

2nd International Conference on Smokeless/Spit Tobacco

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Summary Report

Tobacco Control Research Branch
Behavioral Research Program
Division of Cancer Control and Population Sciences
National Cancer Institute
National Institutes of Health
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Conference Sponsors

American Association of Public Health Dentistry
American Dental Association
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Centers for Disease Control and Prevention
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Welcome and Opening Remarks

Robert Mecklenburg, D.D.S., M.P.H., welcomed participants to the 2nd International Conference on Smokeless/Spit Tobacco. He noted that participants should assume that representatives from the tobacco industry were present, as occurred in April 1991 during the 1st International Conference on Smokeless Tobacco, held in Columbus, Ohio, United States. After that event, the tobacco industry attempted to stop the European Union (EU) from banning the importation and sale of smokeless tobacco in EU countries, with the exception of Sweden. Dr. Mecklenburg also called attention to a letter from then Director of the Division of Cancer Prevention and Control, the National Cancer Institute (NCI) of the National Institutes of Health (NIH), which helped correct that situation (see Dr. Greenwald letter, Appendix A). He noted that the EU Commission recently voted to continue its ban, but had changed product-warning labels to a more general statement than the previous warning about oral cancer.

Dr. Mecklenburg thanked the conference sponsors and recognized Dr. Craig Stotts, University of Arkansas College of Nursing, committee member, who had organized the report for the 1st International Conference on Smokeless Tobacco and was recording the 2nd Conference.¹ He presented five conference objectives, as follows:

1. Identify major types of tobacco around the world that are not incinerated when used;
2. Learn their shifting patterns of use, both through global migration and new marketing strategies;
3. Examine the addictive qualities and risks to health from use;
4. Identify other substances and factors that, in combination with smokeless tobacco, increase addiction or health risk; and
5. Identify and assess the scientific issues that are needed to guide public policy.

Dr. Mecklenburg introduced representatives of each sponsoring organization. A summary of each representative's remarks follows the brief biographical information.

American Association of Public Health Dentistry (AAPHD): Scott Tomar, D.M.D., Dr.P.H., a member of the AAPHD Executive Council, is an epidemiologist with extensive publications on smokeless tobacco. A faculty member of the University of Florida College of Dentistry, he also has served at the Centers for Disease Control and Prevention (CDC).

Dr. Tomar noted that AAPHD has addressed the smokeless tobacco issue since the mid-1980s and has adopted several policy positions. The first of these precede passage of the 1986 Comprehensive Smokeless Tobacco and Health Education Act. AAPHD policies have helped guide the association's internal affairs and partnerships with other organizations that address the harmful impact of tobacco use.

American Dental Association (ADA) and ADA Health Foundation: John Zapp, D.D.S., has broad experience in dental practice, Federal medical care administration, and public policy. In 1992, after 19 years with the American Medical Association (AMA) culminating in service as an AMA Vice President, he became the fifth Executive Director of ADA and is the President of the ADA Health Foundation.

Dr. Zapp was pleased to note the increased awareness among public and health professionals of the adverse effects of smokeless tobacco use and the issue's importance. He complimented the group and expressed respect for the work of so many participants in heightening this awareness among key audiences.

¹ The conference agenda is found in Appendix B.

Centers for Disease Control and Prevention: Rear Admiral and Assistant Surgeon General William Maas, D.D.S., M.P.H., as Chief Dental Officer and Oral Health Advisor to the Surgeon General, is the highest-ranking dentist in the U.S. Public Health Service. His remarks also reflect his position as Director of CDC's Division of Oral Health, which supports community, State, national, and global programs that protect and promote oral health.

Dr. Maas greeted participants on behalf of both the Division of Oral Health and the Office on Smoking and Health in the National Center for Chronic Disease Prevention and Health Promotion of CDC. He commented on two recent events, noting that the first-ever Surgeon General's Report, *Oral Health in America*, had just been released. This report makes clear that oral health is important to maintaining general health and well-being, that lifestyle behaviors such as tobacco use increase risks to both oral and general health, and that a commitment by all elements of society is needed to effect positive change.

Second, a report coauthored by Dr. Tomar and Dr. Samira Asma recently was published that analyzes data from the National Health and Nutrition Examination Study, finding that cigarette smoking is the primary cause of about half the cases of adult periodontitis.² For years, the focal loss of periodontal attachment from using smokeless tobacco has been recognized; evidence now exists on the threat tobacco use in various forms poses to periodontal health. Tobacco is such a direct threat to oral health that dentists and dental hygienists would dramatically improve patients' health if they applied the same effort to helping people avoid and discontinue tobacco use as they have to promoting oral hygiene and providing clinical oral hygiene services.

NCI: Scott Leischow, Ph.D., is the Chief of the Tobacco Control Research Branch at NCI. Dr. Leischow has served as Director of the Arizona Program for Nicotine and Tobacco Research and as a professor in the School of Public Health at the University of Arizona.

On behalf of NCI, Dr. Leischow thanked Dr. Mecklenburg for working to organize this conference and researchers who work in basic science, policy development, and areas between those foci. Their findings and conclusions form the basis for this conference. NCI is committed to developing many avenues, such as this conference, for promoting messages to address every aspect of tobacco use, including smokeless tobacco, its health and social effects, and ways to reduce tobacco-related diseases and consequences. NCI sees great benefit from developing partnerships and coordinated approaches that bridge the gap between behavioral, developmental, and addiction research. Dr. Leischow hopes that this conference will catalyze how the scientific and public health communities manage problems associated with smokeless tobacco use. Further investigation is needed, which NIH is very willing to support.

National Institute of Dental and Craniofacial Research (NIDCR): Dushanka V. Kleinman, D.D.S., M.Sc.D., is Acting Director of NIDCR. She has served as President of AAPHD, President of the American Board of Dental Public Health, and in leadership positions in other organizations.

Dr. Kleinman noted that sponsors had been asked to describe why their respective institutions are interested in supporting this conference. Another question could be, "How could they afford not to support it?," particularly as the smokeless tobacco issue is international in scope. And, she observed, no one can be narrow in the investigation of diseases if useful answers are to be found. Dr. Kleinman commented that as a research, research training, and science transfer organization, NIDCR needs to be a catalyst for health promotion and a full partner with other organizations working on this issue.

NIDCR is one of several NIH institutes that worked with CDC and the Health Resources and Services Administration to develop the *2010 Healthy People Objectives for the Nation*, which focused on tobacco

² See *J Periodontal* 71:743-751, 2000.

as a special subject of concern and a contributor to serious health problems. In addition, NIDCR, as a collaborating center with the World Health Organization (WHO), can aid the WHO Tobacco Free Initiative and other work where oral health is a part. The Surgeon General's reports on tobacco dating back to the 1960s have included a craniofacial component; with gingival and periodontal effects often noted as early signs of tobacco-related disease. Disparities in health are a concern, because tobacco use often compounds or confounds many other problems disadvantaged people face. NIDCR appreciates the partnerships that it has had over the years with CDC, the Robert Wood Johnson Foundation (RWJF), and all the other partners in supporting this meeting and other tobacco and oral health research, science transfer, and public health work.

Oral Health America: Robert Klaus, Ph.D., President and CEO of Oral Health America, recognized early on the opportunities and obligations that the health care professions have to educate the public about smokeless tobacco. He believes that partnerships between the health care professions and private sector voluntary and business interests are necessary to effect social change.

Dr. Klaus echoed Dr. Mecklenburg's opening remark about the tobacco industry being present everywhere. He learned of this 4 years ago, when Oral Health America held a press conference in the Orioles Stadium in Baltimore, Maryland, where Joe Garagiola, chairman of the National Spit Tobacco Education Program (NSTEP), and others spoke about the dangers of chewing. By the time speakers got from the podium to their seats, the U.S. Smokeless Tobacco Company had placed its literature in every chair in the stadium.

A role of Oral Health America is to manage NSTEP as a means to educate the public, especially those most exposed to spit tobacco advertising. For years, Oral Health America has produced public service announcements to be used on the air, in schools, at sporting events, and elsewhere. Many people do not view spit tobacco as an issue. For example, a recent article in the *New York Times* described a Kentucky physician who urged his patients to chew tobacco as a safe alternative to smoking. A second role Oral Health America serves is to create coalitions with health care professionals to build prevention and cessation services into their practices. Dr. Klaus urged participants to ensure that smokeless tobacco programs are fully integrated into State coalitions in the tobacco control movement.

Robert Wood Johnson Foundation: Diane Barker, M.H.S., worked for 6 years with RWJF, where she was part of a team that assembled the foundation's original tobacco control agenda in 1990 and 1991. She has worked on several tobacco control projects since and currently manages a health policy consulting firm for national, State, and local philanthropic institutions, professional associations, and community organizations. She retains an affiliation with the foundation, serving as its representative at this conference.

Ms. Barker described RWJF as the largest philanthropic organization devoted exclusively to improving the health and health care of Americans. Last year, the foundation supported 800 new health and health care projects totaling \$588 million, 16 percent of which was devoted to reducing tobacco use. In recent years, RWJF has become known for its innovative programs for shifting the paradigm. For example, it has sponsored the Substance Abuse Policy Research Program to identify significant policy issues in substance abuse and the Tobacco Etiology Network to establish interdisciplinary networks among researchers interested in different aspects of nicotine dependence. RWJF recently entered the managed care field by supporting research to help develop innovative treatments and to integrate tobacco intervention treatment into health care systems. The foundation regularly develops partnerships with other funding organizations, such as NCI and the National Institute on Drug Abuse (NIDA) of NIH, to support major projects.

As a private foundation, RWJF often has the ability to fund critical research and capacity-building projects, which government agencies are not well positioned to do. Efforts include providing funding for the Campaign for Tobacco Free Kids, a nationwide media program, and the SmokeLess States Program, which advocates policy changes, such as increasing State excise taxes on spit tobacco; RWJF also supports NSTEP. To date, the foundation has committed \$6 million to raise the public's awareness of spit tobacco use and its effects and to ensure that spit tobacco is included on every tobacco control agenda. RWJF encourages applicants to consider spit tobacco control projects relative to grant initiatives directed at substance use issues.³

As conclusion to the opening remarks, **Dr. Mecklenburg** thanked other conference supporters, particularly the organizers of the 11th World Conference on Tobacco OR Health, especially AMA staff, and Dr. Barry Bleidt, its scientific program chairman. Also recognized were the FDI World Dental Federation and the International Association for Dental Research, present in spirit and their support for this conference.

Keynote Addresses

Spit Tobacco in Context

Dr. Mecklenburg introduced Dr. Derek Yach. Dr. Yach has a distinguished record of service in medical practice and public health in his native country, South Africa, and in addressing complex global public health problems. He came to Geneva, Switzerland, in 1995 to organize WHO's Tobacco Free Initiative. Recently, he also was appointed to be the Executive Director of Non-Communicable Diseases and Mental Health, an overarching program within WHO that includes tobacco prevention and control programs.

Upon arriving in Geneva, Dr. Yach immediately overcame a difficult organizational challenge by choosing a positive, brief title for an important global program—"Tobacco Free Initiative." He inspired the development of the Framework Convention on Tobacco Control, the first-ever WHO treaty-making effort. This convention involves many United Nations (U.N.) organizations and their country counterparts, heads of state, state departments, and international nongovernmental organizations (NGOs). WHO's daunting task is to mount an effective challenge against powerful multinational corporations that are enticing people throughout the world to use their deadly products. Indeed, tobacco use may soon become the leading cause of death globally and the generator of an incredible increase in tobacco-related disability and loss of quality of life.

Derek Yach, M.D., observed that this conference addresses a subject in much need of attention. He hopes that the key message that permeates this meeting and the 11th World Conference on Tobacco OR Health—and that resonates with people around the world—is that tobacco use is addictive and kills. Dr. Yach stressed that spit tobacco is addictive, kills, is used by youth worldwide, and affects poor communities, but that interventions against it exist and work. It is important to have all governments and NGOs seriously counter tobacco industry efforts, not only against the marketing of its deadly, addictive products, but also to expose its efforts to undermine all major tobacco control initiatives.

Globally, there is unprecedented intensity of marketing of tobacco, a product that kills half of its regular users wherever they reside. About 60 percent of men smoke tobacco. There are about 1.2 billion smokers

³ Further information is available at www.rwjf.org.

worldwide, and figures are even higher when spit tobacco users are included. Although women generally use tobacco less than men do, the number of female users is increasing because the tobacco industry is targeting them. The industry simply sees women as a massive marketing opportunity.

The relationship between alcohol and tobacco use for oropharyngeal cancer is well established. The recent report on oral cancer from the FDI World Dental Federation reminds us how deadly smokeless tobacco can be. Periodontal disease resulting from smoking has been shown to be dose dependent and to be particularly marked in younger individuals. Perhaps over 50 percent of periodontal disease can be attributed to cigarette smoking. Treatment of periodontal disease in smokers is not as successful as in nonsmokers. Oral tobacco use results in gingival recession at the usual site of snuff or chewing tobacco placement. The condition is found in about 60 percent of oral tobacco users. Epidemiologists have shown so many serious conditions to be associated with tobacco use that it is essential for tobacco control programs also to include smokeless tobacco. Dr. Yach observed that this has not yet been achieved.

Over the past century, tobacco use has taken millions of lives—indeed, more than have wars. Four million deaths per year are now attributed to tobacco use. The annual toll continues to increase, and it is estimated that about 10 million deaths per year will be caused by tobacco by the 2020s, 70 percent of which will occur in developing countries. A study in India shows that smoking is about five times higher among the less literate than among those with at least 12 years of education. These results are similar to findings from surveys in other countries, such as Poland, and in Latin America and South America. This indicates the need to think hard about how populations with low education levels can be reached effectively.

Youth smoking rates are high. Country surveys for the *1997 Tobacco or Health: A Global Status Report* and the *2000 Tobacco Control Country Profiles* show that less than 20 percent of 13- to 15-year-olds reported exposure to any anti-tobacco message. Yet, 60 percent of the population worldwide lives in a milieu where smoking is ubiquitous, and in most countries more than 20 percent use tobacco. Indeed, in China, Poland, the Ukraine, Russia, and other countries, the rates are much higher. School-based systems are ineffective because they don't adequately consider the larger social-cultural-youth development environments where pro-tobacco forces are most influential.

An article in a recent special issue of the *Journal of the American Medical Association* that focused on tobacco issues identified five reasons why prevention efforts have not had more impact: (1) action occurs too late, after tobacco-using behaviors are established; (2) attempts to weaken tobacco marketing face intense opposition by the tobacco industry; (3) health care providers and their organizations have not adequately recognized the tobacco industry as the vector of tobacco disease; (4) efforts to cultivate support for tobacco control by culture- and community-based organizations are largely latent; and (5) the globalization of trade and marketing itself makes tobacco control efforts ineffective, especially in countries that have weaker economies and are attracted by the promises of employment and cash in the near term.

A primary WHO initiative is to globalize support for increased tobacco control. WHO appointed a committee of experts to examine and develop a consensus report on tobacco industry activities to undermine tobacco control efforts and determine if WHO had been affected adversely by such tactics. The experience of committee members, of WHO endeavors, and documentation from numerous sources, including industry internal papers obtained during litigation disclosure, comprised the substance of the report. Evidence provided by the committee showed that since the mid-1980s, tobacco companies engaged in a wide range of activities aimed at trimming WHO's effectiveness, reducing its budget for tobacco control, and pitting other U.N. agencies against WHO with respect to tobacco control. Their actions created a public policy climate in which it was argued repeatedly in major media that tobacco control is not a need for developing countries. The report concluded that the tobacco industry has operated over many years with a deliberate intent to subvert WHO's tobacco control efforts. The industry

used sophisticated, well-financed, invisible, and elaborate methods. The report is available in print, on the WHO Web site, and on a CD-ROM. It includes about 900 citations to substantiate its findings and has been through a strict legal review.

In fact, efforts to thwart tobacco control are everywhere, observed Dr. Yach. He has no doubt that some individuals attending this conference will be reporting on it to the industry. Dr. Yach strongly encourages that a similar fact-finding mission be launched on tobacco industry efforts to undermine public health efforts against the use of smokeless tobacco.

The media's reaction to the WHO report was phenomenal. Stories appeared on the front page of major U.S. newspapers and in editorials. Most European newspapers carried reports that were continued in their business sections, and the BBC is responding with a "Tobacco on Trial" program that is to be aired over much of the developing world, in conjunction with WHO tobacco-free policies and positions. CNN also provided in-depth coverage and analysis, and *Newsweek* magazine published an article on worldwide tobacco smuggling. It isn't the health story that is so interesting to the media, noted Dr. Yach, but the tobacco industry's corruption, subversion, and deception that are driving governments to now consider adopting tobacco control measures. In Geneva, ambassadors and other governmental representatives, after learning about what is being exposed, are actually reconsidering their positions, because they don't want to be seen as supporting pro-tobacco causes.

The smuggling issue has caught wide attention. It appears that a third of cigarettes in international trade are smuggled to avoid taxes, ease purchase, and increase profits. The specter of complicity by the tobacco companies is further incentive for governments to distance themselves from association. Recently, the U.N.'s Economic and Social Council commended the work and final report of the Ad Hoc Interagency Task Force on Tobacco Control, coordinated by WHO and sponsored by a wide range of important international agencies, including many that are not in the health sector, such as the International Monetary Fund, the World Bank, international cultural organizations, and others. This effort is important because it demonstrates that WHO can bring together trade, economic development, agricultural, and many other non-health organizations and high-level representatives within the U.N. system and their private sector advocates to take a united stand in an area that has been traditionally controlled by the tobacco industry.

WHO conducts a variety of tobacco control initiatives—for example, World No-Tobacco Day—where public health leaders go on public record as advocating global tobacco control. Such public announcements are frequently in the company of popular entertainers and sports personalities within each country. World No-Tobacco Day is an example of what can and should be done to increase public awareness of the serious consequences of tobacco use to the public, their communities, and the world. WHO admires initiatives in the United States to reach a wide audience through baseball. There are lessons to be learned, but in other countries perhaps they might have to be adapted to cricket. World No-Tobacco Day 2002 focused on tobacco-free sports and coincided with the kickoff date of the World Cup in South Korea. The World Cup is free of tobacco advertisers and sponsorship, has smoke-free stadia, and beamed tobacco control messages globally to youth and sports lovers. Further, the 2002 Winter Olympics were similarly tobacco free, sending a message that sports and tobacco do not mix.

The international Framework Convention on Tobacco Control (FCTC) is another extremely important WHO initiative. Framework conventions develop the terms of reference, negotiating rules, and operating mechanisms for the negotiation of legally binding international treaties. Such treaties are not signed by health ministers, but by heads of state. This step takes the issue to a higher level of international relations. Of all the treaties developed since the United Nations was founded, none have been initiated ever before by WHO. Tobacco is such a transcending issue and the influence of the major multinational tobacco companies so profound for so long, it is essential that the issue be elevated to the level of international law. As Dr. Gro Harlem Brundtland, Director General of WHO, has stated, "An international solution is

needed for an international problem.” Where international conventions can sometimes be vague and appear to have no relevance to daily work, this one is intended to establish agreement on specific actions critical to world health. The convention requires the support of the world’s major leaders so it can place tobacco control on the global political agenda. The convention provides a unique opportunity to mobilize national and international organizations and an opportunity to define the parameters and terms of the fight, by ensuring that national and international laws are drafted that address current and future tobacco products.

Planning for the FCTC included two major working groups having representatives from 150 member states that represent 95 percent of the world’s population. Country delegations are scheduled to move into full negotiation in October 2000. (The FCTC process has completed its fourth full negotiating session, which has galvanized governments and NGOs to take stronger action against tobacco.) The FCTC is equivalent to the biological and nuclear weapons conventions and others of that level of importance to civilization.

Because the tobacco industry is mounting a campaign against the FCTC, it is imperative that the most extensive and elaborate set of partners be involved, partners who understand their unique and complementary role and common vision. Some of the partners identified include the United Nations, UNICEF, the U.S. Agency for International Development, the Food and Agriculture Organization, the World Bank, CDC, the International Union Against Cancer, the World Medical Association, the World Federation of Public Health Associations, Action on Smoking and Health, and other partners in foreign affairs, finance, world trade, and agriculture.

In conclusion, this conference and others such as the 11th World Conference on Tobacco OR Health make it possible for delegates, their teams, and NGO experts to come to the convention with the common understanding that is needed to establish rigorous, effective tobacco control terms at an international level.

Dr. Mecklenburg commended Dr. Yach for his vision and courage. He noted that most of the tobacco industry internal documents that have been critical in making a case against the industry’s practices are housed in the United States, but many more valuable documents exist in Gulliford, United Kingdom. Unfortunately, the industry has been successful in applying access rules that make acquiring and analyzing these documents very difficult. Dr. Mecklenburg then called on Dr. Klaus to introduce the second keynote speaker.

My World of Spit Tobacco

Dr. Robert Klaus stated that in the 5 years since beginning NSTEP, this is the first time NSTEP coordinators could attend a conference devoted to this issue, and it is very much appreciated.

During his 31-year professional career in major league baseball, Mr. Doug Harvey became the “dean” of National League umpires. He officiated eight World Series, All-Star games, and many other championship series. Mr. Harvey now volunteers for Oral Health America’s NSTEP program as a former spit tobacco user and an oral cancer survivor. To date, he has spoken to over 53,000 people about the risks associated with spit tobacco use.

Doug Harvey noted from personal experience that once you have had cancer, you can never forget it. He told the audience that his neck is hard as a rock and food ripples when it goes down. He has been left with scars and his voice rattles.

Mr. Harvey regularly speaks to young people in their schools about the dangers of tobacco use. Asked by a second-grader why companies sell these products if they are so dangerous, he told the child that it was to make money. When the tobacco industry wrote its first check for the Master Tobacco Settlement Agreement they simply raised their prices to pass the expense along to their customers, Mr. Harvey observed. Out of the \$206 billion settlement, only about one-tenth of 1 percent is used for anti-tobacco efforts. The States should commit sufficient money to tobacco control so that public awareness, concern, and outrage would force tobacco companies out of business.

At age 18, Mr. Harvey began using chewing tobacco and continued for 50 years. He noted that he did not begin as many ball players do by using it as part of hero worship of major league players. When diagnosed at age 67 with oral cancer, Mr. Harvey was told that there was a 100-percent chance that the cancer was caused by his tobacco use and that he had about a 50-percent chance of survival. Determined to beat the cancer, he underwent radiation treatments. His “second mask,” the first being his umpire’s mask, was a radiation mask that was bolted to the table to ensure that he stayed perfectly still during treatments. As a result of his treatments, Mr. Harvey developed ulcers on his esophagus and his throat constricted; he also lost 60 pounds and suffered renal shutdown. A tube was inserted into his stomach that allowed him to ingest liquid food and medications. Yet Mr. Harvey believed that if he could bring his weight up, he would live.

After his recovery, Mr. Harvey approached Joe Garagiola, a well-known baseball catcher and sports announcer and now Chairman of NSTEP. He asked Mr. Garagiola how he could help inform young people about the dangers of spit tobacco, noting that he will speak on this issue regardless of program funding because his is a life-and-death message that youth must understand. Although Mr. Harvey cited several examples that reassure him the spit tobacco message is reaching people, he believes there is little to recommend to addicted users about how to stop. He advises people to try nicotine patches, nicotine gum, or anything else that they think might help them quit, but to quit. An alternative is to get cancer. Cancer made him stop, Mr. Harvey concluded, but he wouldn’t want anyone to put off quitting and then go through the agony of treatment to have any chance of staying alive.

Panel: Patterns of Smokeless Tobacco Use

Smokeless Tobacco Variants Around the World

Deborah Winn, Ph.D., moderator, introduced Dr. Mihir N. Shah, Assistant Professor at the Government Dental College and Hospital in Ahmedabad, India. He is a principal investigator of tobacco habits for the research and education unit of the Government of Gujarat State and represents India on the Tobacco Committee of the International Association for Dental Research.

Mihir N. Shah, Ph.D., noted that in the United States, most tobacco is consumed as cigarettes and other smoked products, and less than 10 percent in smokeless forms. Smokeless tobacco is widely used in India and throughout Southeast Asia, accounting for at least 30 percent of the tobacco used. Thus, the focus of this discussion is on smokeless tobacco uses in the South and Southeastern Asian regions, especially in India, Bangladesh, and Pakistan. Examining global trends may reveal a decline in cigarette smoking in some western countries, but smokeless tobacco use is definitely on the rise. While smokeless tobacco has traditionally been used by the elderly, in recent times promotion has been heavily targeted to young people and they have responded.

Different smokeless tobacco forms are used in different countries. For example, 1 in 10 users in Thailand, Myanmar, Malaysia, and surrounding countries use a form of snuff that is about 50-percent tobacco and 50-percent Oriental gum. In Afghanistan, a combination of powdered tobacco, slaked lime, and indigo is common. Smokeless tobacco in India, Bangladesh, Pakistan, and Sri Lanka is marketed in the form of a dry tobacco preparation that contains several ingredients, and almost invariably lime. In developed countries, especially the United States and Sweden, the most common form of smokeless tobacco is moist oral snuff in cans, with the popular ones being Skoal and Copenhagen in the United States and snus in Sweden. Dry tobacco is in powdered, shredded, or pressed block forms. These are either chewed or held in different locations in the mouth, in the lower buccal or labial fold in the United States, and in the upper labial fold in Sweden. These products have a different composition than forms found in South Asia, which commonly contain additives such as chopped areca nut (from the areca palm tree), lime, catechu (from catechu tree bark), and a variety of flavoring agents.

A traditional form is the betel quid, which holds ingredients wrapped in a tender leaf from the *Piper betel* tree. Smokeless tobacco variants such as shammah and toombak, commonly used in Iran and other Arabic countries in the Middle East and North Africa, will be discussed by another speaker, noted Dr. Shah, so he emphasized variants in India, Bangladesh, and Pakistan, home to about 200 million regular smokeless tobacco users. He observed that this is a high number by global standards. Due to economic constraints in developing countries, of 10 people who use tobacco, 3 use smokeless tobacco, 5 smoke indigenous products, and only 2 smoke manufactured cigarettes. This is a basic difference between developed and developing countries.

Major industries are only recently influencing these patterns of use by focusing on youth with new, prepackaged products. What started as local enterprise tobacco industry has become a full-grown national and international industry that promotes the use of gutkha, a finely ground mixture of tobacco, areca nut, lime, cardamom, and catechu in attractive foil pouches. Other commercially available smokeless tobacco products include khaini, gudakhu, and mava. Packets of these materials absent tobacco are called pan masala. Pan behar is another tobacco-free mix that contains areca nut, catechu, cardamom, copra, menthol, and perfume. The foil packets are assembled as a long chain, making it convenient to buy individual doses for a few rupees, just as one would buy individual cigarettes. Gutkha is sold by street vendors on virtually every street corner and has become a multimillion-dollar industry. Now 14- to 24-year-olds become addicted because of product promotion through sporting events, especially at the cricket matches common in South Asian countries. Gutkha is exported to at least 40 to 60 countries around the globe, including the United States. Unfortunately, it has become common to offer gutkha to someone you care about. Blood nicotine levels reached by using gutkha are dramatically higher than that reached from smoking cigarettes. A habitual user might use a form of snuff 40 to 50 times a day and may sleep with it.

The rapidly rising popularity of gutkha and the continued use of traditional tobacco products have led to an alarming rise in the incidence of oral cancer. Indeed, Gujarat State now has the highest incidence of oral cancer in India. Oral cancer is the leading cause of cancer death among men (50 percent) and women (16 percent). Dr. Shah said that he has examined 16-year-old habitual gutkha users who already present with severe oral submucous fibrosis. This disease creates inelasticity of buccal tissues, so that the mouth loses its ability to open or chew. Gutkha users often present with severe leukoplakia, leathery or bleeding gums, foul breath, and often a malignant transformation; moreover, they seek help too late to treat either the periodontal disease or malignancy. Even so, patients continue to use the product.

Betel chewing is traditional in India, dating back thousands of years and long before tobacco was introduced into the country. However, since its introduction 400 years ago, tobacco has become a common ingredient in the quid. Betel chewing is considered useful for medicinal purposes, especially as an aid to digestion. As with gutkha, the primary contents of betel quids are areca nut, tobacco, lime, and catechu. A large variety of condiments can be added to suit individual tastes.

Other commonly used forms of snuff in South Asian countries are homemade mixtures of tobacco with other ingredients. These include mishri, shammah, nass, and flavored betel leaf. Sons learn preparation methods from their fathers, who inherited the methods from their fathers. Women also use self-prepared mixtures. These mixtures, which look like a smeared brown paste, are applied simply to one's third finger and then rubbed on to the oral gingiva.

In conclusion, Dr. Shah observed that smokeless tobacco users find it harder to quit and to withstand withdrawal than those who smoke. He noted that it is relatively easy for his patients to quit cigarette smoking if he gives them proper advice and lots of support, but it is very difficult for gutkha patients to stop chewing. Especially among youth, ages 14 to 24, gutkha use has been increasing with terrible effects to health, and something must be done about it.

Discussion

Urban-rural differences. Betel chewing is more practiced in the rural areas. However, use is declining as it is considered to be old-fashioned. Youth especially view gutkha as a modern way to chew. Strips of gutkha in attractive foil packages are displayed in shops everywhere. It is so inexpensive that price is hardly a barrier to youth. At 1 or 2 cents a pouch, many people develop a habit of using an entire pouch at a time. Some people use gutkha at times they would not trouble to make or buy a self-prepared product. Self-prepared variants are most common in the older population.

Composition of products. Composition varies by region and is not well studied. There is research on specific ingredients—for example catechu as a component of gutkha. Dr. Shah's thesis was about behavioral variables of cigarette smokers and gutkha users. He examined oral effects in youth and adolescents and found that the calcium hydroxide, an antiseptic, stimulates keratin in oral mucous membrane and is important for its structural integrity.

Use by emigrants in United States. Dr. Shah had been trying to learn the extent of gutkha use in North America. It is available in ethnic stores that stock Indian, Pakistani, and Bangladesh goods. He didn't think that it is sold in convenience stores, such as 7-Eleven stores.

Policy interventions. The Indian government provides a minimum price support to tobacco and catechu growers and taxes product sales. However, the control of growing and distributing gutkha is difficult. Law enforcement is limited in third-world countries like India. There should be a warning label that gutkha is addictive and harmful to health. There is a minimum age law but children as young as 8- or 9-years-old are buying gutkha from the shops without government or public objections.

Gutkha. It is easily available, cheap, and can be bought by single packet, by the packet roll, or in a box. Dr. Shah knows many Indian-Americans who use it as they did earlier in South Asia.

Oral effects. Early onset periodontal disease is very common among gutkha users. As with other forms of smokeless tobacco used in India, recession is at the site of quid placement where it produces irreversible damage to oral tissues. This recession does not respond to treatment, and the area of recession is always associated with oral leukoplakia. The thickening of the gingiva and product odor can mask the foul smell and tissue destruction. Malignancies are often undetected in a swamp of active periodontal disease processes.

Smokeless Tobacco in Africa and the Middle East

Dr. Winn introduced Dr. Ali M. Idris, Professor of Dentistry, Toombak and Smoking Research Centre, University of Khartoum, Sudan. His research and expertise in traditional tobacco use has brought him to many developing countries where there had been little systematic study of tobacco use and its health effects.

Ali Mohamed Idris, Ph.D., noted that data on tobacco use in Africa is meager. The term “toombak” is the common term in North Africa for smokeless tobacco forms. Use and prevalence of smokeless/spit tobacco are quite high in Africa and the Middle East. Snuff, toombak, shammah, and tombol are terms for several smokeless tobacco products available for oral dipping or chewing or for nasal use in almost all parts of Africa and some parts of Middle Eastern countries. Such products are used by millions of people. Dry fermented snuff products are consumed in North Africa, including Libya, Tunisia, Algiers, and Morocco. In West Africa, Malawi, Cameroon, Ghana, and Nigeria, snuff products consumed are called chicambo, chic, snuff, and taba, respectively. Snuff consumption has been known in Bantus of South Africa from ancient times. Toombak is a snuff product used by more than 10 million people of the Sudan and in neighboring countries. In the Arabian Peninsula, shammah is prevalent in Yemen and in southern and western parts of the Kingdom of Saudi Arabia, in the Gizan province.

The habit of snuff taking remains much as originally practiced, by inhaling it through the nostrils; however, the current predominant use is by dipping a pinch of snuff by placing it in the mandibular, gingivolabial, or gingivobuccal sulcus. Smokeless tobacco consumed in a form of snuff dipping in the oral cavity is the most prevalent form of traditional tobacco consumption in all parts of the African continent and Southern parts of Arabia. In nearly all of North Africa, oral snuff dipping is prevalent. Snuff dipping is also prevalent in the State of Central Africa, Democratic Republic of Congo, Nigeria, Cameroon, Ghana, Malawi, Mali, Chad, and the Sudan. However, the Bantu tribes of South Africa and southern Sudanese Nilotic and Nuba tribes practice nasal snuff taking. Nasal snuff taking is also prevalent in the southern and western parts of the Kingdom of Saudi Arabia and southern parts of Yemen. In the rest of Arabia and the Middle East, including Egypt, Grand Syria (Syria, Lebanon, Jordan, and Israel/Palestine), Iraq, and Persia, there is no notable consumption of any kind of smokeless tobacco. While tobacco chewing is practiced primarily in Asia, the United States, and North Europe, it is also practiced in South Africa and a few areas in Yemen.

Toombak, the form of smokeless tobacco common in the Sudan and most neighboring countries, is made of tobacco of the species *nicotiana rustica*. This tobacco contains higher levels of alkaloids than the tobacco produced for cigarettes. Natron (sodium carbonate) is added to increase alkalinity. The two materials are finely homogenized, thus increasing nicotine absorption. Ready-to-use toombak has an astringent taste and pungent scent, reddish-brown color, and viscous texture—and it is highly addictive. A characteristic clinical and histological lesion is seen at the site of toombak dipping. The mucosa appears yellowish-brown or de-pigmented and slightly wrinkled. The necks of the adjacent teeth become exposed and stained brown-black. Toombak remnants can be seen in the gingival sulci and between the teeth. The clinical and histological appearances of the toombak dipper’s lesion have been investigated in relation to oral squamous cell carcinoma. The degree of clinical severity is positively correlated with longer duration of toombak use. An inflammatory infiltrate has been noted in the lamina propria. The most significant observation in connective tissue was the presence of amorphous keratin deposit between the lamina propria and the submucosa in approximately one-fifth of the cases. Using immunohistochemical, histological, and ultra-structural methods, deposits can be characterized as an altered collagen.

Early population studies in Sudan reported a high frequency of oral cancer. Descriptive epidemiological studies attributed the high frequency of oral cancer to toombak use at the site of toombak dipping. A case control study relying on tumor registry data quantified the risk of various intraoral subsites for squamous cell carcinoma of the oral cavity associated with toombak use. A corresponding relative risk of cancer was found among men, and more so with women and long-term users. Cigarette smoking and consumption of alcohol are two strong and often overriding risk factors for oral cancer; however, less than 20 percent of the Sudanese population smoke cigarettes and greater than 81 percent of those who use toombak do not smoke. Also, alcohol consumption is low due to a legal prohibition by Islamic law.

Other studies have looked at biomarkers and mouth cancer. The precise form of the tobacco product is significant in determining the nature of the lesion and its prognoses. Among tobacco-specific nitrosamines (TSNAs), N'-nitrosonornicotine (NNN) is a specific major contributor to carcinogenesis in the oral cavity. TSNAs arise during the aging, curing, fermentation, and processing of tobacco. In some developed countries, the concentration of TSNA is kept at a relatively low level. However, no such effort is made in the Middle East or Africa. In fact, analysis of toombak has revealed extraordinarily high levels of TSNAs in toombak and in the saliva of toombak dippers.

Toombak use also is a potential risk factor for esophageal and lung cancer. Lung tumors have been induced by NNK (4-methylnitrosamino)-1-(3-pyridyl)-1-butanone in rodents. Therefore, one or both of these TSNAs are likely to induce cancer in humans in a tissue-specific manner. In slightly over a year, an average toombak user in the Sudan will be exposed to a level of NNK that will induce lung tumors in a majority of rats. In another study, the mean daily excretion of both NNN and NNK metabolites was 68 times higher in toombak users than the levels of these metabolites in a group of smokers in the United States. A study of the activation of NNK and NNN in toombak users further suggested significant differences in the ability of toombak users to activate NNK, which indicates similar differences in their risk for cancer.

A likely candidate for toombak-induced genetic alteration is the p53 tumor suppressor gene. One study indicates that carcinogenic agents in toombak, such as TSNA, might induce p53 mutations. A number of studies have reported an association between cigarette smoking (benzo[a]pyrene) exposure with induction of p53 mutations or protein over expression.

Incidence of molecular damage in oral mucosal lesions, including toombak dipper's lesions and oral squamous cell carcinomas from snuff users and nonusers from the Sudan and Sweden were investigated. The authors concluded that the lower expression of epithelial markers in Swedish snus dipper's lesions is consistent with their lower TSNA level and their lower rate of malignant transformation. Other investigators have concluded that toombak use plays a significant role in induction of increased p53 gene mutations. It also has been concluded that the high level of expression of keratin types 13, 14, and 19 in carcinomas from toombak dippers suggests that toxic/carcinogenic agents in toombak may deregulate keratinocyte proliferation and maturation. Studies of the presence of human papilloma virus (HPV) infection in the carcinomas within in situ hybridization and by molecular methods indicate that the high levels of TSNAs in toombak may damage p53 without having involvement of HPV infection.

The scientific community has focused little attention on smokeless tobacco or even traditional smoking practices in Africa and the Middle East, even though the use of these products is increasing. Study is needed on traditional tobacco use in Africa to understand the types of traditional tobacco products, behavior patterns, and negative health consequences associated with their use. Also, it is important to understand that addiction to these products is very hard to break. In terms of the social environment, toombak and other forms of smokeless tobacco play an important role in the Sudan's economy.

Smokeless Tobacco Use Following Migration and Its Consequences

Dr. Winn introduced Dr. Saman Warnakulasuriya from the Department of Oral Medicine and Pathology at Guys, King's and St. Thomas' Dental Institute in London. He has an international reputation for his work in oral cancer, particularly oral cancer screening.

Saman Warnakulasuriya, Ph.D., observed that as migration occurs from countries where smokeless tobacco use has been traditional, patterns of use are introduced and sustained in countries where use once was seldom observed. Migrating populations continue to use traditional products, at least during the first generation. Over a generation or two, there is some shift. Yet, the migrations add a wide variety of traditional tobacco products into cultures once unfamiliar with them. Traditional products often include additives that are quite different from and far more toxic to those common in the host countries.

There is considerable global variation in the use of indigenous tobacco products. Westerners are accustomed to smoking tobacco, so little consideration is given to smokeless tobacco, but scientists need to look at how the product is being used in many cultures. In the West, cured and refined tobacco is being used for either chewing or dipping. Recently, other products that use tobacco with betel leaf, areca nut, and other materials are being introduced.

Dr. Warnakulasuriya believes that the terms in the scientific literature for various combinations of materials and their manner of use are very confusing. He offered a few terms that should be understood when reading or writing. First, the term "betel quid" is used largely when tobacco is mixed with betel leaf, areca nut, and lime. Some populations who use betel quid this way refer to it as "pan" or an "areca habit." Whether a simple mixture or including flavoring agents, and regardless of the name used, tobacco is a primary ingredient.

Dr. Warnakulasuriya noted that Dr. Shah referred to some names for tobacco mixtures that are common in India, for instance, "mava," "naswar," and "khaini." Most mixtures include slaked lime, because a high pH is required to facilitate rapid absorption of nicotine and other substances through the oral mucosa needed to achieve many psychoactive effects. Areca nut from the areca palm tree in its natural form is cut, ground, and chewed in most parts of South Asia. Chemicals from the nut, mostly alkaloids, especially arecoline, are attributed to the generation of oral submucous fibrosis. The youngest child found to have developed oral submucosa fibrous and picked up in Dr. Warnakulasuriya's travels was not more than 8 years old by the time he was seen. The child had been chewing areca nut for 3 years.

The betel preparation virtually always contains four materials: tobacco, slaked lime, and cut or ground areca nut wrapped in a leaf from the *Piper betel* tree. In India and in some of the corner shops in the United Kingdom near where Asian immigrants have settled, one can find commercially prepared small foil-packaged products called pan masala or gutkha. The Department of Trade and Industry in the United Kingdom classifies these products as "Indian sweets," but a redefinition is urgently required. There has been an enormous expansion of this industry, originating either from India or Pakistan and now exported to wherever Asian populations live. These products also are now widely available for bulk purchase over the Internet. Because of their enhanced economic aspect, these migrant people can afford to buy a large quantity of these products where they have settled. Dr. Warnakulasuriya spoke primarily about betel quid habits that originated in South Asia and followed migration to parts of Africa and Europe, especially the United Kingdom. A question had been asked about patterns of indigenous product use by South Asian immigrants in the United States, but information is still lacking.

An appreciation of patterns of smokeless tobacco use in migrant populations is only beginning to be understood. Indians living in Malaysia surveyed by Dr. Ramanathan first brought immigrant use to the

attention of investigators, when it was learned that oral cancer is quite predominant in the Indian groups compared to the Chinese and the Malaysians who live in Malay Peninsula. It is reported that the incidence of oral cancer among Indians in Malaysia is similar to that observed in their home of origin, such as Bombay (Mumbai) or Madras (Chennai). Later, a pattern evident in a large population study in South Africa was consistent with those findings, with Indian people living in Natal also predisposed to oral cancer. Their associated habits are well described, and areca chewing among South African Indians has been shown to carry an attributable risk close to 90 percent for development of mouth cancer.

During the past 10 years, South Asian immigrants in the United Kingdom have been studied in detail. In the United Kingdom, where ethnic minorities live in dense geographic pockets, regional surveys conclude that these people might be more predisposed to oral cancer. For example, if one looks at the Bangladesh population living in either Yorkshire, in the West Midlands, in East or North West London, the combined areca and smokeless tobacco habit is quite prevalent, with a majority consuming areca nut in some form. Most quids also include tobacco. Small convenience samples of Indians, Pakistanis, and Sri Lankans have been surveyed, but it is extremely difficult to sample ethnic minority populations for studies of this nature due to poor accessibility and language difficulties. The limitations of these studies are fully recognized. Yet, it is quite clear that patterns of use are similar among recent immigrants and those who have lived in the United Kingdom for several decades. There are few gender differences.

Among young Asian migrants who have grown up in the English education system, about a quarter have the tobacco patterns of use of their parents and grandparents. Some of these children also smoke. One study from Leicester (United Kingdom) found significant differences in smoking and betel quid use among different Asian migrant populations. Among Hindus in this population, smoking is high among the younger generation and it is combined with the use of smokeless tobacco. There are important differences in the patterns of use between first- and second-generation Asians. Another study found that chewing betel quid is quite low among Asian immigrant children between the ages of 12 and 16, but that they use areca nut and tobacco in other forms.

Seventeen studies among betel quid chewers have so far detailed the association of betel quid with oral cancer, showing that the relative risk rises at least threefold when tobacco is included in the betel quid. In a study of Asians, Chinese, and native peoples in the Thames area in the United Kingdom, oral and oropharyngeal cancer was higher among Asians than the other groups. Several other studies also have shown that migrant populations from South and Southeast Asia continue to have a high risk of oral cancer. In addition to oral cancer, other consequences of betel quid use include diabetes mellitus, respiratory disorders and attacks of asthma, and possible cardiovascular complications.

Although lifestyle changes to some extent among migrants moving into Western culture, habits continue to such a degree that there is no difference in the risk of oral cancer in these populations after they migrate. Both the form and prevalence of tobacco use is similar to that in the Indian subcontinent, at least among adults. Although it was thought that children growing up in the Western culture might not pick up the habit, it has been shown that many do. Recent studies suggest that youth initially use these forms of tobacco as a way to show cultural identity. Surveys of betel quid users suggest a serious dependency as well and that use of smokeless tobacco could be a gateway for future use of smoked tobacco. Thus, it is important to target these populations with anti-tobacco messages and smoking control measures.

Discussion

Initiation. The origin of the habit is cultural. Young children start because the product is available in the home. They don't buy it themselves, but it's freely available in corner shops in the United Kingdom and there are no regulatory measures in place to stop the sale of these smokeless tobacco products to minors. It's offered in most Asian festivals and when one meets friends. After initiation, addiction set in.

Addiction. Addiction is a problem among regular (daily) users. They want to give up once they are told by their dentists that their oral health is seriously compromised. They appear to understand the problem, at least those who have been exposed to health messages, but they cannot quit because of their addiction to the substance.

Other health consequences. The historical focus has been on chewing related to oral cancer and other malignancies. It is now recognized that there are other health consequences of use of smokeless tobacco mixed with areca nut. For example, there is a very high incidence of diabetes in the Asian community, which preliminary evidence suggests is related to chewing areca nut. Experimental evidence also suggests that chewing areca nut precipitates diverticulitis. Additional evidence exists that chewing induces serious asthma attacks, especially among novice users. There are cardiovascular effects of the product, as well. In an experiment in which investigators tried chewing areca preparations themselves under laboratory observation, Dr. Warnakulasuriya noted that due to profound cardiovascular effect, one volunteer couldn't walk to the door after having taken a mouthful of the product.

Education. Messages are confusing when it is stated that adolescents who use the product should be able to give it up after they get older. Longitudinal studies are needed because cross-sectional studies on very heterogeneous populations in the United Kingdom are not generalizable. Patterns of chewing by Bangladeshis, Indians, Sri Lankans, Pakistanis, and so on vary. One cannot infer, simply because one study shows a decline in use, that this will be a trend. Numerous studies would be necessary to show changes in adolescent chewing after they mature. Recent studies from India suggest an epidemic of areca nut use among younger people due to the availability of commercially packaged products.

Demography. Few studies have looked at socioeconomic differences, but results suggest that chewing prevalence is highest among people who have low social status. That might change in the migrant communities as people educate their children. At the moment, among the older adults, certainly socioeconomic status and education level seem to have a confounding effect on prevalence of the habit.

Panel: Smokeless Tobacco Clinical Effects and Biological Mechanisms

Smokeless Tobacco Cancer Potential

Newell Johnson, MDSc, Ph.D., FmedSci., moderator, introduced Dr. Deborah Winn, noting her seminal work on snuff and risk of oral and pharyngeal cancer among women in Southern United States.

Deborah Winn, Ph.D., reported that several types of smokeless tobacco are available in the United States. Dry snuff has a very fine consistency, almost like flour. Plug chewing tobacco also is used and comes in block form. Only 4 percent of the smokeless tobacco sold in the United States is dry snuff and another 4 percent is plug chewing tobacco. Most snuff used now is in moist form, which is sold in round cans. Sales of moist snuff have increased dramatically. In 1995, 53 million pounds were sold, compared to 36 million pounds in 1986. Of total pounds sold in the United States, 46 percent are in the form of moist snuff and the same percentage in the form of loose-leaf chewing tobacco. About 3 percent of the U.S. population uses smokeless tobacco. Most use is by males—about 7 percent compared to females at less than 1 percent. Youth are more likely to use snuff than adults. For example, about 20 percent of boys surveyed in grades 9–12 in the United States used smokeless tobacco in the previous month. Also, the prevalence of smokeless tobacco use in some American Indian and Alaska Native populations is very

high. In one study of Alaska Native teenage youths, 28 percent of girls and 34 percent of boys used smokeless tobacco.

A number of case reports, mostly older, describe oral cancers in anatomic sites in the mouth where smokeless tobacco was placed for many years. Some earlier case-control studies have been difficult to interpret because relatively few study subjects used smokeless tobacco. Also, several studies did not control for confounding factors such as smoking. Most studies were consistent, however, in showing an association between use of smokeless tobacco and oral cancer.

A study of oral pharyngeal cancer in women in southeastern United States published in 1981 included cases from five hospitals and from death certificates, and controls were selected from the same sources. The study found a fourfold increased risk associated with use of smokeless tobacco among nonsmoking women. These women primarily used dry snuff. In the hospital sample comparing nonsmoking smokeless users with those who did not use any tobacco products, there was a striking relationship between smokeless tobacco and gum and mucosa cancer—nearly a 50-fold increase in risk for women who used snuff for 50 years or more.

In the 1980s, investigators conducted a population-based case-control study that included over 1,100 cases in four areas of the United States. In that study, use of smokeless tobacco among men was highly correlated with smoking, and the independent effect of smokeless tobacco could not be estimated. However, among women with no smoking behaviors, there was a statistically significant sixfold increased risk associated with oral and pharyngeal cancer. In another U.S. study that included estimates of risk among nonusers of cigarettes, the odds ratio for regular chewing tobacco use was 2.25 among males, but not statistically significant. Among women the odds ratio of snuff was 34.5 and statistically significant, although based on small numbers.

In yet another study, investigators hypothesized that West Virginia would have high rates of oral and pharyngeal cancers compared to the United States as a whole because smokeless tobacco use is so common there. Indeed, 16 percent of West Virginian adult males use smokeless tobacco, compared to 4 percent in the rest of the United States. However, West Virginia had slightly lower incidence and mortality rates of oral/pharyngeal cancer among both men and women compared to the United States as a whole. So, investigators concluded that there was no relationship between use of smokeless tobacco and oral cancer. A limitation of the study was that the investigators had no information about the tobacco habits of the subjects. It is possible that there might have been an underreporting of cancer cases as a whole or all cancer cases specifically, especially because the registry was new.

Investigators in still another study obtained national estimates of the number of persons in the United States who died and were not smokeless tobacco users from a sample questionnaire survey of next-of-kin of deceased persons. From another sample survey, they obtained national estimates of the numbers of persons in the United States who use and who do not use smokeless tobacco. They used these numbers to obtain an estimate of the ratio of the “risk” of death among smokeless tobacco users and among those who did not use smokeless tobacco. Investigators found that there was no association between smokeless tobacco use and oral or digestive tract cancer. A strength of this study was that the risk estimates for smoking were consistent with those in other studies. However, the numerator and denominator for the risks of death among smokeless tobacco users and nonusers come from different surveys and so their measure of association is not strictly a relative risk. Researchers have also looked at esophageal, bladder, and colon cancers; leukemia; and multiple myeloma in relation to tobacco use. However, the results in terms of smokeless tobacco have not been conclusive.

Laboratory animal studies show that TSNA in smokeless tobacco cause cancer and mutations. TSNA concentration varies widely among smokeless tobacco products within a country and between countries,

so users' exposures to these carcinogens vary. Duration as well as frequency of smokeless tobacco use are additional factors that contribute to the overall dose of TSNA users receive. Many smokeless tobacco users also smoke cigarettes, pipes, or cigars. The long-term natural history of certain oral mucosa lesions that occur in smokeless tobacco users needs more study. In a baseball players' study, 46 percent of the men who used smokeless tobacco in the current week had a tobacco-related oral mucosal lesion. Evidence suggests that many of the smokeless tobacco lesions in adolescents and young adults disappear with discontinuance of use, but less is known about lesions in older users with long-term smokeless tobacco use. Also, a better understanding is needed of genetic, environmental, and intermediate markers.

Discussion

Oral lesions in baseball players. There was one dysplasia among the 92 baseball players whose oral lesions were biopsied. Since players are generally younger adults and so have limited duration of exposure, one would not expect to see much dysplasia.

Smokeless Tobacco Oropharyngeal Effects

Newell W. Johnson, MDSc, Ph.D., FMedSci., Professor of Oral Pathology in the University of London and a specialist in oral pathology, serves as Director of the WHO Collaborating Centre for Oral Cancer and Precancer. Dr. Johnson reviewed the literature on the oropharyngeal effects of unburned tobacco products. He stressed the variability of such tobacco products in terms of their manufacture and composition, and hence their toxicity, and noted the lack of conclusive or consistent evidence supporting a relationship of smokeless tobacco to disease. On the other hand, it is clear that all tobacco is addictive and that, given the variability in the products, a differential approach to management of these products is needed.

Dr. Johnson pointed out that tobacco varies tremendously by species, the content of the soil in which it is grown, the curing and manufacturing processes, and the additives and contaminants in the product. All of these factors affect the carcinogenic properties of the products. Some products also contain protective components, such as betel leaf and mint, which contain antioxidants that protect against some of the damaging effects of tobacco.

In reviewing the literature of oral diseases related to unburned tobacco, Dr. Johnson presented a table of tobacco-induced lesions in the upper aero-digestive tract, a number of which are related to unburned tobacco. He suggested that the term "leukoplakia" not be used, preferring the term "white patch," which has no histological, biological, or prognostic connotation. Many tobacco-related lesions, he stressed, are benign. Tooth loss or the severity or extent of generalized periodontal breakdown is practically undocumented, although localized periodontal breakdown where the tobacco is placed and the lesion is established is clear. In the United States, dental caries has been related to unburned tobacco use because many of the tobacco products contain high levels of fermentable carbohydrate. Data also show a relationship between diabetes and asthma and areca nut use. Data on the relationship to gastrointestinal and other cancers are limited. Esophageal cancer risk is markedly raised by chronic use of areca nut alone, but particularly as a component of pan/paan/betel quid, especially when these mixtures also contain tobacco.

Evidence for the cancer risk of tobacco (in all forms) is coming from a variety of approaches, including descriptive epidemiology, case-control studies, cohort and longitudinal studies, and intervention studies. Dr. Johnson reviewed the strengths and weaknesses of a number of studies, noting a lack of power and overly broad categories. Also, although tobacco contains more than 300 carcinogens, most of the

literature with unburned tobacco focuses on tobacco-specific nitrosamines, which provide only a fragment of the picture, and does not take into account the effects of the wide and highly variable range of tobacco products used in different parts of the world.

Still, Dr. Johnson explained that tobacco accelerates cell proliferation of mucosal epithelia locally. It systemically suppresses antioxidant levels in man. Studies also are being conducted on numerous molecular and other biomarkers in smokeless tobacco use. Excellent work is also coming out of the laboratories in India to determine and analyze tobacco-specific and smokeless tobacco-specific biomarkers. Such research is showing an association between HPV in the head and neck and upper aerodigestive tract cancer in nonusers of tobacco.

Other studies are looking at the carcinogenic effects of alcohol in relation to tobacco use and are finding that this effect is stronger than the smoked tobacco effect. Dr. Johnson explained the data suggest that the increased incidence of cancer in much of Europe can be attributed to higher levels of alcohol consumption in recent decades. In addition, there is good evidence that the Swedish form of snuff might not be particularly carcinogenic, although it is addictive and carries cardiovascular risks. Other good news comes in the form of evidence in intervention studies among U.S. Air Force recruits who stopped using smokeless tobacco and had a rapid resolution of white patches. A large study by Dr. Prakash Gupta's group has shown a drop in the incidence of "leukoplakia" following tobacco use intervention in India.

Dr. Johnson concluded that all tobacco use cannot be treated the same way with respect to oropharyngeal cancer.⁴ Better research is needed, including much better epidemiological studies.

Smokeless Tobacco and Noncancer Health Effects

Dr. Johnson introduced Dr. Gunilla Bolinder, Chief, Clinical Proficiency Center, Karolinska Hospital, Stockholm, Sweden. She earned her Ph.D. from an investigation of the cardiovascular effects of using smokeless tobacco.

Gunilla Bolinder, M.D., Ph.D., presented findings from her work on the cardiovascular effects of long-term use of smokeless tobacco. She began by explaining that the use of smokeless tobacco is an ancient custom in Sweden, where 20–30 percent of the male population uses smokeless tobacco. Most commonly, moist snuff is placed under the upper lip. Use of smokeless tobacco is considered a sign of manliness. The tobacco industry targets young people at sports events and other venues. In recent years, smokeless tobacco use has increased significantly among women and individuals working in the health professions.

Dr. Bolinder explained that the nicotine in smokeless tobacco has a number of possible health consequences. For example, it has complicated and contradictory effects on neurological and vascular function. First, nicotine is a central nervous system stimulant having a high abuse liability. It has a complicated and contradictory effect on neurological and hormonal function in the brain and on the cardiovascular system, especially autonomic control. Based on the pharmacological actions of nicotine and on findings of an increased cardiovascular risk in smokers, it has been suggested that the long-term use of nicotine might increase the risk of cardiovascular diseases such as myocardial infarction, coronary artery disease, stroke, hypertension, or arteriosclerosis, and might also promote circulatory, metabolic,

⁴ These arguments can be read in detail in:

Johnson, Newell. Tobacco use and oral cancer: a global perspective. *J Dent Ed* 65:328-339, 2001.

Johnson, N.W. Head and Neck Cancer: Epidemiology of premalignant and malignant lesions. Chapter 9.1.1 In: Souhami, I. et al., eds. *The Oxford Textbook of Oncology*, Second Edition, Oxford: Oxford University Press, 2002.

and gastrointestinal problems. Little is known about smokeless tobacco effects on pregnancy or fetal outcomes, especially fetal nicotine addiction. There are studies connecting attention-deficit/hyperactivity disorder and maternal exposure to nicotine.

Dr. Bolinder then described two studies she conducted to determine whether smokeless tobacco users showed any differences in cardiovascular mortality, physical performance, metabolic markers for cardiovascular disease, early signs of arteriosclerosis, and internal blood pressure and heart rates compared to nonusers of tobacco. The first of these, a large cohort study involving 135,000 middle-aged male construction workers, found that the excess risk of dying of ischemic heart disease was most pronounced for smokers with a dose-response relationship. Smokeless tobacco use also was found to be associated with an excess rate of dying from ischemic heart disease. After 12 years, long-term heavy smokers had a threefold excess cardiovascular mortality and smokeless tobacco users a twofold increase over associates who did not use tobacco.

Discussion

Swedish snus sales in the United States. Swedish Match is working to introduce its smokeless tobacco to the United States and to other countries. It has, for example, bought factories in India and America (introducing Click in India and Exalt in the United States).

Control populations. Studies comparing tobacco users to nonusers might be skewed because nontobacco users may have more healthy lifestyles in general.

Fetal effects. Nicotine easily crosses the placental barrier and disperses throughout fetal tissue and concentrates in the developing brain. It and other tobacco constituents may contribute to low birth weight and failure to thrive. Much more research is needed on this subject.

Biomarkers of Oral Leukoplakia

Dr. Johnson introduced Dr. Laura Kresty, a Post-Doctoral Fellow at The Ohio State University, School of Public Health, Environmental Health Sciences Division, James Cancer Hospital and Solove Research Institute, Columbus, Ohio. This work was conducted with Dr. Gary D. Stoner at The Ohio State University and Dr. Stephen Hecht, Dr. Rajaram Gopalakrishnan, and Steven Carmella, a Fellow, at the University of Minnesota, Minneapolis, Minnesota.

Laura Kresty, Ph.D., discussed her study of the relationship between the urinary metabolites of TSNA and NNK and oral leukoplakia in smokeless tobacco users and compared these findings to those in smokers. The study also examined possible associations between these urinary metabolites and patterns of tobacco and alcohol use, oral hygiene, and diet. This study looked at the metabolites 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL) and [4-(methylnitrosamino)-1-(3-pyridyl)but-1-yl]-beta-D-glucosiduronic acid (NNAL-Gluc) as potential detoxification pathways. In addition to urinalysis, the study included a survey of patients and an examination of the gross tissue of the lips, oral mucosa, palate, tongue, mouth floor, and teeth by an oral pathologist.

Leukoplakia was present in 38.3 percent of the subjects, with the highest rates in combination users, followed by dippers, and then chewers. Among the 70 study subjects, leukoplakia was evident in 60 percent of chewers and dippers, 46 percent of dippers, and 14 percent of chewers. Intensity of use appeared to be a factor. The researchers proposed that these differences might be related to the frequency of use of each of these groups of people. The study also found that levels of NNAL, NNAL-Gluc, and

cotinine were significantly elevated in smokeless tobacco users compared to the control group. The levels of NNAL were highest in snuff dippers, followed by smokers, and then chewers. The main activation pathway for both NNK and NNAL is alpha-hydroxylation, leading to the formation of formaldehyde and other aldehyde and hydroxy compounds. All urinary biomarkers were most elevated in snuff dippers, and both snuff dippers and smokers had higher levels than chewers. In contrast to observations in smokers, there was no finding of two phenotypes of the NNAL-Gluc:NNAL ratio in smokeless tobacco users. The study also found leukoplakia presence to be significantly associated with increasing total levels of NNAL, NNAL-Gluc, or NNAL-Gluc+NNAL and there was a dose-responsive trend. A similar trend was noted for urinary cotinine and leukoplakia.

This study also looked at a number of secondary factors, which were not directly related to the urinary biomarkers, including those that contribute to initiation of smokeless tobacco use. About 60 percent reported parental influence and the perception of a relaxing or calming effect to be important factors. Approximately 30 percent said it was the perception of use as an adult activity and belonging to a sports team that led them to use smokeless tobacco.

About 20 percent thought of smokeless tobacco as an alternative to cigarette smoking. A number of significant findings were also found in relation to diet. Smokeless tobacco users were more often self-reported current beer drinkers, which may be important since alcohol seems to increase absorption of some carcinogens. They also consumed fewer sweets, possibly due to some of the additives in smokeless tobacco. On the other hand, smokeless tobacco users consumed fewer vegetables weekly. Overall low vegetable and fruit consumption made it difficult to detect any positive or protective associations between fruit and vegetable consumption and urinary biomarkers or leukoplakia.

In conclusion, in this study, tobacco dipping was associated significantly with increased levels of NNAL and NNAL-Gluc, and frequency of chewing was associated significantly with increased urinary metabolite. An earlier age of initiating snuff use was associated significantly with leukoplakia in snuff dippers. There is also significant uptake of carcinogenic nitrosamines in smokeless tobacco users, supporting the argument that smokeless tobacco use is not a harmless alternative to smoking. No significant findings related to blood pressure were found.

Discussion

Obtaining samples. Subjects didn't seem to mind providing either saliva or urine samples. This suggests that these methods might be a practical means for biomarker testing.

During the lunch break, **Dr. Fred Magaziner**, Academy of General Dentistry, presented an education video that targets middle-school children enrolled in Montgomery County, Maryland public schools. The period also allowed for time to examine poster presentations (see Poster Abstracts, Appendix C).

Panel: Smokeless Tobacco and Nicotine Dependence

How Nicotine Interacts with the Brain: Basic Biology

Arden Christen, M.S.D., moderator, introduced Dr. William Corrigan, President, Society for Research on Nicotine and Tobacco. Dr. Corrigan conducts research at the Smoking and Nicotine Dependence Program of the Centre for Addiction and Mental Health, Toronto, Ontario.

William A. Corrigall, Ph.D., described how nicotine receptors and the cells on which they are located respond to nicotine. He also summarized some of the basic biological effects of nicotine in the brain that are related to addictive behavior.

Dr. Corrigall explained that the brain contains a variety of neurons with elaborate branching that allows them to receive signals from many other brain cells, forming neural networks. Neurons are elaborate structures because they serve sophisticated functions. Elaborate branching allows neurons to receive signals from hundreds to thousands of other neurons. They can interact fairly simply or linearly one with another, or they might feed back information through any number of other neurons to control activity. A neuron's activity might be influenced variably by another neuron depending on presynaptic modulating influences of yet other neurons. Nicotine can influence both direct pathways and feedback systems, and modulate the conditioning of such pathways and feedback systems. The receptors through which nicotine acts are not present in our brains for that purpose. They exist to transduce the activity of a neurotransmitter called acetylcholine. The process is chemical and electrical, in which nicotine ultimately causes a change in neuronal activity.

There are five protein units in the receptor for nicotine that array in the synaptic membranes so that they leave a channel between them that function as ion gates. Each protein is coded by a separate gene. They are designated alpha 2 to alpha 9 and beta 2 to beta 4. Typically, neuronal nicotinic receptors are composed of both alpha and beta proteins. They differ in their sensitivity to nicotine.

Many subunit combinations are possible in the brain, including those that are involved in reward functions. Reward or pleasure functions are reinforcing, and it appears to be by action at these particular receptors that nicotine produces addiction.

Why is nicotine addictive? Shortly after neurons are activated by a signal, its receptors are temporarily desensitized. However, if nicotine lingers around receptors, a long-term desensitization occurs. The mechanism is not clear. At the same time, there is what cell biologists call "up regulation"—a proliferation of receptors, possibly because messenger RNA instructs the neuron to make more receptors. So, there appear to be more of them around when exposed to nicotine for a long time. Although such neurons become less sensitive, they do activate after more intense nicotine exposures.

Dr. Corrigall described one of his studies in which rats press a lever repeatedly to obtain intravenous infusions of nicotine. Cocaine slows the process of dopamine reuptake, and a number of other drugs of abuse, including nicotine, are believed to act on this pathway. In addition to the dopamine system, however, there are other ascending and descending systems that need to be considered in nicotine addiction. In his study, Dr. Corrigall manipulated a particular area of the rats' brains to deplete dopamine by treating them with a nicotine antagonist. Three weeks later, the rats were self-administering much less nicotine. This suggests that nicotine acts on those cells. When nicotine was injected into one particular set of ascending neurons, the rats also adjusted their nicotine intake. This basic research suggests that other systems that modulate dopamine effect on neurons are important in the addictive properties of nicotine in animals.

Dr. Corrigall concluded by emphasizing that nicotine acts on specific receptors and that these receptors exist in various subtypes and have differential responses to nicotine. Several of them, located in the mesolimbic dopamine pathway, appear to be critically important in nicotine addiction. He stressed that it is important to know where the nicotine receptors are located on reward-relevant areas in the brain. Understanding them will help in the development of medications that may target nicotine receptors directly or the neurochemical receptors through which they act.

How Addictive Is Smokeless Tobacco?

Dr. Christen introduced Dr. Jack Henningfield, Vice President, Research and Health Policy, Pinney Associates, and Associate Professor, Department of Psychiatry and Behavioral Sciences at the Johns Hopkins University School of Medicine. Until 1996, he was Chief of Clinical Pharmacology, NIDA, where his studies focused on the biological basis and characteristics of drug addiction.

Jack Henningfield, Ph.D., began by reflecting on some smokeless tobacco history, noting that 15 years earlier, he, Dr. Mecklenburg, and others were discussing how to respond to a request by then Surgeon General C. Everett Koop to develop a report on smokeless tobacco. At the time the Surgeon General could not make a report so a report was made to him. Report development was led by a creative, brilliant, and determined behavioral scientist, Dr. Joseph Cullen of the National Cancer Institute. He died soon after and the report became one of many fine legacies he left to science and the public. At the time it was clear to Dr. Henningfield that addiction science was not regarded as the strong science it is today.

Globally, there are many forms of smokeless tobacco. Dr. Henningfield recalled that Masterpiece Tobaks was on the market about 15 years ago in the United States and the Food and Drug Administration (FDA) banned it. Pinkerton Tobacco Company marketed it as a handy and convenient chewable form of smokeless tobacco that one didn't have to spit. FDA classified it as a nicotine-adulterated food product, not a drug or a drug delivery system, but a food product because it was similar to a chewy, tasty chewing gum, not like nicotine gum, and had a pleasant taste. Currently, there is a huge variety of products that are not burned, including products such as Premier and Eclipse, which is a burn product that is sometimes called a smokeless cigarette. Definitions that regulatory agencies can use are needed so they don't need to come up with creative approaches such as classifying a product as a tobacco-contaminated fruit gum.

Dr. Henningfield differentiated between “addiction potential” and “addiction risk,” explaining that addiction potential is determined by the pharmacology of the substance. Addiction risk increases when a product is cheap, legal, available, or attractive for other reasons. Although not all users are addicted, research shows that people who use nicotine more frequently or who use a higher dose have a harder time quitting. Also, increasing tolerance and attendant withdrawal signs associated with smokeless tobacco use is qualitatively similar to cigarette smoking, although less pronounced.

Whether or not an addicting substance causes widespread problems has to do with several factors, among them availability, flavoring, things that make it easier to use, and access. For example, in the 1960s and early 1970s, cocaine in the United States wasn't a major public health problem. Use soared in the early 1980s, and cocaine became the number one drug addiction problem to many policymakers. What happened? It became relatively cheap and easily available, was hyped through songs and in the media, and then later in the 1980s, crack cocaine made use even more convenient. Crack did for cocaine what cigarettes did for nicotine—provided an extremely addictive, convenient to distribute and use, drug dosage form. The chemical stayed the same.

Tobacco products vary in their nicotine delivery capacity. For example, a cigarette, on average, delivers about 1–3 mg of nicotine to be delivered over about 5 minutes of smoking. Chewing tobacco and snuff products in the United States might deliver 10 mg or more of nicotine over 15–20 minutes of use. In contrast, people absorb less than 1 mg of nicotine, on average, from 2-mg nicotine gum, and 2 mg from a 4-mg gum over 30 minutes of use, and they obtain less than 1 mg nicotine per hour from the highest dose nicotine patches.

Dr. Henningfield urged considering the diverse factors that contribute to the addiction risk of smokeless tobacco. In addition to considering pharmacology, all factors surrounding use—context, perception of

relative safety, absence of strong health warnings, convenience of use—influence the risk of youth and adults becoming addicted. Such factors are important to consider in making smokeless tobacco policy and when helping users quit. Nicotine is a critical factor in establishing addiction, so the capacity of products to deliver nicotine is also an issue, and it would be helpful to have information concerning the dosing capacity of smokeless tobacco products, namely their nicotine content and pH levels.

It is known from epidemiological studies and surveys that there are dose-related signs of dependence. Kids or adults who use tobacco more frequently have a harder time quitting and report more withdrawal, greater cravings, and so on. Some smokeless tobacco users only do so occasionally or during certain seasons of the year. Does that mean that some users are not addicted? That's conceivable and, in fact, with most addictive drugs there are plenty of people who use them who are not addicted. That doesn't mean cocaine isn't addictive because some people use occasionally. It is an important area of research understanding the phenomenon of occasional users better and to better understand the factors that influence the risk of transition to addictive use.

One can become addicted to any smokeless tobacco product, but there are some obvious product differences. Cigarette smokers who change brands tend to switch to lighter brands of cigarettes, but then smoke more to get the same amount of nicotine, tar, and other things. People who have been using smokeless tobacco four years or more are most likely to have moved up to a high-absorption brand such as Copenhagen. In fact, there was or still is an advertisement that stated “Sooner or later, it's Copenhagen.”

In 1996, the tobacco companies swore to the U.S. Congress that tobacco was not addictive, told FDA that pH did not make a difference, and fought CDC's efforts to release pH data on smokeless tobacco products. But industry internal documents described what they termed “the graduation process” as starting out with low nicotine dosing smokeless products, such as Skoal Bandits, Wintergreen Mint, Happy Days Mint, Longcut, Wintergreen, Skoal, and Long Cut, and transitioning to Copenhagen. There was a marketing strategy not to give free samples of the high-absorption products but rather of the lower dose products labeled by U.S. Tobacco (now U.S. Smokeless Tobacco) as “starter” products. Store vendors were encouraged to place starter products by the candy counter and give them out as free samples. Starter products might include guidance about how to use, contain flavoring agents that mask the bitter taste of tobacco, and have a lower pH that inhibits nicotine absorption across oral membranes. (A higher pH frees nicotine molecules so that they are easily absorbed.) On college campuses, youths were hired to be the promoters and explainers of the process.

One problem with promoting smokeless tobacco as a treatment for cigarette addiction is that it conveys the message that use must be safe because health professionals are promoting it. This has the potential to undermine prevention efforts by reinforcing the message of relative safety that is already being promoted by the smokeless tobacco industry. Over the past two decades, perception of harm has emerged of the largest variables associated with drug use of young people across all categories of drugs in the United States. Therefore, consistent messages of harm are important and the message that should be conveyed is the scientifically grounded fact that smokeless tobacco products are deadly and addictive.

Dr. Henningfield concluded that the addiction risk of smokeless tobacco is very high. Whether it is as high as that of cigarettes is like comparing falling out of a 10- versus a 15-story building. In addition, smokeless tobacco manufacturers use a variety of tools to increase the prevalence of smokeless tobacco use and addiction by increasing the likelihood of trying the products and then of graduating to addictive use. These tools include pharmacologic techniques, such as adjusting the nicotine dosing capacity and speed of delivery for the target market of a particular brand; use of appropriate flavoring for various markets; and use of marketing techniques to influence social acceptability and perception of harm. At this time, however, smokeless tobacco products appear subject to even less regulation than cigarettes, and

therefore manufacturers are able to employ the foregoing tools virtually at will to create and sustain their markets. He called for stronger public health measures, such as better definitions of smokeless tobacco products, regulatory oversight, and product labeling that describes for consumers, researchers, and clinicians product nicotine dosing capacity.

Assessing Smokeless Tobacco Dependence

Dr. Christen introduced Dr. Karl Fagerstrom, Fagerstrom Consulting, Helsingborg, Sweden. Dr. Fagerstrom has studied nicotine addiction for decades. He helped develop nicotine gum and other nicotine replacement therapies and is well known for developing a nicotine dependence scale used worldwide. Recently, WHO gave Dr. Fagerstrom an award for his contributions to tobacco control.

Karl-Olov Fagerstrom, Ph.D., shared a draft instrument he has developed that can be used to assess dependence in smokeless tobacco users, which he often referred to as “smoke-free” tobacco users. He began with an introduction to the differences in nicotine absorption among cigarette, snuff, chewing tobacco, and nicotine gum, stating that cigarettes produce a high level of nicotine more rapidly than snuff and chewing tobacco, and these smokeless products provide a more rapid uptake than does the gum. Swedish snus has a nicotine concentration almost identical to cigarettes. However, the concentration of the nicotine metabolite cotinine is higher than from cigarette smoking, probably because more nicotine is swallowed with snus and directly metabolized to cotinine.

As explained in an earlier presentation, different products, even with the same nicotine content, can produce very different nicotine levels because of differences in the free nicotine available that is regulated by pH. It is quite clear, however, that nicotine intake from even low absorption from smoke-free tobacco products can establish dependence.

Dr. Fagerstrom said that his scale is a modification of one described in a paper entitled, “Measuring Dependence in Smokeless Users,” by Boyle, Jensen, Hatsukami, and Feverson. He modified the first question by increasing the weighting of having to use within the first 30 minutes after awakening by having four alternative lengths of time to first use choices. He modified the second question by offering three choices with different weights. The third question, “What types and brands do you use” is new, and important because of the varying pH by brand. The question would have to be modified for traditional products used in some areas of the world, and absorption rates determined.

Dr. Fagerstrom explained that Question #4 is the same one as in the paper, and Question #5 is almost the same. In Sweden, few users intentionally swallow the juices, although some is unintentionally swallowed. Earlier we have said that tobacco used that is swallowed is of limited effect in producing nicotine in the body’s circulation. However, two recent studies and Dr. Neal Benowitz suggest that about 40 percent or so of swallowed nicotine is actually taken up and enters the body’s circulation.

Dr. Fagerstrom observed that Question #6 (“How many minutes they keep the pouch in the mouth?”) is an important question. He changed the time cutoffs slightly to make a more even distribution within the three categories. The question provides more points the longer the user keeps the pouch in the mouth. In extreme circumstances, that would then lower the dependence because if the user only used smokeless tobacco once in the morning and let it be there for the rest of day, there would be a high score once but the total score for dependence would fall. Dr. Fagerstrom did not change the last question about sleeping with tobacco in the mouth and did not think it is very important. He again recognized the authors and urged others to consider, use, and refine the still evolving smoke-free dependence index. He added a

caveat that one should probably be careful comparing scores on this questionnaire between smokeless tobacco and cigarette users until the new index is validated.

Discussion

Awakening to use smokeless tobacco. Although not in the questionnaire, it is a sign of strong dependence if one wakes up and needs smokeless tobacco before being able to go to sleep again. Few would answer “yes” and it would not especially add to the variability and total score.

Using smokeless tobacco as a harm reduction strategy. Dr. Fagerstrom declined to answer.

Absorption. The amount of nicotine available and the quantity placed in the mouth are two variables. The mouth becomes a reservoir so that over time, if the quid is kept in the mouth and one does not swallow, all nicotine will be absorbed. The buffering agent accelerates the process and swallowing dilutes it. A problem with nicotine gum, for example, is if one uses it right after drinking coffee, the acidic coffee reduces free nicotine molecules and the nicotine is swallowed.

Athlete seasonal users. Some quit and some users say that they quit. Dr. Fagerstrom doesn't know how many athletes use smokeless tobacco only during the practice and playing seasons. Environmental changes, such as pressure from the family not to use, might promote abstinence by some players.

Dependence and hereditary factors. Heredity might have more influence on nicotine dependence than it does on alcohol dependence. Not knowing who is most vulnerable, the best primary prevention measure would be to not let youth even see others smoking or using smokeless tobacco products.

Dr. Christen, moderator, thanked the panel and noted that, although Dr. Corrigan didn't receive questions, in the future his topic will likely lead to the most insight into dependence and treatment.

Panel: Smokeless Tobacco Prevention and Cessation

Prevention and Treatment

Herbert Severson, Ph.D., moderator, introduced Dr. Dorothy Hatsukami, Professor, Department of Psychiatry, University of Minnesota. Dr. Hatsukami is well known for over 20 years of research in tobacco addiction and tobacco dependence. She was President of the Society for Research on Nicotine and Tobacco and has studied the physical dependence of smokeless tobacco use and its treatment for the last 10 years.

Dorothy Hatsukami, Ph.D., shared evidence that shows that prevention and treatment in smokeless tobacco can be effective. She focused on avenues of intervention and efficacy of these interventions.

Dr. Hatsukami identified a variety of prevention measures, including community actions such as increases in taxes (which has been associated with lower rates of use among males age 16 and older) and restricting sales to minors. Other strategies include school-based prevention programs. These programs are often embedded in a comprehensive curriculum that addresses alcohol, cigarette, and other drug use prevention. This approach may be particularly effective since smokeless tobacco use is often intertwined with use of these other substances. Other topics covered in these prevention programs include learning about nicotine addiction and the consequences of tobacco use; dispelling the notion that tobacco use is normative;

examining social influences of tobacco use, including tobacco advertising and peer pressure; learning refusal training skills; and educating parents. In general, these school-based prevention studies have shown modest results in decreasing initiation and prevalence of smokeless tobacco use, with multicomponent programs or programs stressing the physical consequences of smokeless use generally showing the greatest effect over several years. It was further noted that school-based prevention programs in the context of community programs are likely to have the greatest impact.

Interventions with smokeless tobacco users were also noted. Of the few existing intervention studies conducted with smokeless tobacco users, treatment studies in the dental clinic show particularly promising results. Patients are given oral exams, feedback, and the advice to quit by a hygienist and dentist. They also receive support materials and followup phone calls. Studies of these interventions found that the intervention group had significantly higher rates of abstinence at 12 months than did the control group. Smokeless tobacco treatment in the context of oral health care may provide a unique opportunity to intervene with a significant number of smokeless tobacco users.

Dr. Hatsukami also cited four randomized, placebo-controlled nicotine replacement studies, one with nicotine gum and three with the patch. These studies showed no significant difference with long-term abstinence rates among those using either patch or gum compared to those receiving a placebo. However, one study involving pharmacists who dispensed nicotine patches with a self-help manual showed a significant reduction in relapse rate (e.g., use of smokeless tobacco for 7 consecutive days). Although nicotine replacement therapies did not enhance treatment success, use of nicotine gum and the patch reduced withdrawal symptoms during the quitting process. Similar results were observed among those using a nicotine-free mint snuff; a significant reduction in withdrawal symptoms was observed, but there was no enhancement in treatment efficacy over using a nonmint snuff product. One of the studies examining nicotine gum showed that the intensity of social support makes a difference to the success of treatment interventions. Smokeless tobacco users assigned to the high-intensity, group behavioral treatment condition were more successful in achieving abstinence than those who received brief treatment.

Concluding remarks noted that health care providers, including pharmacists, need to play a more important role in prevention and treatment; that effective treatment methods need to be disseminated; and that research is needed on how to improve this dissemination. In addition, more studies are needed that examine improved methods for treating smokeless tobacco use, including new medications.

Clinical Practice

Herbert Severson, Ph.D., Research Scientist, Oregon Research Institute, Eugene, Oregon, has conducted research on smokeless tobacco for over 20 years. He has authored sections for three Surgeon General Reports and has authored or coauthored over 100 publications, 5 books, 12 videos and a number of educational materials about smokeless tobacco.

Dr. Severson described strategies for treating smokeless tobacco addiction in a clinical setting. He explained that most tobacco users who quit have done so on their own, but many try repeatedly and are unsuccessful. The issue is how they can be encouraged, supported, or assisted in their efforts. One way to do this is to use clinical encounters to encourage and help.

Dental settings provide valuable opportunities for intervention since about half of all tobacco users see a dentist in a given year. His research team has conducted three randomized clinical trials using minimum intervention methods that demonstrated that dentists and dental hygienists can provide counseling in the

context of oral health care delivery. Their studies have assessed both HMO clinics and fee-for-service practices and found that the intervention program had significant effects for increasing smokeless tobacco cessation in both settings. One of these trials compared the relative effectiveness of interventions for smoking and smokeless tobacco use. The trial included 75 randomized dental practices that assessed over 35,000 patients. Four thousand smokers and 633 smokeless tobacco users were identified. The intervention included checking for tobacco use, relating tobacco use to oral health findings, providing advice to quit, providing written materials and a take-home video, encouraging patients to set a quit date, and following up with a phone call or mailing. Patients were receptive, expecting to hear preventive messages related to their oral health, and supportive of this intervention. There was an 80-percent response rate for the 3- and 12-month followup. The research team found that three times as many people quit tobacco use if they received advice from either the dentist or dental hygienist.

Another intervention study examined the effectiveness of a self-help cessation program for smokeless tobacco users. Short articles were published in local newspapers and asked people who used chew and wanted to quit to call a toll-free number. Those who met criteria for enrollment were randomized to either receive only a self-help manual or the manual, a video, and two supportive phone calls. The video featured testimonials and quitting strategies. The phone calls, conducted by a cessation counselor, included (1) an initial call to offer tips and support and to encourage the participant to set a quit date and a (2) a followup call after the participant had quit. Participants who received only the manual were compared to those who received the manual, the video, and two phone calls. Higher quit rates were found among participants who received the manual, video, and phone calls than among those who received only the self-help manual. At the 6-month followup, among participants who received only the manual, 16.5 percent reported quitting all tobacco and subjects. Among participants who received all three components, 21.1 percent reported quitting. Participants who were older and more educated had higher quit rates. Given that the estimated cost per quit for participants receiving only the manual is \$128, compared to \$750 per quit for those receiving all three components, the manual-only strategy is a cost-effective way to promote quitting.

Smokeless Tobacco Cessation Among School Athletes

Dr. Severson introduced Dr. Margaret Walsh, Professor, Department of Preventive and Restorative Sciences, University of California-San Francisco, San Francisco, California.

Margaret Walsh, M.S., Ed.D., presented data on current spit tobacco use among high-school and college student athletes that were used in developing interventions targeting these populations. She described two randomized, controlled trials to test the efficacy of an athletic, team-based, low-intensity smokeless tobacco cessation intervention targeting these populations.

In 1996, Dr. Walsh and colleagues had surveyed college baseball athletes and football athletes and found that 52 percent of the baseball athletes and close to 27 percent of the football athletes regularly used spit tobacco. In 1999, they again assessed baseball athletes and found that that prevalence had dropped to 40 percent, but that was still considerably higher than what is currently recorded for this age group of males in the general population.

In a recent study, Dr. Walsh assessed the prevalence and current smokeless tobacco use among 1,226 baseball athletes in 39 rural California schools. Users were defined as those who reported trying smokeless tobacco more than once a month. This definition allowed testing the intervention effects in a broader group of smokeless tobacco users that included not only daily users but also those who were regular but less frequent users. It was learned that 43 percent of athletes were daily users and 33 percent

were weekly users and that the balance used more than once a month but not daily or weekly. Fifty-one percent reported they were year-round users and 49 percent were seasonal users. Smokeless tobacco use was highly associated with factors such as having a friend who used alcohol or also smoked cigarettes, finding it hard to say “no,” and overestimating peers’ use of smokeless tobacco. Those who thought smokeless tobacco posed no personal health risk or who had a father or coach who had used were also likely to be users. Finally, those who thought others would like them more if they used smokeless tobacco or who thought nicotine was not addictive or that it improved their athletic performance were more likely to be users. Being Caucasian and older than 16.5 years of age were also risk factors. Reasons for use reported by over half of the users included that use was satisfying, there was no good substitute, abstinence led to a strong craving, use helped cope with boredom, friends used, and used because the baseball season started.

Dr. Walsh and colleagues used data from the survey to develop an intervention, which they tested in a randomized, controlled trial. The intervention applied a social contextual perspective to the entire baseball team that was aimed at creating a supportive environment of nonuse and to change social norms. The survey also indicated that there was considerable experimentation with smokeless tobacco among student athletes. This suggested that there is an opportunity to stop the transition from occasional use to smokeless tobacco dependence and to promote cessation among the more dependent users.

The interventions tested were conducted in an athletic facility and used student athlete peer leaders as well as dental health professionals. The intervention included organizing a school advisory board comprising the local dentist and dental hygienist, the high-school principal, the baseball coach, a peer leader from the team, and anyone else invited by the principal. The board set up an infrastructure to support the sustainability of the program. The second component was an oral cancer screening with feedback that included advice to quit or stay tobacco free; a self-help quick guide; brief cessation counseling by a dental hygienist that focused on problem solving, coping with cravings, and trigger situations; and two followup telephone calls. The third component was a pyramid system that attempted to change the social norms and promote nonuse.

Forty-four high schools were assessed and stratified by use rate and size of team; quit and initiation rates were assessed at 1 month, 1 year, and 2 years. At the 1-year followup, prevalence of cessation in the intervention school was 27 percent compared to 14 percent in the control group, and 23 percent at 2 years in the intervention group compared to 13 percent in the control group.

Predictors of quitting at 1 year included receiving the intervention, using spit tobacco monthly versus daily or weekly versus daily, having self-confidence that quitting was possible, and being in the first 2 years of high school. The intervention effect was especially strong in the daily user group. The confidence level about quitting also increased. Freshmen in the intervention group were 15 times more likely to quit than those in the control group. In conclusion, this type of low-intensity intervention appears to capture some young occasional users who are open to stopping their use.

The second intervention included the dental component in a peer cluster, randomized, controlled trial in 16 colleges. In this intervention, self-reported quit rates were three times more in the intervention group than in the control group at 1 year. Predictors for quitting in the college study were being in the intervention group, using chewing tobacco, and using it less than 17 times per week.

In both randomized control trials, this low-intensity, team-based intervention was effective in promoting cessation of smokeless tobacco use; the intervention effect was sustained at the college level for 1 year and for the high school at 1 and 2 years. Although the quit rates were higher among less frequent users, a strong intervention effect was shown among daily users in the high-school study, suggesting that this type of intervention can promote the cessation of smokeless tobacco use among frequent users.

Smokeless Tobacco Programs in Scandinavia

Dr. Severson introduced Dr. Seppo Wickholm, Senior Consultant, Samhallsmedicin, Center for Tobacco Prevention, Stockholm, Sweden.

Seppo Wickholm, D.D.S., presented an overview of smokeless tobacco use and prevention and cessation programs in Scandinavia. He explained that smokeless tobacco is used more commonly in Norway, Finland, and Sweden, and is seldom used in Denmark and Iceland. While the sale of oral snuff is forbidden within the EU, with the exception of Sweden, it is still very easy to purchase the product under the counter.

In Finland, oral snuff is commonly used on the Swedish-speaking west coast. The habit is increasing, especially among adolescents; 12 percent of 16-year-old boys are daily or occasional users. Use is common among athletes participating in sports such as swimming and ice hockey. Snuff use also is increasing in Norway. Eighteen percent of men ages 16 to 24 are occasional users. Among men ages 45 to 54, only 6 percent are occasional users. Use is considered a cultural import and is most common among residents near the eastern border closest to Sweden.

Among Swedish males, snuff dipping has a long tradition. It is used when hunting or fishing or in certain sports, such as ice hockey and soccer. Currently, 20 percent of men between the ages of 16 and 84 are daily users, with a peak of 30 percent at 25 to 34 years of age. The number of women who use snuff is increasing. The public generally perceives the use of snuff as a harmless alternative to smoking. Health-oriented institutions, such as the Centre for Tobacco Prevention and Swedish Dental Services, question this perception.

Smoking cessation techniques cannot be applied as simply as snuff cessation methods. The cessation program developed for the Swedish Quit-Line is a step-by-step program that includes free booklets. It includes a 3–6 week period of disrupting tobacco using rituals by advising tobacco users to change brands, hide their boxes, and so on. The focus is on reinforcing personal motivation to quit, prompting users to take control of their behavior, and provide nicotine replacement therapy and information designed exclusively for snuff dippers. Dr. Wickholm noted that many men find it easier to use a quit line for help than to go to their primary health care center or dentist for assistance.

Panel: Tobacco Without Fire: Dangerous, Useful, or Both?

A Swedish Perspective and General Aspects

Cathy Backinger, Ph.D., moderator, worked at CDC, then FDA, and is currently in the Tobacco Control Research Branch, NCI, where she had been the Acting Director until July 2000. She is now Project Officer for several NCI-funded tobacco intervention grants. She introduced Dr. Lars Rasmstrom, Director, Institute for Tobacco Studies, Stockholm, Sweden.

Lars Ramstrom, Ph.D., first drew attention to the diversity of smokeless tobacco, a group of products with widely differing characteristics. This diversity, he believes, makes it impossible to speak about effects of “smokeless tobacco,” as the effects of each product have to be assessed individually. He then addressed the potential harmfulness/usefulness of smokeless tobacco, with special attention to the moist snuff called “snus” that is manufactured in Sweden and commonly used by Swedish males. A powder of

finely ground tobacco leaves, snus is manufactured through a heating process unlike the fermentation process used in the manufacture of most American brands of moist snuff. Dr. Ramstrom proposed that since the Swedish form of snuff is substantially less harmful than cigarette smoking, it may actually be useful as an alternative to young people who would otherwise have started smoking and as a tool to help those who want to quit smoking. On the other hand, he recognizes that snus can have some adverse health effects and cause nicotine addiction.

Dr. Ramstrom stated that studies suggest that snus use by Swedish males does not cause oral cancer at measurable levels. However, studies examining its potential for causing excess coronary heart disease are equivocal. International comparisons indicate that tobacco-related mortality is exceptionally low in Swedish males. This suggests that their use of snus does not cause an excess mortality to offset the benefits of their uniquely low smoking rates. This observation further contributes to the general agreement that the use of Swedish snus is substantially less harmful than cigarette smoking.

The next question is whether snus can be used to help established smokers quit smoking. Some studies indicate that rates of smoking cessation are higher among those who are or have been snus users than among those who have never used snus. This applies particularly to those with strong nicotine dependence. Among those who quit smoking with the help of snus, some people later discontinued their use of snus. This, of course, is the ultimate goal of using snus. But, even ex-smokers who continued to use snus achieved a health benefit since they switched to a lower risk level.

Whether snus could be a gateway to more harmful tobacco use, specifically cigarette smoking, has been elucidated in a few studies. One study found that among males in a young birth cohort who were teenagers when snus use had become prominent, the prevalence of current daily smokers having had snus as their first tobacco use was 3.5 percent, while the prevalence of current daily smokers with cigarettes as their first or only tobacco use was much higher, at 18 percent. In this cohort, the prevalence of “ever starting to smoke” was 43 percent. Among males in an older birth cohort, who were teenagers at a time when snus use was less prominent, the prevalence of “ever starting to smoke” was substantially higher, at 67 percent. These findings suggest that the increasing prominence of snus use in Sweden can have reduced the onset of smoking in addition to favoring subsequent smoking cessation.

In the last 10 years, the prevalence of snus use in Swedish males has increased from around 16 percent to around 20 percent. During the same period, the prevalence of daily smoking in Swedish males has decreased from around 25 percent to around 17 percent, a record low for the Western World.

Thus, it appears that snus does not add to the total occurrence of tobacco use but rather helps in limiting rates of smoking. Dr. Ramstrom concluded that there may be some useful lessons to be learned from the Swedish example. The next question, he suggested, is whether these lessons are exportable, given the great differences in product toxicity and carcinogenic contents and cultural differences in patterns of use.

Discussants

The first discussant, **Elbert D. Glover, Ph.D., F.A.A.H.B.**, Director, Addiction and Psychiatric Medicine Research, Robert C. Byrd Health Sciences Center, Morgantown, West Virginia, identified problems with the argument that smokeless tobacco should be used in harm reduction efforts. He stressed the importance of understanding the differences between various smokeless tobacco products manufactured and which populations are most likely to use which products. Foremost, he explained, all tobacco products are nicotine-delivery systems. The first problem that needs to be addressed is the addiction caused and sustained by them.

Companies process tobacco differently so that each product yields a certain nicotine release rate in ways that often enhance nicotine absorption, explained Dr. Glover. For example, just as ammonia is added to cigarette tobacco to increase the “hit” of delivery of nicotine through the lungs, the pH of tobacco used in smokeless products can be manipulated to increase nicotine delivery rate through oral tissues. (As an aside, he commented that although some people believe that fiberglass is added to smokeless tobacco to cause fissures for increased nicotine intake, such an addition would be unnecessary since nicotine absorption easily can be changed by changing the pH level.) Cigar tobacco is similar to smokeless tobacco in being rather alkaline. Thus, it too allows absorption of nicotine through oral tissues, even if chewed rather than burned. The amount of nicotine in the product is less important than how much nicotine is released in an absorbable form. Withdrawal symptoms occur when smokeless tobacco users quit, although their symptoms appear to be less intense than the symptoms among those who are stopping cigarette smoking.

Dr. Glover believes that using smokeless tobacco as part of a harm reduction campaign undermines the health professional message that all tobacco is harmful and addictive. One of the arguments for using it in this way is that it reduces the years of life that are lost due to smoking. However, Dr. Glover pointed out that loss of health is another important measure often ignored by those who advocate the use of smokeless tobacco. An attractive reason for using smokeless tobacco rather than nicotine gum is that it is cheaper. Nevertheless, he noted, nicotine gum does not contain the cancer-causing and other harmful ingredients that are in smokeless tobacco.

Dr. Glover then showed a series of slides of oral lesions, tooth loss, gum recession, and dental caries caused by the use of smokeless tobacco. He explained that for some of these conditions, surgery is needed, healing is slower, and the health consequences substantial. Dr. Glover concluded by stating that the bottom line is that smokeless tobacco is not safe and should not be used as part of a harm reduction model.

The second discussant, **Scott Tomar, D.M.D., Dr.P.H.**, Associate Professor, Division of Public Health Services and Research, University of Florida College of Dentistry, Gainesville, Florida, examined the issue from a population/public health perspective.

Dr. Tomar pointed out that there have been some recent changes in the United States that affect the marketing and promotion of smokeless tobacco products. The U.S. Tobacco Company (now the U.S. Smokeless Tobacco Company), the largest manufacturer of moist snuff in the United States, recently has been losing some of its market share to generic brands and other manufacturers, so is beginning stronger marketing of its smokeless tobacco products. However, the Master Settlement Agreement between State attorneys general and U.S. tobacco manufacturers has led to changes in the way tobacco companies can market their products (e.g., eliminated product sampling and some of the utilitarian promotional objects). Meanwhile, there has also been some advocacy for using smokeless tobacco as a “harm reduction” alternative to smoking. In addition, school, workplace, and environmental policies are further restricting smoking, prompting nicotine-dependent smokers to change to smokeless products. In addition to campaigns promoting smokeless tobacco to male populations—the traditional users of these products—tobacco companies are trying to market these products to female smokers.

This raises a number of policy questions. For example, would smokeless tobacco keep in the market some smokers who would otherwise quit? Studies on ultra-light cigarettes suggest that promoting a product as “safer” would cause no reduction in the rate of major tobacco-related diseases and would rather lead to a justification of continued use. Other questions include whether the use of smokeless tobacco would lead to greater initiation rates, prolong use among those who might otherwise quit, and serve as a gateway drug to cigarette smoking.

Dr. Tomar described his study to assess patterns of smokeless tobacco use by current and former smokers, the patterns of cigarette smoking among current or former smokeless tobacco users, and switching between smokeless tobacco and cigarettes. He cited data from the 1994 National Health Interview Survey (NHIS), 1989 Teenage Attitudes and Practices Survey (TAPS-1), and its 1993 followup survey (TAPS-II).

Analysis of the TAPS data revealed that young males who were not current smokers in 1989 but were regular users of smokeless tobacco were more than three times as likely as those who had never been regular users to become current smokers by 1993 (48 percent versus 15 percent). In contrast, just 6.4 percent of young males who had never been regular smokeless tobacco users but were current smokers and 4.6 percent of nonsmokers at baseline became regular smokeless tobacco users 4 years later. Thus, few baseline smokers became smokeless tobacco users, but many baseline smokeless tobacco users became smokers. This was the worst possible outcome and supports public health concerns that smokeless is not a viable harm reduction strategy in a general population.

Analysis of the NHIS data reveals that 44 percent of men aged 18 to 34 years who were former snuff users were now current daily smokers, compared to 25 percent who were current snuff users and 22 percent who had never used snuff. In contrast, 8 percent of former smokers were now current snuff users compared to 10 percent of those who had smoked at one time, 5 percent of daily smokers, and 4 percent of those who had never smoked.

Dr. Tomar concluded that (1) smokeless tobacco use may be a risk factor for smoking initiation among young males, (2) few male smokers are switching to smokeless tobacco completely, and (3) some smokers are using smokeless tobacco to supplement their smoking. The availability of snuff may be responsible for increasing the rate of smoking initiation among males in the United States and likely has little effect on smoking cessation.

Discussion

Computed data suggests that, hypothetically, if all U.S. cigarette smokers switched to smokeless tobacco use, there would be a 98-percent reduction in risk of death. This risk would be comparable to the risk of death from automobile accidents. In addition, use of snuff seems to work in Sweden. The reactants responded that 6,000 deaths are still significant, and there are other health consequences in addition to the risk of death. In addition, data need to be monitored over a longer period of time than has been done to date. Also, both the method of using Swedish snus in the upper lip and its chemical composition are different than in the United States. There are also unintended increased initiation and protracted use consequences when smokeless tobacco is advocated for harm reduction.

Panel: Smokeless Tobacco Intervention Policies and Practices: Those That Are and Those That Should Be

Can Ireland's Smokeless Tobacco Ban Be Sustained?

Craig Stotts, R.N., Dr. P.H., moderator, is Associate Dean and Professor, College of Nursing, at the University of Arkansas for Medical Sciences in Little Rock, Arkansas. He introduced Dr. Bernard McCartan, Head, Department of Oral Surgery, Oral Medicine, and Oral Pathology, School of Dental Science, Trinity College, Dublin, Ireland.

Bernard McCartan, B.D.S., M.A., M.Dent.Sc., provided an EU perspective on smokeless tobacco, with a focus on Ireland. He explained that smokeless tobacco use in EU member countries varies by country, with chewing tobaccos, oral snuff, and nasal snuff in use in different regions. In general, the use of smokeless tobacco is quite uncommon and, in Ireland, virtually nonexistent. Dr. McCartan described the legislative history on the use of smokeless tobacco, including a government ban on smokeless tobacco in Ireland that successfully withstood legal challenge by the tobacco industry. After this ban took effect in 1994, an EU directive (which has the force of law in each of the EU member nations) called for “the prohibition of the marketing of certain types of tobacco for oral use.” This ban is limited to oral snuff so some other forms, such as traditional forms of chewing tobaccos used by immigrant populations, remain unregulated, whereas they are banned under the Irish legislation.

When Sweden was added to the EU, this directive was amended to allow for the continued use of oral snuff in Sweden. The export of Swedish snus to the remainder of the EU is prohibited. The net effect of this ban may have been to prohibit a relatively less harmful form of tobacco, snus, while exempting a more harmful form, smoking tobacco. In 2000, new EU legislation on tobacco labeling will allow for the change of messages on moist snuffs in Sweden from “causes cancer” to a less descriptive “smokeless tobacco can damage your health.”

The possible accession to the EU of other nations where smokeless tobacco use is prevalent, such as Norway and some Eastern European countries, might require further amendments to the directive. Thus, at a time when the EU is tightening its controls on cigarettes, the controls on smokeless tobaccos could be relaxing.

EU smokeless tobacco policy in the future may very well be shaped by the direction taken by the scientific community on harm reduction issues and further modified by tobacco industry influences on policymakers. Dr. McCartan stated that the EU must decide between goals of reducing the health consequences of tobacco use or reducing tobacco dependence, then developing strategies accordingly.

Research Perspectives

Dr. Stotts introduced Dr. Prakash Gupta, Senior Scientist, Epidemiology Research Unit, Tata Institute of Fundamental Research, Mumbai, India.

Prakash Gupta, Sc.D., described the situation of smokeless tobacco use and control in India. There is a rapid transition from traditional smokeless tobacco products assembled by local vendors, such as betel quids, to industry-manufactured smokeless tobacco products, such as foil-packaged gutkha. Whereas no companies organize the promotion of traditional products, the manufactured products are heavily promoted using marketing methods similar to those used in the United States in the 1950s and 1960s to increase sales of cigarettes. Manufacturing of smokeless tobacco, in the last three decades since the industry started, has blossomed into a \$300 million per annum business.

The government in India has been working to establish an appropriate regulatory stance on smokeless tobacco. One regulatory approach has been to regulate smokeless tobacco as a food because it is kept in the mouth and either chewed or sucked. As a food, smokeless tobacco products could be banned because of the significant amount of carcinogens they contain. However, the government ordered a study to examine the feasibility of a ban and, swayed by industry pressures, concluded that, even if a ban were enforced, it would not completely solve the problem because there are numerous smokeless tobacco products that are not commercially manufactured. Discussion continues within the country, and strategies such as banning chewing tobacco near schools and religious places are under consideration.

In India, the market for smokeless tobacco is focused on users age 35 and older. Whereas most smokers are male, smokeless tobacco use is common among women, including pregnant women.

Dr. Gupta reviewed research results on the harms caused by smokeless tobacco and the prevalence of these harms in India. He explained that smokeless tobacco causes oral submucous fibrosis, a disease that is progressive and debilitating, has no cure, and is a premalignant condition. The prevalence of oral submucous fibrosis has increased in recent years in India, particularly among young users. There is also evidence of an increase in the incidence of oral cancer among younger people. This is likely due to a rapid increase in the use of the commercially prepared form of smokeless tobacco called “gutkha.” Dr. Gupta called for more epidemiological evidence of the increase in the incidence of adverse oral health conditions in relation to the use of specific types of smokeless tobacco products. Also, it is important to determine the extent of smokeless tobacco-related periodontal disease in the population and the economic cost of various adverse oral health consequences.

Dr. Gupta stated that there is not much smokeless tobacco control activity in India. One reason is that there are numerous types of smokeless tobacco. Smokeless tobacco products that are not manufactured commercially, such as betel quids that are prepared by the user or street vendors (mixtures of tobacco, lime, and areca nut), or mishri (burnt tobacco) are not being targeted by the government for tobacco control efforts. Dr. Gupta stressed that there should be educational strategies developed against such traditional forms.

For products manufactured on a small scale, some direct advertising and sales incentives are used. Thus, additional strategies can be applied to try to control such use. Those products manufactured on a large scale, such as gutkha, should be approached with strategies similar to those applied by cigarette control programs. Strategies aimed at environmental tobacco smoke would not apply, although the use of smokeless tobacco spitting does create a public nuisance.

Economic Perspectives

Dr. Stotts introduced Dr. Frank Chaloupka, Professor of Economics, University of Illinois at Chicago, Chicago, Illinois. He is the coeditor of a new book on the economics of tobacco control, *Tobacco Control in Developing Countries* (Oxford University Press).

Frank Chaloupka, Ph.D., spoke about the economic perspectives of smokeless tobacco. He focused on the impact of tobacco tax changes and price on smokeless tobacco and cigarette smoking behavior in the United States. Dr. Chaloupka traced the history and development of Federal taxation on tobacco products in the United States, noting that while cigarettes have been taxed since 1951, there had been no permanent Federal tobacco tax for chewing tobacco or snuff until 1996. Over time, however, taxes on smokeless tobacco products have increased periodically at the same rate as for cigarettes. Such tax increases have been flat or increased slightly, remaining close to the rate of inflation. Federal taxes have had implications for the price of tobacco products as well. At one outlet on the Internet, Dr. Chaloupka found cigarettes with a Federal tax that accounted for 13.1 percent of the price. Yet, only 2.9 percent of a major brand of snuff was for taxes. There are significant differences in the Federal tax in relation to the price on different types of tobacco products. Dr. Chaloupka stressed that his main point is that there is a significant difference in the relative taxes on the different types of tobacco products in the United States. This same pattern emerges in most of the other countries around the world.

The situation with State tobacco taxes is different. All States had a cigarette tax in place by fiscal year 1970. However, some States still do not tax smokeless tobacco products. In 1970 only seven States taxed

smokeless tobacco products, and it has risen gradually until 1986. Only after the Federal Government adopted a tax on smokeless tobacco products in 1986 did most States start to adopt similar taxes. Now 44 States tax smokeless tobacco products, and most of these States use a type of tax that is based on the price of the product at the wholesale level. Few States have set high tax levels. Indeed, only five States have taxes that are 50 percent or higher of the wholesale price.

There is a large body of literature on the impact of tobacco taxes on tobacco, primarily focusing on cigarette prices and use. What emerges from this literature is that increases in cigarette taxes reduce cigarette smoking, a concept called “price elasticity.” In general, a 10-percent increase in the price of cigarettes leads to a 4-percent reduction in cigarette smoking. About half of the reduction is a result of the increase in people quitting smoking. The other half reflects a reduction in the number of cigarettes that smokers consume. Other studies show that young people and lower income populations are more responsive to price increases than are older and more affluent users.

Results from research in developing countries are consistent with findings in the United States. Price elasticity in developing countries is about double that in high-income countries; that is, a 10-percent increase in price in these countries leads to about an 8-percent reduction in overall cigarette smoking. Dr. Chaloupka believes that if recent price increases are sustained, reductions in consumption will become greater. Taxes not only significantly reduce demand, but are also a useful tool for governments to increase their revenues.

While few studies have examined the impact of total prices or taxes on smokeless tobacco consumption, one study found that young adult male smokeless tobacco users had greater reductions in use in response to an increase in smokeless tobacco tax than did older users. There is also evidence of substitution among tobacco products in response to price increases. For example, if the price of cigarettes increases to a greater extent than the price of smokeless tobacco products, some smokers who might have quit entirely switch from cigarettes to smokeless tobacco products.

Within the past two decades, several studies in countries other than the United States came to the same conclusions in relation to tobacco product taxes; that is, higher smokeless tobacco taxes led to significant reductions in smokeless tobacco use, but higher taxes for one tobacco product without proportionate increases in taxes on other tobacco products led to substitutions.

Dr. Chaloupka summarized by stating that, in the United States as in most countries, Federal and State taxes on smokeless tobacco products have been rising over time. In many countries, taxes have been increasing at a rate that is keeping pace with inflation. In countries with high inflation, such as the United States, tobacco taxes have not always kept up with inflation, so the real prices of tobacco prices are actually falling.

Increasing smokeless tobacco taxes can be one of the most effective policies in reducing the frequency and probability of use, especially among young and low-income populations, where use is becoming increasingly concentrated. Finally, when tobacco taxes are increased, the increase should be proportional so there is less likelihood of substitutions with products whose prices do not rise to the same degree.

Government Perspectives

Dr. Stotts introduced Dr. Michael Eriksen, Director, Office of Smoking and Health, CDC, Atlanta, Georgia, who addressed the role for governmental policies on smokeless tobacco.

Michael P. Eriksen, Sc.D., identified seven actions governments should take, as follows:

1. Be involved with the regulation of all tobacco products;
2. Inform the public about the hazards of all tobacco products, including smokeless tobacco and pass legislation requiring accurate warning labels that depict the harm associated with the products;
3. Have a role in surveillance and collecting data on the extent of the tobacco problem;
4. Sponsor and conduct research on the hazards of tobacco in all of its forms;
5. Conduct or sponsor research on activities and problems facing other countries;
6. Play a role in education in such areas as disassociating tobacco from its image of glamour and disassociating smokeless tobacco use from sports and other types of recreational behaviors; and
7. Stimulate tobacco policy debates, particularly in addressing harm reduction. In addition to discussions about the relative safety of smoking and smokeless tobacco, Dr. Eriksen anticipates discussion of new technology cigarettes, such as Accord and Eclipse that heat tobacco rather than burn it.

Dr. Eriksen stated that currently there is little common ground in the United States or elsewhere on how to manage smokeless tobacco issues. Still, there is a common objective to reduce the number of people dying from tobacco use, and it is necessary to build smokeless tobacco policy on that objective.

Dr. Eriksen concluded with a call to all participants to play a role in WHO's Framework Convention on Tobacco Control, which is in the planning stage. Scientific experts need to weigh in on what the focus of this convention should be in terms of smokeless tobacco products. If researchers do not take this responsibility, he warned, the private enterprise, attorneys, and others with greater degrees of self-interest in the outcome will shape the agenda.

Closing Remarks

Dr. Mecklenburg stressed the importance of the tobacco control research and public health communities addressing all types of tobacco use—cigarette and other smoking as well as large variety of smokeless tobacco products. Smokeless tobacco requires proportional research, public, and professional interventions, and public support. This conference showed there are many forms of smokeless tobacco, used in many ways, all addictive, and with effects that range from mild to devastating and that often are not well studied. It can be asserted anywhere in the world that using smokeless tobacco is not a safe alternative to smoking. The June 4, 1991, statement by the Director, Division of Cancer Prevention and Control, NCI, remains an excellent guide to the public and policymakers. It states:

1. NCI recommends that the public avoid and discontinue the use of all tobacco products, including smokeless tobacco.
2. Nitrosamines are not safe at any level found in tobacco products.
3. NCI considers total bans on tobacco advertising, promotion, and sales to be highly desirable, wherever public policy permits such measures.

A conservative, science-based approach to proposing and supporting public policies development was encouraged. The tobacco industry, Dr. Mecklenburg said, should be given no concession or tool that has the potential to induce people to begin using, continue using, or switch from smoking to using smokeless tobacco. Participants were asked to remain true to their professional responsibilities by countering profit-driven industry assertions with scientific truth and by keeping allegiance to public health principles.

Observing that conference presenters provided a wealth of data, Dr. Mecklenburg noted, however, that these data are fragmented and don't provide all the information needed to inform the public or to

adequately guide the development of sound policy and administrative decisions. A systematic research agenda is needed and funds directed toward questions that can best shape decision-making. He suggested that a committee be organized to analyze the information presented at this conference and that a third conference focus especially on the identification of primary research questions. Dr. Mecklenburg proposed that conferences be convened at a regular interval, as are the triennial World Conferences on Tobacco OR Health. (The 3rd International Conference on Smokeless Tobacco was subsequently scheduled for Stockholm, Sweden, September 22–25, 2002.)

Dr. Backinger added that NCI tobacco research funds are used for much more than cigarette research. She believes that there should be much more investigation into the many forms of smokeless tobacco, their adverse health consequences, and related issues that are now under-researched. NCI welcomes investigator-initiated research proposals in this area.

Dr. Mecklenburg concluded the meeting by thanking all those who worked on planning this conference, abstract reviewers, each speaker for providing well-prepared and informative presentations, Oral Health America staff and 11th World Conference staff for their help, and all attendees for their questions and considerations. He adjourned the conference.

APPENDICES



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

June 4, 1991

National Institutes of Health
National Cancer Institute
Bethesda, Maryland 20892

Mr. Klaus Unger, President
Procordia
Box 17007
10462 Stockholm, Sweden

Dear Mr. Unger:

It has come to my attention that Mr. Roland Perlstrom, Vice President, Public Affairs, is using inaccurate and misleading statements in reference to the National Cancer Institute when he advises officials of the European Economic Community in regard to public policy on smokeless tobacco.

Contrary to a letter of May 7, 1991 signed by Mr. Perlstrom, the NCI has not "recommended setting maximum levels for the constituent parts of oral tobaccos."

Mr. Perlstrom's letter included seven statements to encourage individuals to vote against the Vernier report on Commission proposal COM (90) 538. Point 7 falsely states that "A limitation of nitrosamine content has been recommended by the U.S. National Cancer Institute and National Institute of Dental Research at a workshop on the control of smokeless tobacco in Maryland in January 1991." This meeting was jointly sponsored by NCI and NIDR, but the views expressed were by individual participants representing both the public and private sector of science and health affairs. The report of this meeting is in a review and development stage since numerous statements on diverse issues were presented. The official document will be based upon the strongest available scientific evidence and expert judgement.

In the future, Procordia representatives should use the following three sentences whenever it refers to the NCI.

1. The NCI recommends that the public avoid and discontinue the use of all tobacco products, including smokeless tobacco.
2. Nitrosamines are not safe at any level found in tobacco products.
3. The NCI considers total bans on tobacco advertising, promotion and sales to be highly desirable, wherever public policy permits such measures.

Sincerely,

Peter Greenwald, M.D.
Director
Division of Cancer Prevention
and Control

2nd International Conference on Smokeless/Spit Tobacco

Agenda

Saturday, August 5, 2000

Palmer House, Chicago, IL

		Sponsors
	American Association of Public Health Dentistry ADA Health Foundation National Cancer Institute Oral Health America	American Dental Association Centers for Disease Control and Prevention National Institute of Dental and Craniofacial Research The Robert Wood Johnson Foundation
7:30 a.m.	Registration	Oral Health America
8:00 a.m.	Welcome and Opening Remarks	Moderator: Dr. Robert Mecklenburg Dr. Scott Tomar, AAPHD Dr. John S. Zapp, ADA & ADAHF Dr. William Maas, CDC & CDO Dr. Scott J. Leischow, NCI Dr. Dushanka V. Kleinman, NIDCR Dr. Robert Klaus, OHA Ms. Dianne Barker, RWJF
8:30 a.m.	Keynote Addresses Spit Tobacco in Context	Dr. Derek Yach, WHO
9:00 a.m.	My World of Spit Tobacco	Doug Harvey, NSTEP
9:30 a.m.	Break	
10:00 a.m.	Panel: Patterns of ST Use ST Variants Around the World ST in Africa and the Middle East ST Use Following Migration and Its Consequences Discussion	Moderator: Deborah Winn, Ph.D. Mihir N. Shah, Ph.D. Ali Mohamed Idris, Ph.D. Saman Warnakulasuriya, Ph.D.
11:00 a.m.	Panel: ST Clinical Effects and Biological Mechanisms ST Cancer Potential ST Oropharyngeal Effects ST and Noncancer Health Effects Biomarkers of Oral Leukoplakia Discussion	Moderator: Newell W. Johnson, Ph.D. Deborah Winn, Ph.D. Newell W. Johnson, Ph.D. Gunilla Bolinder, M.D. Laura Kresty, Ph.D.
12:00-2:00 p.m.	Poster Session – box lunches	

Appendix B (continued)

2:00 p.m.	Panel: ST and Nicotine Dependence How Nicotine Interacts with the Brain: Basic Biology How Addictive Is ST? Assessing ST Dependence Discussion	Moderator: Arden Christen, M.S.D. William A. Corrigall, Ph.D. Jack Henningfield, Ph.D. Karl-Olov Fagerstrom, Ph.D.
3:00 p.m.	Panel: ST Prevention and Cessation Prevention and Treatment Clinical Practice ST Cessation Among School Athletes ST Programs in Scandinavia Discussion	Moderator: Herbert Severson, Ph.D. Dorothy Hatsukami, Ph.D. Herbert Severson, Ph.D. Margaret Walsh, Ed.D. Seppo Wickholm, D.D.S.
4:00 p.m.	Break	
4:15 p.m.	Panel: Tobacco Without Fire: Dangerous, Useful, or Both? Discussion	Moderator: Cathy L. Backinger, Ph.D. Lars Ramstrom, Ph.D. Elbert D. Glover, Ph.D. Scott Tomar, Dr.P.H.
5:00 p.m.	Panel: ST Intervention Policies and Practices: Those That Are and Those That Should Be Can Ireland's ST Ban Be Sustained? Research Perspectives Economic Perspectives Government Perspectives Recommendations from the floor Closing Remarks	Moderator: Craig Stotts, Dr.P.H. Bernard McCartan, M.Dent.Sc. Prakash Gupta, Sc.D. - TIFR Frank Chaloupka, Ph.D. - U-IL at Chicago Michael P. Eriksen, Sc.D. - OSH,CDC Dr. Robert Mecklenburg
6:00 p.m.	Adjourn	

2nd International Conference on Smokeless/Spit Tobacco

**August 5, 2000
Chicago, Illinois, USA**

**POSTER
ABSTRACTS**

COST-EFFECTIVENESS OF SELF-HELP SMOKELESS TOBACCO CESSATION

Laura Akers, B.S., Herbert H. Severson, Ph.D., Judy A. Andrews, Ph.D., Ed Lichtenstein, Ph.D.
Oregon Research Institute

Although use of smokeless tobacco (SLT) is a recognized public health problem, few low-cost resources are available for users who wish to quit. This study explored two levels of cessation assistance, provided entirely by mail and phone, to 1,069 interested SLT users in five Northwest States. In the Manual-Only (MAN) condition, users received the 64-page step-by-step *Enough Snuff* quitting guide. In the Assisted Self-Help (ASH) condition, users received the quitting guide, a supplementary video with testimonials from successful quitters, and two supportive phone calls from trained SLT cessation counselors. At 6-month followup, self-reported cessation rates for all tobacco products were 21.1 percent for ASH and 16.5% for MAN participants ($p < .05$).

The proposed economic analysis compares the incremental cost-effectiveness of ASH versus MAN treatment, and of MAN treatment versus usual care (quitting on one's own). A detailed inventory enumerates costs of materials, packaging, postage, phone counseling activities, staff time to process requests for quitting assistance, and participant time to use the materials. For the MAN condition, incremental cost per quit ranges from approximately \$128 to \$266, depending on the spontaneous quit rates with which they are compared. For the ASH condition, incremental cost per quit is roughly \$760. All analyses are performed from the societal perspective, although provider-perspective analyses are also presented. Findings will be compared with outcomes from cost-effectiveness analyses of smoking cessation programs.

No conflict of interest declared.

**A HISTORY OF SMOKELESS TOBACCO ADVERTISING IN THE UNITED STATES:
1789 – 1940s**

Arden G. Christen, D.D.S., M.S.D., M.A.
Indiana University School of Dentistry

This poster will trace the development of smokeless tobacco (ST) advertising in the United States over a span of approximately 150 years.

On May 27, 1789, the Lorillard Company published the first-known American advertisement for tobacco, promoting the use of cut and plug tobacco and snuff. In the mid-1800s, the Industrial Revolution produced a new entity—consumerism. At that time, ST producers quickly perfected effective, novel, and innovative methods to promote their products. During the late 1870s, technical advances in lithography enabled printers to produce tobacco-related materials in vibrant colors. Handsome ST trade cards were especially popular between 1885 and 1899. Metamorphic advertising trade cards of the late 1890s, which used a horizontal folding-out process, created mini-sociodramas that touted ST use as a simplistic solution to life's problems. Between the 18th and 20th centuries, dental snuff was proclaimed in print advertising as a panacea: a “cure-all” for various systemic and oral diseases or disorders.

Receives fees, grants, and honoraria from Federal agencies, universities, and commercial companies for producing patient and public education materials and testing pharmaceutical agents. There is no financial conflict of interest with the subject material presented.

OUTCOMES OF ORAL TOBACCO CESSATION INTERVENTION WITH U.K. RESIDENT BANGLADESHI WOMEN: A NON-RANDOMIZED COMMUNITY TRIAL

R. Croucher, S. Islam, R. Rahman, S. Shajahan and M. Jarvis
Dental Public Health, Barts and The London Dental School, London, U.K.; ICRF Health Behaviour Unit, UCL, London, U.K.

This study reports the outcomes of an oral tobacco cessation intervention with Bangladeshi women resident in Tower Hamlets, a deprived inner-city area of London, U.K.

Design and setting: A nonrandomized community pilot trial involving Bangladeshi female volunteers who expressed a strong wish to stop tobacco use and were willing to try using nicotine replacement therapy.

Participants: One hundred thirty volunteers, mean age of 42.5 years, were recruited through a series of presentations to community groups.

Intervention: After medical screening, study group members had access to free nicotine replacement therapy (NRT) (Pharmacia-Upjohn Nicorette 15 mg 16-hour patches) for 4 weeks, while comparison group members were offered brief advice and encouragement to give up tobacco use at baseline and advised for a later followup.

Main outcome measures: Changes in salivary cotinine score from baseline for study and comparison groups; withdrawal symptoms and adverse effects reported in the study group.

Results: Study and comparison group members matched at baseline (age, salivary cotinine score, number of paan quid with tobacco chewed daily, age of starting paan quid with tobacco chewing, and proportions using leaf tobacco and having first paan within 1 hour of waking). One hundred eighteen participants completed treatment, of which 19.5 percent had validated tobacco abstinence: 22 percent of the study group and 17 percent of the comparison group stopped tobacco use. Factors associated with successful cessation were baseline measures of fewer paan quid with tobacco and lower age of starting paan quid with tobacco use. Use of NRT helped those with average salivary cotinine scores, whereas brief advice and encouragement helped only those with a below-average salivary cotinine score to give up tobacco use. Most withdrawal symptoms were reported as “mild,” while the most common adverse effects were skin reactions and sleep disturbance. Oral pain was reported by 62 percent of all participants as a barrier to successful cessation.

Conclusions: As in tobacco smoking cessation, the use of NRT offers an increment to successful tobacco chewing cessation compared to brief advice and encouragement, specifically for those participants with average levels of dependency. Long-term followup is needed. The issue of oral pain as a barrier to oral tobacco cessation warrants further investigation.

Study supported by a North Thames NHS Executive Inner City Health Grant. S. Islam is funded by the Medical Research Council.

PATTERNS OF ORAL TOBACCO USE AND NICOTINE DEPENDENCY IN A COMMUNITY SAMPLE OF U.K. RESIDENT BANGLADESHI WOMEN

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The objective of this study was to establish the prevalence of paan chewing with tobacco by Bangladeshi women resident in Tower Hamlets, a deprived inner-city area of London, U.K., and the extent to which they manifested dependence on oral tobacco.

Design and setting: A cross-sectional study in two Tower Hamlets local authority housing estates selected on the basis of the high proportions of the Bangladeshi community resident in them. Addresses were selected at random from the current electoral register, using random number tables.

Participants: Two hundred forty-two subjects, mean age of 35.4 years (95% c.i. = 33.9–36.9 years), were recruited.

Intervention: Structured interview with questions about tobacco use based upon the Fagerstrom Test for Nicotine Dependence (FTND), expired carbon monoxide score, and salivary cotinine score.

Results: Complete data were available for 229 subjects. From analysis of salivary cotinine and expired carbon monoxide to validate self-reported behavior, the population prevalence of paan quid with tobacco chewing was 48.5 percent and of cigarette smokers was 4 percent. Higher mean salivary cotinine scores were associated with greater consumption frequency and the use of leaf tobacco in the paan quid. Logistic regression analysis showed that respondents with above-average salivary cotinine scores were four times more likely to have their first paan quid with added tobacco within an hour of waking (OR=4.02, p=0.03, 95% c.i.=1.08-14.94) and just under four times more likely to use leaf rather than processed tobacco (OR=3.91, p=0.025, 95% c.i.=1.19-12.81).

Conclusions: This study confirms that although smoked tobacco prevalence is low, the prevalence of tobacco chewing in U.K. resident Bangladeshi women is similar to the high tobacco smoking prevalence in U.K. resident Bangladeshi men. Validated nicotine dependency measures correlate with items from the interview (FTND-based) dependency items.

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MOBILIZING HEALTH EDUCATORS AND PROFESSIONALS FOR COMMUNITY-BASED SPIT TOBACCO INTERVENTION

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Tobacco products, with their carcinogenic and addictive properties, are responsible for an untold number of cancer-related death and disease in the United States. Included among these dangerous products are spit tobacco (ST) products—those designed for dipping and chewing (i.e., snuff and chewing tobacco). While most physicians, dentists, nurses, teachers, coaches, 4-H leaders, health educators, and other adults are aware of the need for addressing the issue of ST use, very few are doing so. In light of the M.D. Anderson Snuff and Chewing Tobacco Survey, it is important that the attitudes and behaviors of these adult role models be changed. The behavior and attitudes of these health care professionals and educators strongly impact adolescent behavior. According to the 1998 Youth Tobacco Survey sponsored by the Texas Department of Health, more than 30 percent of middle-school students and 40 percent of high-school students use tobacco. The Spit Tobacco Prevention Network (STOPN) is a collaborative effort that represents a partnership of numerous organizations that have combined their efforts to eliminate ST use in Texas. STOPN has joined forces with professionals and educators in two pilot communities to develop and implement a community-based model to decrease tobacco use among youth in the State of Texas.

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INTERPROFESSIONAL COLLABORATION AGAINST SPIT TOBACCO

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The National Spit Tobacco Education Program (NSTEP) has brought together a variety of professionals in a long-term campaign to educate the public to the dangers of spit tobacco (ST). The campaign's national chairman, Joe Garagiola, is a former professional baseball player and now a television personality. Too many of his friends and fellow ballplayers succumbed first to the habit and then to its consequences, which have proven fatal to teenagers as well as to people in their later years. Convinced that the image of star athletes chewing and spitting while pursuing our national pastime sent exactly the wrong message to the Nation's youth, Garagiola now leads a team of media consultants, communications experts, dentists, hygienists, health educators, academics, and practitioners in this campaign for oral health. Predictably, interprofessional collaboration is not always easy. Different professions have different ideas of which audiences to reach, how to reach them effectively, how to evaluate that effect, and where to put the limited available funds. The multimedia campaign reported here has leveraged millions of dollars worth of publicity in various settings across the United States about the dangers of ST use.

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SMOKELESS TOBACCO AND CULTURAL PRACTICE: PUNK AND ALDER ASH AND TOBACCO (IQ'MIK, A.K.A. BLACKBULL)

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Smokeless tobacco use is 10 times more common among Alaska Natives than among the U.S. population as a whole. The rates of smokeless tobacco use in rural regions of Alaska like the Yukon Kuskokwim Delta may be underestimated. A survey conducted by the YKHC during 1996–1998 in two villages in the YK Delta found 52 percent of men and women over 18 years of age were users of smokeless tobacco, far above the rates for people outside the YK Delta. These figures also say something about the onset and prevalence of traditional Iq'mik (a.k.a. Blackbull), often the tobacco of first use among natives of the YK Delta. Iq'mik is a local form of smokeless tobacco made by mixing air-dried tobacco leaves with Punk or Alder ash (in Yu'pik, "Arak"), an ash created by burning the fungus that grows off the bark of birch trees or alder bushes. Large sacks of the Punk fungus are sold in villages across the Delta and Punk ash is sold in zip-lock bags in most stores in Bethel and the surrounding area. Once burned into tiny charcoal pieces and ash, it is mixed with a handful of tobacco leaves in the mouth or in a bowl with a little water stirred with a knife. The ratio of tobacco to ash in the mixture varies depending on the quality of the individual's teeth and his/her ability to tolerate the strength of the mixture. The product is then called Iq'mik or Blackbull and is stored in a small box the user carries. The name Blackbull is thought to come from a brand name for a compressed brick of tobacco that was sold in trading posts on the YK Delta over 50 years ago. The charcoal bits in the ash are important to most users, who say it gives the tobacco spit a blacker color and makes it taste better (i.e., less like tobacco). The ash is thought to make the tobacco "stronger." Mostly, but not exclusively, used by women and children, Iq'mik often makes the users feel sick when mixing the ash and the tobacco in the mouth.

Currently, little is known about the prevalence of Iq'mik use or the addictive properties of Iq'mik. This poster presentation will discuss and illustrate how Alaska Natives of Western Alaska use tobacco. It will also present questions that need to be answered.

No conflict of interest declared.

A HARM REDUCTION STRATEGY FOR INVETERATE CIGARETTE SMOKERS

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All forms of tobacco use are associated with health risks and are to be discouraged, especially among children. But not all forms of tobacco use are associated with health risks of the same type or magnitude. For example, risks from cigarette smoking result in the loss of an average of 8 years of life for smokers. In contrast, lifelong smokeless tobacco (ST) users lose 0.04 years on average. This differential impact on health justifies a harm reduction strategy for the approximately 12 million inveterate smokers in the United States. These persons, who are unable to quit smoking, are at the highest risk for smoking-induced disease and premature death. Our strategy involves converting inveterate smokers to the use of ST as a safe, effective, and economical alternative source of nicotine. We present the results of formal smoking cessation trial that employed ST as a substitute for smoking and as a form of nicotine maintenance. We also compare the safety, nicotine availability, and cost of ST and other alternative nicotine delivery systems that may provide nicotine maintenance for inveterate smokers.

No conflict of interest declared.

THE X-CHEW CHALLENGE™: AN INTERACTIVE COMPUTER-MEDIATED INTERVENTION FOR SPIT TOBACCO CESSATION

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The “X-Chew Challenge™” is a CD-ROM-based interactive smokeless tobacco (ST) cessation program for adolescents that combines videos, graphics, text, and animation to assess and evaluate users according to their ST habits. “The X-Chew Challenge™” is a “standalone” program that assists the user in arriving at a specific behavior change plan based on responses to program queries regarding current tobacco use behavior, level of addiction, and readiness to quit. The program allows the user to identify with on-screen characters modeling healthy behaviors that are presented during the program. It is able to optimize the intervention in light of the history of the user and provides material that is directly relevant to the user’s stage of change. Individuals can set their own pace and access information at any time. “The X-Chew Challenge™” is currently being evaluated with adolescent ST users in several high schools in the State of Oregon. Appraisals of short-term tobacco cessation outcomes, reviews by expert consultants, and consumer satisfaction measures have been very positive and will be reported.

No conflict of interest declared.