

Regulatory Issues – Who Gets To Call The Shots: The Case of the United States Smokeless Tobacco Company and the Federal Trade Commission

*Judith Wilkenfeld*  
*Campaign for Tobacco-Free Kids*  
*Washington, D.C., USA*

Discussant:

*Mitch Zeller*  
*Consultant*  
*Olney, Maryland, USA*

1500 hrs (3:00 p.m.)

*Break*

*Auditorium Foyer*

1530 hrs (3:30 p.m.)

Smokeless Tobacco Cessation

*Auditorium*

Moderator:

*Margaret Walsh*  
*University of California, San Francisco*  
*San Francisco, California, USA*

Tuesday, September 24, 2002 (continued)

Economic Interventions

*Ayda Yurekli*  
*World Bank*  
*Washington, D.C., USA*

Pharmacotherapy

*Elbert D. Glover*  
*West Virginia University School of Medicine*  
*Morgantown, West Virginia, USA*

Smokeless Tobacco Cessation for Adults: A Review and Research Agenda

*Herbert Severson*  
*Oregon Research Institute*  
*Eugene, Oregon, USA*

Youth Cessation

*Aira Lahtinen*  
*Finnish Dental Association*  
*Espoo, Finland*

Telephone Interventions: Snus Not A Significant Contributor to Abstinence from Smoking Amongst Quit-Line Callers in Sweden

*Asgeir R. Helgason*  
*Centre for Tobacco Prevention*  
*Stockholm, Sweden*

Discussant:

*Jon O. Ebbert*  
*Mayo Clinic*  
*Rochester, Minnesota, USA*

1700 hrs (5:00 p.m.)

*Recess*

1800 hrs (6:00 p.m.)

Evening Events

*Stockholm Tobacco and Match Museum Tour and Dinner at the Vasa Museum*

*Auditorium*

*Sponsored by: Centre for Tobacco Prevention*  
*GlaxoSmithKline*  
*Novartis*  
*Pharmacia*





Wednesday, September 25, 2002

0730 hrs (7:30 a.m.)	Registration Desk	<i>Auditorium Foyer</i>
0830 hrs (8:30 a.m.)	Smokeless Tobacco Products Chemistry and Constituents Moderator: <i>Mirjana Djordjevic</i> <i>National Cancer Institute</i> <i>Bethesda, Maryland, USA</i>  Overview <i>Mirjana Djordjevic</i> <i>National Cancer Institute</i> <i>Bethesda, Maryland, USA</i>  Toombak and Snus <i>Ali Idris</i> <i>Toombak and Smoking Research Center</i> <i>Khartoum, Sudan</i>  Smokeless Tobacco Prevalence Among School Personnel in India <i>Prakash Gupta</i> <i>Tata Institute of Fundamental Research</i> <i>Mumbai, Maharashtra, India</i>  New Smokeless Tobacco Products <i>Gregory Connolly</i> <i>Massachusetts Department of Public Health</i> <i>Boston, Massachusetts, USA</i>  Carcinogenicity of Smokeless Tobacco <i>Joseph Guttenplan</i> <i>New York University Dental and Medical Schools</i> <i>New York, New York, USA</i>  Discussant: <i>Scott Tomar</i> <i>University of Florida College of Dentistry</i> <i>Gainesville, Florida, USA</i>	<i>Auditorium</i>
1000 hrs (10:00 a.m.)	<i>Break</i>	<i>Auditorium Foyer</i>
1030 hrs (10:30 a.m.)	Reducing Risk/Harm? Science, Ethics, and Public Health Moderator: <i>Harri Vainio</i> <i>International Agency for Research on Cancer</i> <i>Lyon, France</i>  Swedish Snus and U.S. Moist Snuff: Oral Health Effects <i>Scott Tomar</i> <i>University of Florida College of Dentistry</i> <i>Gainesville, Florida, USA</i>  Swedish Snus and U.S. Smokeless Tobacco Relationship to Cancer <i>Deborah Winn</i> <i>National Cancer Institute</i> <i>Bethesda, Maryland, USA</i>	<i>Auditorium</i>

Wednesday, September 25, 2002 (continued)

Smokeless Tobacco in Harm Reduction Strategies

*Clive Bates*  
*Action on Smoking and Health*  
*London, England*

Smokeless Tobacco as a Substitute for Cigarettes

*Gregory Connolly*  
*Massachusetts Department of Public Health*  
*Boston, Massachusetts, USA*

Ethical Issues in Using Smokeless Tobacco as a Substitute for Cigarettes

*Lynn Kozlowski*  
*Penn State University*  
*University Park, Pennsylvania, USA*

Snus as a Substitution for Smoking: The Swedish Experience

*Lars Ramström*  
*Institute for Tobacco Studies*  
*Stockholm, Sweden*

Smokeless Tobacco as Cessation for Smoking

*Dorothy Hatsukami*  
*University of Minnesota*  
*Minneapolis, Minnesota, USA*

1200 hrs (12:00 noon)

*Lunch (on your own)*

*(See venues)*

1330 hrs (1:30 p.m.)

Discussants' Responses to Reducing  
Risk/Harm Presentations

*Auditorium*

Moderator:

*Scott Leischow*  
*National Cancer Institute*  
*Bethesda, Maryland, USA*

Discussants:

*Gunilla Bolinder*  
*Karolinska Hospital*  
*Stockholm, Sweden*

*Prakash Gupta*  
*Tata Institute of Fundamental Research*  
*Mumbai, Maharashtra, India*

*David Sweanor*  
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Wednesday, September 25, 2002 (continued)

- 1500 hrs (3:00 p.m.)      Where Do We Go From Here? Developing a  
Research Agenda  
Moderator:  
*Hans Gilljam*  
*Centre for Tobacco Prevention*  
*Stockholm, Sweden*
- Smokeless Tobacco Use and Terminology  
*Ali Idris*  
*Toombak and Smoking Research Center*  
*Khartoum, Sudan*
- Smokeless Tobacco Health Effects  
*Maria Teresa Canto*  
*National Institute of Dental and*  
*Craniofacial Research*  
*Bethesda, Maryland, USA*
- Smokeless Tobacco Cessation Methods  
*Karl-Olov Fagerström*  
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*Smokers Information Center*  
*Helsingborg, Sweden*
- Smokeless Tobacco and Risk/Harm Reduction Strategies  
*Dorothy Hatsukami*  
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*Minneapolis, Minnesota, USA*
- Smokeless Tobacco and Public Health Measures  
*Robert Mecklenburg*  
*Consultant*  
*Potomac, Maryland, USA*
- Smokeless Tobacco Chemistry and Constituents  
*Scott Tomar*  
*University of Florida College of Dentistry*  
*Gainesville, Florida, USA*
- Smokeless Tobacco Surveillance and Epidemiology  
*Witold Zatonski*  
*The Maria Sklodowska-Curie Memorial Cancer*  
*Centre and Institute of Oncology*  
*Warsaw, Poland*
- 1645 hrs (4:45 p.m.)      Closing Remarks  
*Robert Mecklenburg*  
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*Potomac, Maryland, USA*
- 1715 hrs (5:15 p.m.)      Next Steps for the 12<sup>th</sup> WCTOH  
*Cathy Backinger*  
*National Cancer Institute*  
*Bethesda, Maryland, USA*
- 1730 hrs (5:30 p.m.)      Adjournment

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