
Overview and Summary

BRIEF HISTORICAL PERSPECTIVE Large-scale consumption of tobacco has been a significant lifestyle factor in America for centuries (Robert, 1967; US DHHS, 1992). Prior to the beginning of the 20th century, tobacco was consumed in the form of spitting tobacco (chewing tobacco and snuff), smoked as cigars, or loose tobacco smoked in pipes or in hand-rolled cigarettes (Shopland and Haenlein, in press; US DHHS, 1990). Consumption of machine-made cigarettes was almost nonexistent, and spitting tobacco was the dominate form of use, accounting for nearly 60 percent of all tobacco consumed on a per capita basis.

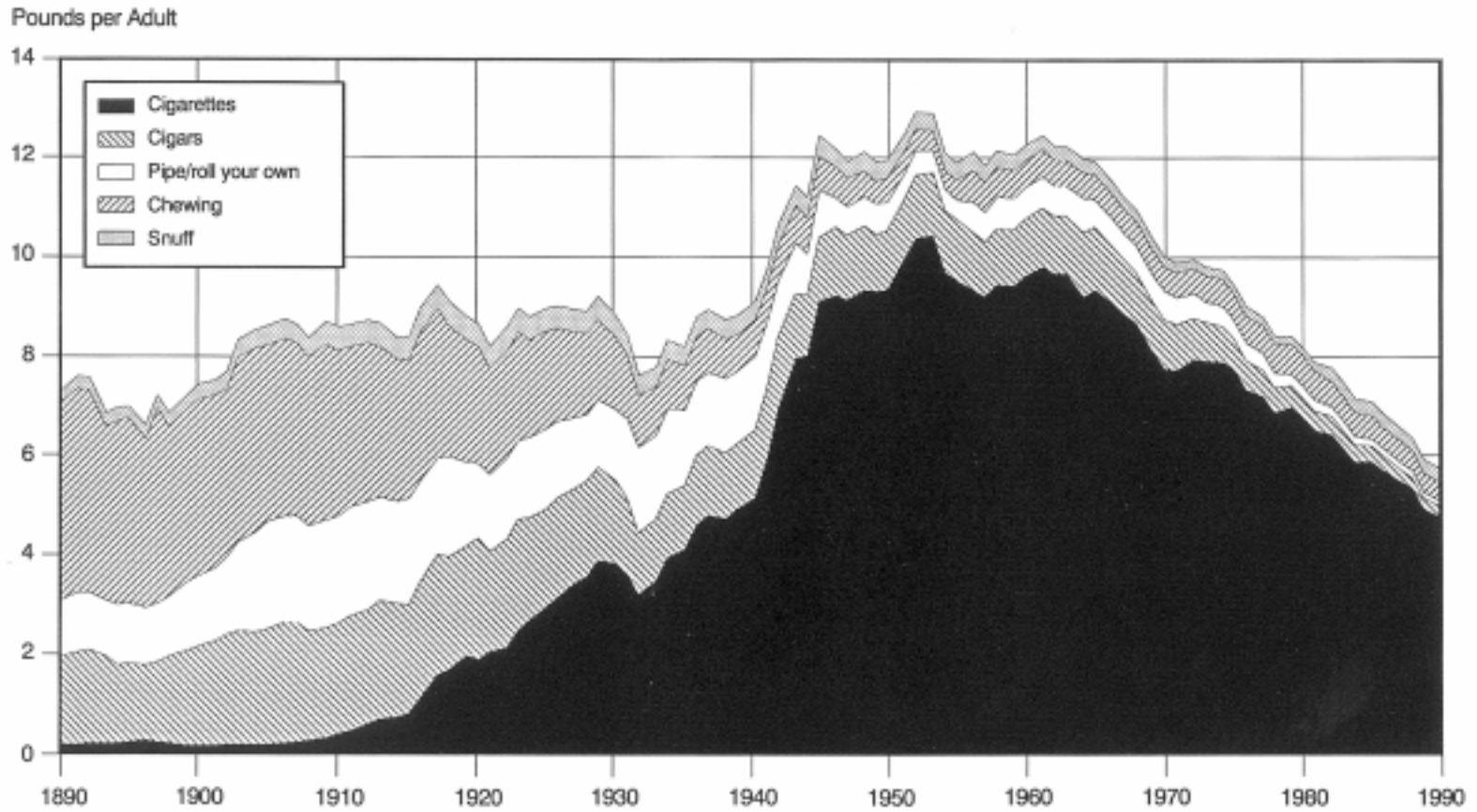
Figure 1 depicts tobacco consumption in the United States, by major product category, for the past 100 years (Milmore and Conover, 1956; US Department of Agriculture). This data is in pounds of tobacco consumed per adult rather than in individual units such as cigars or cigarettes, to allow direct comparisons between categories. The data are also presented in a cumulative fashion to show better the change in individual product use over time and in relation to other categories.

What is clearly evident is that, for much of the latter part of the 19th century and the early decades of the 20th, chewing tobacco was the single predominate product (Milmore and Conover, 1956). When one recognizes that, during the early part of this century, tobacco use was primarily a male phenomena, if these data were expressed in terms of male consumption only, total pounds per person would be nearly double. In 1890, on a per adult basis, chewing tobacco accounted for 4 lbs of the 7.3 lbs of total tobacco used annually. What is also evident is that cigarette smoking did not begin to penetrate significantly into American society until after 1910, when R.J. Reynolds introduced the first blended cigarette—Camel. Camel cigarettes, first marketed in 1913, differed substantially from other brands at that time in that they contained different types and blends of tobacco and had a pH that prevented absorption of nicotine through the oral mucosa (National Cancer Institute, 1991). In contrast to smokeless tobacco users, smokers of these new cigarettes had to inhale the smoke to achieve sufficient quantities of nicotine in the blood stream.

Camel was also the first nonregional cigarette, and Camel's introduction was accompanied by a then massive \$1.5 million national advertising and marketing campaign. Consumption of Camel cigarettes immediately increased, providing one of the first documented cases to demonstrate that advertising could create demand for a product where no previous demand existed. Other manufacturers followed by introducing such brands as Lucky Strike and Chesterfield; for decades these brands dominated the domestic U.S. cigarette market.

Consumption of machine-manufactured cigarettes increased dramatically following World War I; by 1935, more tobacco was being consumed in the form of cigarettes than all other products combined (US DHHS, 1990).

Figure 1
Trends in per capita tobacco consumption by major product category, United States, 1890 to 1990



As the popularity of cigarettes continued to increase, consumption of noncigarette tobacco products, especially smokeless tobacco, declined.

Per capita cigarette tobacco consumption peaked in the early 1950's (as did total per capita tobacco consumption), probably in response both to the first scientific studies linking cigarette smoking to lung cancer and to the introduction and aggressive promotion of filter cigarettes by the cigarette industry in response to these early scientific findings (US DHHS, 1990). Filter cigarettes, which had previously accounted for less than 1 percent of all cigarettes consumed in the United States in 1950, had captured 50 percent of the market by the end of the decade, and today account for over 90 percent of all cigarette sales (US DHHS, 1989a). In comparison to their nonfilter counterparts, filter cigarettes generally contain less tobacco.

For decades following the introduction of the mass-produced and mass-marketed cigarettes, consumption and prevalence of smokeless tobacco had been on the decline (Milmore and Conover, 1956). However, the latter part of the 1970's and the early part of the 1980's, saw major increases in ST use (Connolly, 1986; US DHHS, 1986). This increase was the result of renewed and more aggressive advertising by the ST industry that accompanied the introduction of innovative products such as Skoal Bandits—and the use of well-known sport and entertainment personalities in ST promotions (Ernster, 1989). Personalities such as football stars Walt Garrison and Terry Bradshaw; baseball greats George Brett, Sparky Lyle, Carlton Fisk, and Bobby Murcer; and country-and-western singer Charlie Daniels, obviously appealed to a very young and impressionable audience (Ernster, 1989). Furthermore, use of broadcast media to promote ST was not prohibited under the existing Congressional legislation that had governed cigarettes since 1971; thus, the ST industry was free to use television to recruit a large and relatively untapped market of new users. Because the themes and images used appealed primarily to children and adolescents, increases in ST consumption that occurred during the 1980's was primarily confined to these age groups (Marcus et al., 1989; Rouse, 1989). Where previously little or no use of ST was seen among adolescents, prevalence of ST use among older teens increased between 250 and 300 percent between 1970 and 1985 (Marcus et al., 1989) (See Figures 2 and 3 in the Foreword).

Compared with cigarettes, we know much less about the factors influencing ST use. Only in the past few years have the research results elucidated the many facets of ST use and means to intervene in this process (US DHHS, 1986, 1989a, and 1990).

This monograph represents the most recent major attempt to bring together the important research findings of the last few years. Previous compilations of ST research have been the U.S. Surgeon General's Report in 1986 (US DHHS, 1986) and a monograph published by the National Cancer Institute in 1989, titled *Smokeless Tobacco Use in the United States* (US DHHS, 1989b). The present monograph will use the model established by the two previous publications in presenting as broad a picture of the ST problem as possible. Sections in this monograph describe the epidemiology, clinical and pathological effects, carcinogenesis, nicotine effects and addiction,

prevention, cessation, and policy research findings in the area of ST use. Finally, recommendations based on research and compiled by experts in the field is presented.

EPIDEMIOLOGY From an international perspective, the use of ST is not as prevalent as cigarette smoking, although some countries experience relatively high ST use rates. Although ST use in Europe is practically nonexistent, Sweden has one of the highest rates of use in the world. Prevalence is also high in India, the United States, and Canada. Most countries, however, unless they have banned ST, are experiencing growth in ST consumption.

ST use is typically a male habit, but is prevalent in women in certain geographic areas as well as within some cultures and populations. For example, some Native American tribes have 45 percent ST prevalence rates among adolescent females (Schinke et al., 1989; US DHHS, 1986). Among some elderly women in rural southeastern United States, high prevalence rates of dry snuff contributed to a 50-fold increase in risk for oral cancer among long-term users, according to one study (Winn et al., 1981). Nationally, use among women in the United States is less than 0.5 percent, whereas among adult males regular use exceeds 6 percent. Among younger white males, 30 to 33 percent are current users in many regions of the country (Rouse, 1989).

Baseball players in the United States are often ST users. Ernster and colleagues (chapter 1) found that 37 percent had used ST in the past month. This high-profile group of ST users is highly influential, because they act as role models for youth.

Historically, the highest rates of use in the United States have been among residents in rural areas, but recent studies have documented an increasing prevalence rate among urban and suburban residents. White males are the most likely group to use ST, whereas Hispanics and Asians traditionally have had very low rates of use. However, given ST's recent reach into urban areas and into all education and income strata, this problem is becoming more difficult to relegate to only a few segments of society. ST use is rapidly becoming a significant public health problem not only for the United States but also for other countries of the world.

CLINICAL AND PATHOLOGICAL EFFECTS The presence of oral lesions is common place among many ST users. Among snuff users, oral lesions have been found in 67 percent of baseball players who were year-round users and in 32 percent of baseball players who used snuff only during the baseball season (Greene et al., chapter 2). Other common findings among ST users are gingival recession, loss of tooth structure, and leukoplakia. In Swedish data on snuff use, Bergström (chapter 2) found five- to sixfold increases in risk of developing cancer at the site of snuff placement and a frequent occurrence of irreversible gingival recession.

CARCINOGENESIS Earlier studies have conclusively established the use of ST as a cause of oral cancer. The studies in this monograph on carcinogenesis build earlier studies and expand our knowledge of possible mechanisms of tumor development.

Carcinogenesis is a complex, multistage process, and data are just now beginning to emerge that permit a better understanding of this complex process for ST use. This monograph describes the effects of tobacco-specific *N*-nitrosamines on live tissue, specifically the development of tumors. ST contains much higher levels of *N*-nitrosamines than are permitted in any other consumer product (US DHHS, 1986) and are believed, from a number of studies, to play a major role in ST carcinogenesis.

Anderson and Rice (chapter 3) have reported results from their study suggesting that 4-(methylnitrosamino)-1-(3-pyridyl)-1-bitanone in ST may be a potential source of cancer in the children of ST users. Their findings clearly warrant additional investigation including longitudinal epidemiological studies to determine whether the father's use of ST carries a risk of cancer for descendants.

Nicotine's main activity in the system of a smoker or ST user has been thought to be in its addictive properties. However, Hoffmann and colleagues and Squier (chapter 3) found nicotine to also have a role as a potentiator in the carcinogenic process in ST users.

Other studies in this monograph have found oral cancers in ST users among whom some had human papillomavirus, some had herpes simplex virus, and some had neither virus present. These results may indicate that, in some individuals, the viruses may be co-factors in carcinogenicity, but for others the viruses are not necessary for tumors to develop. The role of two other ST constituents, *N*-nitrosornicotine, a tobacco-associated nitrosamine, and 12-*O*-tetradecanoylphorbol-13-acetate, a tumor promoter, also have been found to affect cell growth and behavior.

NICOTINE EFFECTS AND ADDICTION The multiple adverse health effects of smoking, including nicotine addiction (US DHHS, 1988), have been documented in a series of authoritative reports by the U.S. Surgeon General and others. This monograph presents new research results on nicotine consumption in ST users. Although many studies have found cigarettes and ST to be similarly addictive, some differences remain in these two major forms of nicotine administration.

Among ST users, the blood level of nicotine is very steady following initial administration and remains quite constant during the day—probably the result of the prolonged contact of tobacco with the oral cavity. For this reason, the transdermal nicotine patch may be an improved cessation method for ST users compared with nicotine gum, as the patch more closely mimics the stable nicotine levels commonly seen in ST users.

PREVENTION Typical health education methods may not work when applied to ST prevention. D'Onofrio (chapter 5) describes the success of marketing by the ST industry and recommends that ST prevention efforts incorporate some of these strategies, including the narrow targeting of messages for high-risk groups, attractive packaging of educational programs, product diversification (focusing on "micro-markets"), using educators who are culturally acceptable to the target group, and providing education programs that react

quickly to changes in promotions and marketing strategies by the tobacco industry.

CESSATION One example of the strategies that D’Onofrio recommends is found in the work of Evans and colleagues who used the Little League as a channel for delivering messages about the dangers of ST use (chapter 5). Based on the social inoculation theory originally used by these investigators in their work on smoking, the current study makes extensive use of formative evaluations to guide midcourse corrections in materials, educational strategies, and methods for maintaining a high level of participation in the study.

Cessation interventions for ST use have demonstrated mixed results. Although the withdrawal symptoms appear to be less severe for ST users than for smokers, other factors hamper higher success rates. One factor is the practice of combining ST use with smoking; when one form of tobacco use is prohibited or discouraged, the user often temporarily switches to the other. Thus, ST cessation programs must also include smoking as a targeted behavior.

One advantage that ST cessation efforts have over smoking cessation is the presence of an easily observable clinical marker. A lesion in the mouth where the ST users place tobacco is very common; showing the user this lesion serves as a strong impetus to quit and remain abstinent.

Pharmacological adjuncts hold some promise for improving cessation rates. Although nicotine gum has provided some degree of success, especially when used as part of a comprehensive effort, one problem with gum appears to be using it correctly. The transdermal nicotine patch has several advantages over the gum, including its ease of use and its ability to maintain a steady level of nicotine with only minimal effort by the user. Like nicotine gum, however, the patch’s potential as a cessation aid is greatest only when used as part of a complete program that addresses behavioral and physiological aspects of ST addiction.

The role of health care professionals in ST cessation interventions deserves much more attention than it has previously received. Dentists and oral hygienists see many people who are at high risk for becoming ST users or who are already users. Yet, very few dentists have someone in their office teach prevention of ST use, refer patients to an outside cessation program, or prescribe nicotine replacement therapy.

In a survey by Schroeder and Heisel (chapter 6), dentists reported a willingness to provide pamphlets to their patients using ST, they also reported three major barriers to ST cessation counseling: (1) lack of training in counseling, (2) lack of insurance coverage for this activity, and (3) frustration from attempting to counsel about ST cessation.

Some researchers have found that “low-intensity” counseling by health care professionals is very effective and efficient (US DHHS, 1990). The low-intensity approach requires asking whether the patient uses tobacco and, if so, recommending that the patient quit, giving reasons related to that specific patient’s health, suggesting the patient set a quit date, providing

self-help materials, and scheduling a follow-up visit or phone call. In about 3 minutes, this intervention can provide a cue to action, strategies for quitting, and plans for follow-up—all considered essential elements of any full-fledged cessation program.

POLICY

As mentioned previously, ST use is relatively common in some countries but in many, its use is unknown. The European Community is considering a total ban on ST products, which may be feasible since the industry has not been able to develop a strong consumer base. The World Health Organization (WHO) recommends that ST products be banned in countries where ST use is nonexistent and that, in all countries, a social climate unfavorable to ST use should be established and maintained. Other strategies recommended by WHO include (1) the use of taxation as a means of reducing ST accessibility to young people and providing a financial base for health education programs, (2) restrictions on use in public places and worksites, and (3) prominent health warnings on packages.

In January 1991, NCI convened an expert panel of ST researchers, health care, and public health professionals. This panel developed a set of recommendations that was later approved by the First International Conference on Smokeless Tobacco and that presents the most important actions that are needed to prevent and control the use of ST. This document is presented in this monograph and is offered as a resource for persons who want to become involved in this very important area of tobacco control (chapter 8).

COMPREHENSIVE STRATEGIES TO CONTROL ST USE

In the United States, the National Cancer Institute has led the federal government's efforts in preventing ST use among youth and in helping adult users to quit (US DHHS, 1990). NCI has funded eight major research studies, six on prevention and two on cessation, that have resulted in improvements in our knowledge and understanding of ST problem in general, as well as the efficacy of specific intervention approaches.

As the scientific understanding of ST use has grown, one fact has become increasingly clear: Those factors that encourage, establish and maintain cigarette smoking are essentially identical for ST. Thus, the same strategies now being recommended to control cigarette smoking should also be applied to reduce ST use. These strategies employ a dual approach that targets both the user and the social environment. This approach was detailed in the National Cancer Institutes first Smoking and Tobacco Control Monograph titled *Strategies to Control Tobacco Use in the United States: A Blueprint for Public Health Action in the 1990's*.

The state of the art in controlling tobacco use combines multiple environmental changes with multiple programs directed to individuals in different stages of the initiation and cessation process. Just as is the case in cigarette smoking, this approach recognizes that no single approach is best for all ST users and that different users are most attracted to and most affected by different programs. Perhaps most important, it recognizes that no single intervention channel can reach all users and that no single time is

best for individuals to make an attempt to quit. Comprehensive strategies are characterized by the delivery of persistent and inescapable messages to quit, or not start, coupled with continuously available support for individual cessation efforts provided through multiple channels, and reinforced by environmental incentives to not use ST.

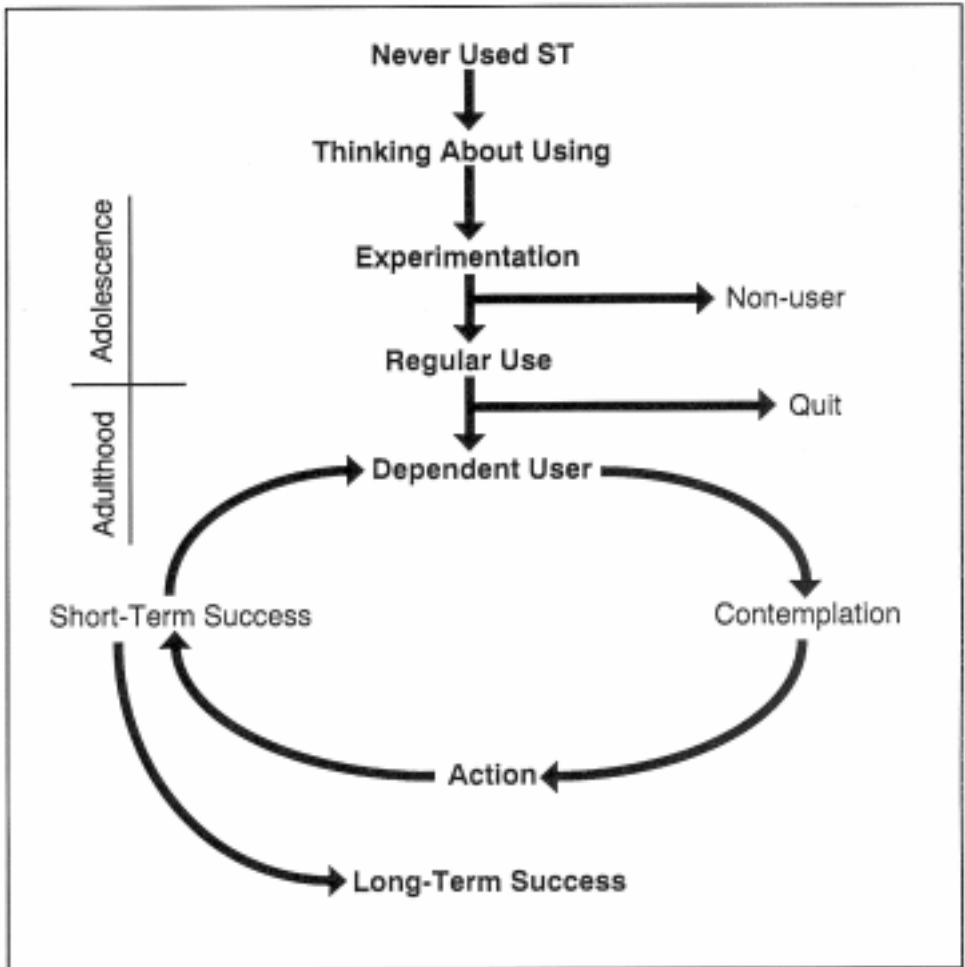
As with cigarette smoking, ST use primarily starts during adolescence. Unlike cigarette smoking, however, ST use is almost exclusively a male phenomena. The processes involved in ST initiation and cessation can be viewed as a cycle (Figure 2) with transition from regular use to dependence occurring during late adolescence and early adulthood. Experimentation and initial use are heavily influenced by issues, such as peer pressure and role modeling, during adolescent development. Dependent use develops when the individual incorporates the personal psychological and sociological utility of ST use into methods by which they function in and cope with the adult world. Although a significant number of adolescents may experiment with ST—including a certain fraction of adolescent females—most never become regular ST users and some who do adopt regular use quit before they become dependent.

Just as the process of quitting smoking is cyclical with smokers making many attempts to stop before finally succeeding, users of ST follow a similar cycle with many attempts to quit. Among cigarette smokers in the United States, about one-third attempt to quit each year but only about 10 percent of these succeed (Pierce and Hatziandreu, 1989). Although comparable national data on ST behavior is unavailable, data from NCI's eight intervention studies on ST use indicate ST users report experiencing the same withdrawal symptoms and problems of relapse as those seen in cigarette smokers (National Cancer Institute, 1990). Clearly, then, ST users who have unsuccessfully tried to quit need to be motivated to try again. A useful conceptualization of the cessation process is one whereby users cycle through various stages of cessation, and with each attempt, gain additional experience that can ultimately contribute to long-term success.

One goal in the overall strategy to control ST use, therefore, is to move users from one stage of the cycle to another, rather than using long-term cessation as the only goal and outcome measure. ST dependency is not a sudden process but one that begins gradually with experimentation starting in early adolescence or even preadolescence. Although the process is nearly identical to that seen in cigarette smoking, a number of regional studies have reported first use of ST occurring much earlier, especially among certain populations of Native Americans where even pre-school-aged children use ST (Schinke et al., 1989)

As shown in Figure 3, the first step in the process is thinking about using ST, and as individuals move through their teenage years, a certain fraction change from believing they will never use ST to contemplation of use. The images presented by advertising as well as the examples of older siblings and adults—especially adult role models such as athletes and well-known entertainers—are powerful inducements for children to perceive ST

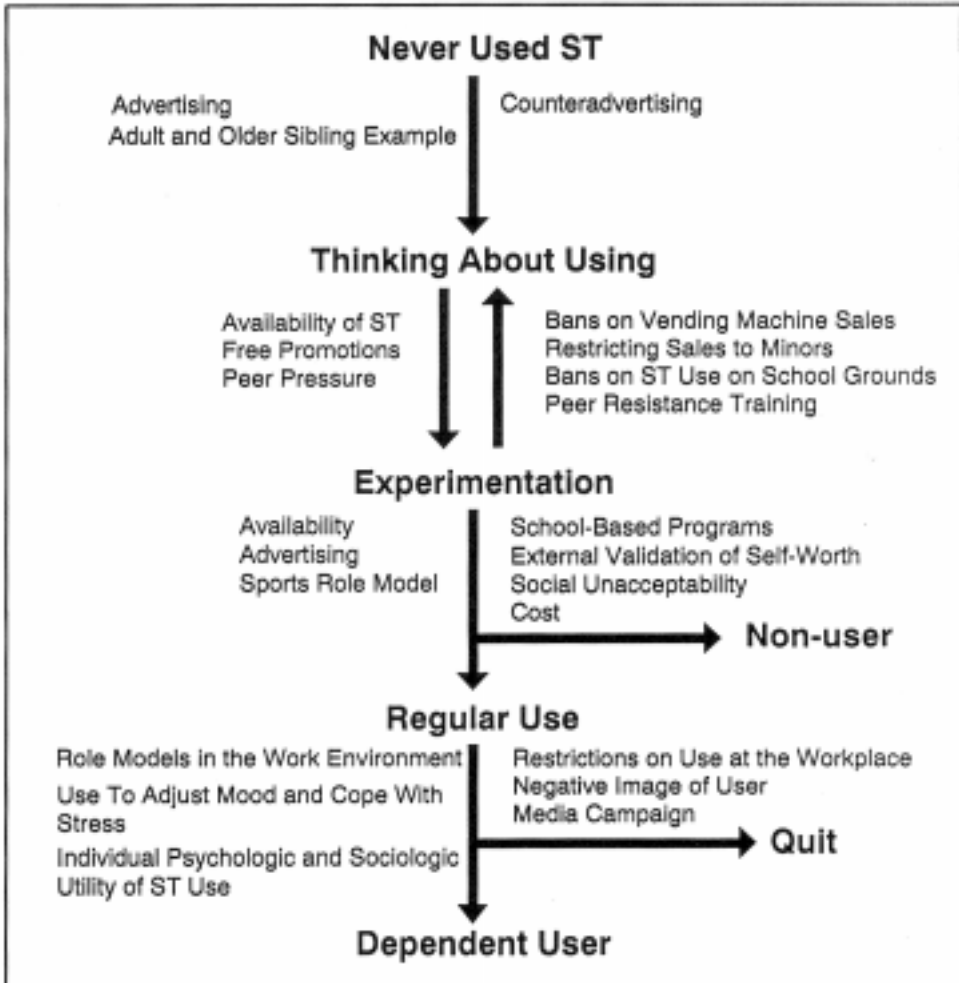
Figure 2
Processes of ST initiation and cessation



use as a means of entry into the adult world. Counter-advertising that creates a negative image of the user can often help offset these influences.

The change from thinking about using ST to experimentation does not necessarily lead to regular use, but as the individual gains experience with ST, this transition clearly becomes more likely. Factors that help move the individual from thinking to experimenting include the wide-spread availability of ST products, the ease with which children can purchase ST, promotional distribution of free samples—many of which are given to teens despite local laws, and advertising. The change from occasional experimentation to regular use is critical, because with regular use the adolescent develops experience that imparts psychological and sociological utility to the user. The ability to purchase ST products easily, the personal and social rewards, and peer acceptance, are all critical to establishing regular use.

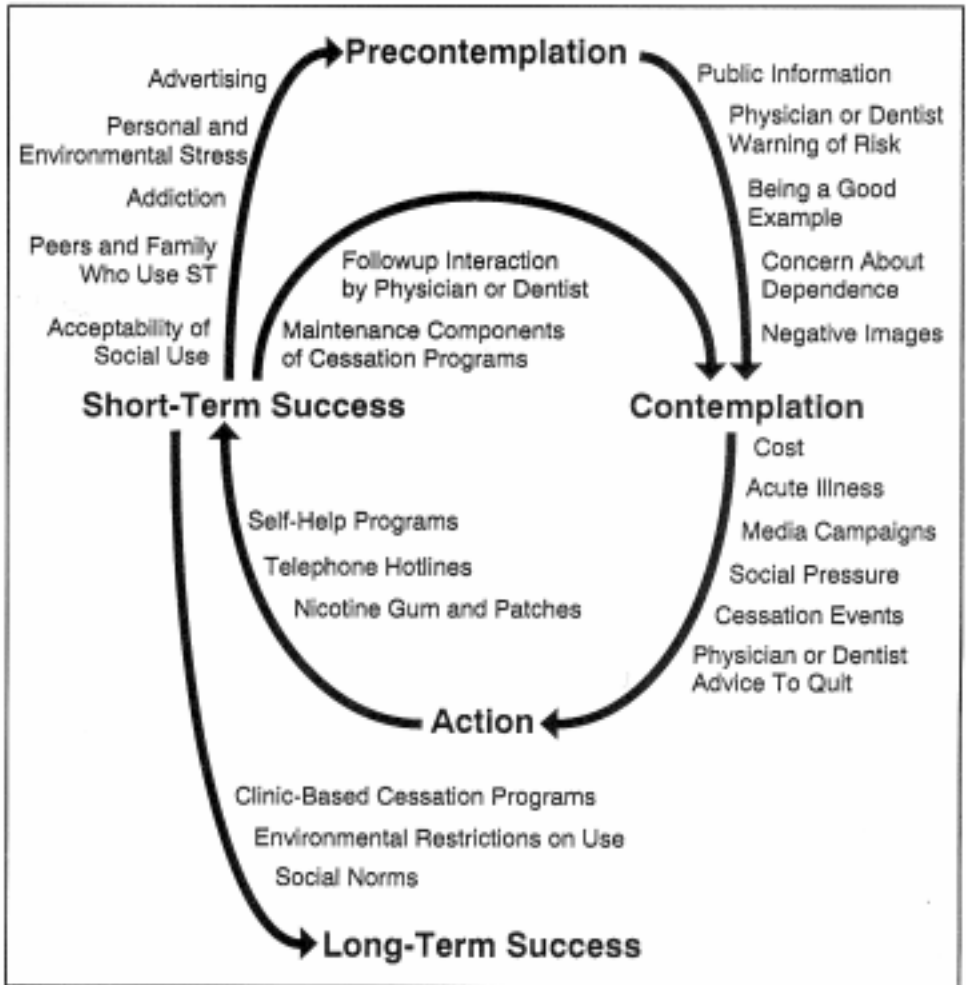
Figure 3
Factors that influence adolescent progression into adult ST use



Progressing from regular to dependent use requires that the utility of ST to persist after the pervasive anxieties of adolescents dissipate. For utility to continue, however, ST use has to be allowed in those situations when the user wants to use the product, such as during work as a means to relieve stress. If ST use is not permitted in the workplace or the user is in a white-collar occupation, the behavior may be frowned on by coworkers. In these instances the user must develop alternative methods for handling stress.

For the confirmed smoker, the cyclical pattern of not thinking about quitting (precontemplation), thinking about quitting (contemplation), and attempting to quit, generates a new set of nonsmokers each time they pass through the cycle (Prochaska and DiClemente, 1986). The same process is

Figure 4
ST cessation process



true for ST users. This process is illustrated in Figure 4 and identifies specific intervention processes that can influence these stages. Interventions are provided as examples to show possible interactions between intervention approaches and not meant to be all inclusive.

Many environmental influences and programs for controlling tobacco use (both cigarettes and ST) are intended to influence the user at different stages in this cycle. Public information campaigns that present the risks associated with ST use move individuals from the precontemplation to contemplation, as is personalizing the risks through physicians' or dentists' warnings. Other reasons important to the user include concern about addiction and setting a good example to others, especially children if the user is a parent.

The move from thinking about quitting to making a serious attempt is often triggered by a variety of environmental stimuli. Two factors that contributed to the decline in ST use in the mid-1980's, even though this decline was temporary, was concern about the health risks and Congressionally mandated warning labels on ST products and in advertising. As with cigarettes, cost is an important consideration that contributes to cessation attempts. Another powerful inducement to quit is a dentist's warning to a patient when the dentist finds leukoplakia at the site of ST placement.

Social factors may also play different roles in motivating quitting behavior among ST users compared with cigarette smokers. Increasingly, smokers are feeling more socially ostracized as fewer public settings permit smoking indoors (Pertschuk and Shopland, 1989; US DHHS, 1991). ST users can be surreptitious users, thereby avoiding social sanctions, resulting in less motivation to quit.

The major barriers to long-term cessation remain difficult to alter and, with the exception of addiction, are part of the user's social and economic environment. The barriers include social norms and workplace rules that encourage ST use; the positive behavior of peers, family members, and friends toward ST use; and periods of stress that facilitate relapse.

R. Craig Stotts, Dr. P.H., R.N.
Donald R. Shopland
Division of Cancer Prevention and Control
National Cancer Institute

REFERENCES

- Connolly, G.N., Winn, D.M., Hecht, S.S., Henningfield, J.E., Walker, B., Hoffmann, D. The reemergence of smokeless tobacco. *New England Journal of Medicine* 314: 1020-1027, 1986.
- Ernster, V.L. Advertising and promotion of smokeless tobacco products. *National Cancer Institute Monographs* No. 8: 87-94, 1989.
- Marcus, A.C., Crane, L.A., Shopland, D.R., Lynn, W.R. Use of smokeless tobacco in the United States: Recent estimates from the Current Population Survey. *National Cancer Institute Monographs* 8: 17-23, 1989.
- Milmore, B.K., Conover, A.G. Tobacco consumption in the United States, 1880-1955. *Tobacco Smoking patterns in the United States*, W. Haenszel, M.B. Shimkin, and H.P. Miller (editors). Washington, DC: U.S. Government Printing Office, 1956. (Public Health Monograph No. 45).
- Novotny, T.E., Pierce, J.P., Fiore, M.C., Davis, R.M. Smokeless tobacco use in the United States: The Adult Use of Tobacco Surveys. *National Cancer Institute Monographs* 8: 25-28, 1989.
- Pertschuk, M., Shopland, D.R. (editors). *Major Local Smoking Ordinances in the United States. A Detailed Matrix of the Provisions of Workplace, Restaurant, and Public Places Smoking Ordinances*. U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute. NIH Publication No. 90-479, 1989.
- Pierce, J., Hatziaudreu, E. *Report of the 1986 Adult Use of Tobacco Survey*. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control. Publication No. 10491, 1989.
- Prochaska, J.O., DiClemente, C.C. Towards a comprehensive model of change. In: *Treating Behaviors*, W.R. Miller and H. Heather (editors). New York: Plenum Press, 1986, pp. 3-27.
- Robert, J.C. *The Story of Tobacco in America*. Chapel Hill, NC: The University of North Carolina Press, 1967.
- Rouse, B.A. Epidemiology of smokeless tobacco use: A national study. *National Cancer Institute Monographs* 8: 29-33; 1989.

- Schinke, S.P., Schilling, R.F., Gilchrist, L.D., Ashby, M.R., Kitajima, E. Native youth and smokeless tobacco: Prevalence rates, gender differences, and descriptive characteristics. *National Cancer Institute Monographs* 8: 39-42, 1989.
- Shopland, D.R., Haenlein, M. Use of epidemiology in lung cancer control. *Prevention and Treatment of Lung Cancer*. In press.
- U.S. Department of Agriculture. *Tobacco Situation and Outlook Report*. U.S. Department of Agriculture, Economic Research Service, Series TS 218. Various years, 1955 to 1992.
- U.S. Department of Health and Human Services. *The Health Consequences of Using Smokeless Tobacco: A Report of the Advisory Committee to the Surgeon General*. U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. DHHS Publication No. (NIH) 86-2874, 1986.
- U.S. Department of Health and Human Services. *The Health Consequences of Smoking: Nicotine Addiction. A Report of the Surgeon General*. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Health Promotion and Education, Office on Smoking and Health. DHHS Publication No. (CDC) 88-846, 1988.
- U.S. Department of Health and Human Services. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General, 1989*. U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 89-8411, 1989a.
- U.S. Department of Health and Human Services. *Smokeless Tobacco Use in the United States*. U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 89-3055, 1989b.
- U.S. Department of Health and Human Services. *Smoking, Tobacco and Cancer Program Status Report, 1985-1989*. U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 90-3107, 1990.
- U.S. Department of Health and Human Services. *Strategies to Control Tobacco Use in the United States: A Blueprint for Public Health Action in the 1990's*. U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute. NIH Publication No. 92-3316, 1991.
- U.S. Department of Health and Human Services. *Smoking and Health in the Americas. A 1992 Report of the Surgeon General in Collaboration with the Pan American Health Organization*. U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control, DHHS Publication No. (CDC) 92-8419, 1992.
- Winn, D.M., Blot, W.J., Shy, C.M., Pickle, L.W., Toledo, A., Fraumeni, J.F., Jr. Snuff dipping and oral cancer among women in the southern United States. *New England Journal of Medicine* 304: 745-749, 1981.

