More than 400,000 Americans die of tobacco-related diseases each year. Smoking is responsible for an estimated 30 percent of all cancer deaths, and smokeless tobacco, or ST, use is a cause of oral cancer. Tobacco users are vulnerable to a wide range of other debilitating diseases and oral conditions, including leukoplakia, periodontitis, delayed wound healing and dental caries. Although tobacco use prevalence has declined substantially—from 42 percent of the U.S. adult population in 1965 to 25 percent in 1993—the nation’s progress toward eliminating tobacco-related disease is in jeopardy. About 3,000 young people become regular smokers every day, and the use of ST tripled between 1972 and 1991. More than three million adolescents smoke cigarettes, and more than one million adolescents currently use ST.

For the past 30 years, the ADA has called on dentists to educate their patients about the oral health hazards of tobacco use. Oral health professionals can be uniquely effective in providing tobacco use cessation, or TUC, counseling. Frequent contact with a patient over an extended period of time during dental therapy provides reinforcement and long-term contact, both of which are essential for improving the success of quit attempts. The dental appointment is an appropriate setting for discussion, as the dentist or dental hygienist can tailor a message to the patient’s current oral condition, and a dental professional’s advice can stimulate quit attempts. Health professionals who systematically use brief, simple clinical intervention strategies substantially improve their patients’ tobacco use quit rates. Even minimal results on an annual basis translate into a significant decrease in the prevalence of tobacco use over time.

The Smoking, Tobacco, and Cancer Program of the National Cancer Institute, or NCI, recommends that oral health professionals help patients be tobacco-free by doing the four A’s (box):

- asking questions about tobacco use;
- advising them to stop using tobacco;
- assisting them in stopping;
- arranging appropriate follow-up.

Clinical studies show that when all four A’s are used together routinely, they result in much higher quit rates than if only two or three A’s are used. In addition, the NCI program recommends that dentists organize their practices to ensure that simple, brief, effective tobacco use prevention and cessation services are used routinely, efficiently and systematically. The 1996 Agency for Health Care Policy and Research’s, or AHCPR, publication titled Clinical Practice Guideline Number 18: Smoking Cessation
NATIONAL CANCER INSTITUTE RECOMMENDATIONS FOR ROUTINE, MINIMUM CLINICAL TOBACCO USE INTERVENTIONS BY THE DENTAL TEAM.

Help patients be tobacco-free by:
- asking questions about tobacco use;
- advising them to stop using tobacco;
- assisting them in stopping;
- arranging appropriate follow-up.

Tobacco use cessation services help people
- contemplate stopping;
- decide to stop;
- actually stop;
- maintain tobacco-free behaviors after having stopped;
- attempt to stop again after previous unsuccessful attempts.

also recommends identifying the tobacco-use status of every patient and providing a brief intervention for every tobacco-using patient. Current national estimates of the extent of tobacco intervention activities within private dental practices are limited. Research suggests that dentists advise at least some of their patients about smoking. However, little information is available concerning the nature of the advice or the dentists' tobacco cessation practices by specialty type or geographical region. Providing self-help materials to patients appears to be a relatively infrequent activity.

This article reports on the results of a national survey of dentists and dental hygienists' tobacco control activities. The survey was designed to estimate the percentage of dental professionals in the United States currently practicing the four A’s and actively providing TUC services for their patients. It also was designed to provide baseline data to measure our progress toward achieving the Healthy People 2000 objective of increasing the percentage of primary care and oral health care providers who routinely advise cessation and provide assistance and follow-up for all of their tobacco-using patients to at least 75 percent.

We collected data regarding tobacco cessation attitudes and behaviors from a sample of general dentists, periodontists and pediatric dentists actively engaged in the private practice of dentistry, as well as the dental hygienists practicing in those offices. We also compared practice behaviors by provider type, specialty status, geographical region and other provider and practice characteristics.

METHODS

Sampling strategy. We mailed self-administered questionnaire booklets to and conducted telephone interviews with a sample of dentists and dental hygienists in the United States to gather information. We selected a stratified random sample of general dentists, periodontists and pediatric dentists from a file maintained at the ADA that contained every known dentist in the United States actively engaged in the private practice of dentistry on a full- or part-time basis. The mailing list contained

the names of ADA members and nonmembers.

We sampled professionally active general dentists, as 82 percent of active dentists in private practice in the United States are general dentists. Because we also were interested in the tobacco cessation practice activities of periodontists and pediatric dentists, we oversampled these specialty groups to achieve an adequate sample size to make meaningful comparisons of practice behaviors between dental specialties.

As we were interested in possible geographical regional differences in tobacco cessation attitudes and practice behaviors, we stratified the sample by three geographical regions:

- Region 1: New England, Middle Atlantic and South Atlantic states;
- Region 2: East South Central, East North Central, West North Central and West South Central states;
- Region 3: Mountain and Pacific states.

To estimate the percentage of dentists advising TUC with the desired degree of precision, we needed a sample of 190 dentists for each of the nine dentist type and geographical region combinations (n = 1,710).

We asked each dentist who participated in the survey if one or more licensed dental hygienists worked at least six hours per week in the practice. If so, we provided the dentist with a procedure to select a dental hygienist from the practice to complete an accompanying questionnaire designed specifically for dental hygienists.

Survey methodology. We based our survey instrument on the extensive work of an ad hoc committee of the National...
Dental Tobacco Free Steering Committee, and, when appropriate, we designed items to provide separate assessments of interventions relative to smoking and ST use. To ensure the clarity of items and ease of completing the survey, we pilot tested the survey instrument on a convenience sample of 50 dentists.

After modifying the survey, we mailed questionnaire booklets with a cover letter explaining the voluntary and confidential nature of survey participation to 3,999 dentists with usable addresses in October 1994. Each questionnaire booklet for dentists and dental hygienists was a self-mailer with first-class postage; no reply envelope was required. As an incentive, respondents who completed this questionnaire could request tobacco cessation educational materials provided by NCI for no charge.

We mailed reminder postcards to nonresponders two weeks after the initial survey mailing. Then, in November 1994, we mailed nonresponders an abbreviated questionnaire booklet that included the key items and a second cover letter that restated the basic appeal in the original cover letter.

After the initial mailing, reminder postcard and second mailing, we received 1,417 surveys with usable addresses and entered them into a database. To increase the response rate and achieve the desired sample size of 1,710 respondents, we conducted long and short versions of a telephone interview on a random sample of nonresponders in each of the nine dentist type-by-geographical region cells. We randomly assigned a long or short version of the telephone interview to participants until we reached our desired sample size.

Only dentists who actively provided clinical care and were either general dentists, periodontists or pediatric dentists and the dental hygienists who practiced in their offices, if any, were included in the study. Overall, 1,746 dentists (585 general dentists, 586 pediatric dentists and 575 periodontists) and 723 dental hygienists completed either the long version of the mailed survey, short version of the mailed survey, long version of the telephone interview or short version of the telephone interview. The final dentist response rate was 43.7 percent. The respondents were proportionately distributed among the three geographical regions.

Survey content. Both the long and short versions of the questionnaire asked the dentists and dental hygienists to give their age, race, gender, graduation year from dental or dental hygiene school and personal history of tobacco use. Dentists were asked about their specialty status and if they actively provided clinical patient care.

We asked participants, “In the past three months, what percent of your patients did you ask whether or not they smoke cigarettes, cigars or pipes?” Possible responses were nearly all (91 to 100 percent), most (75 to 90 percent), majority (51 to 74 percent), some (25 to 50 percent), a few (1 to 24 percent) and none (0 percent). We asked participants a similar question about ST use, which was defined as any form of snuff or chewing tobacco.

We asked participants whether they ever advised a tobacco-using patient to stop and if they provided any TUC services for their patients. If the partici-
TABLE 1

<table>
<thead>
<tr>
<th>SURVEY ITEM</th>
<th>All Dentists* (%)</th>
<th>General Dentists (%)</th>
<th>Periodontists (%)</th>
<th>Pediatric Dentists (%)</th>
<th>Dental Hygienists (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asked most or nearly all patients whether they smoke†</td>
<td>33 (29-37)</td>
<td>33 (29-37)</td>
<td>71 (68-75)</td>
<td>2 (1-3)</td>
<td>25 (22-28)</td>
</tr>
<tr>
<td>Asked most or nearly all patients whether they use smokeless tobacco, or ST§</td>
<td>15 (12-18)</td>
<td>14 (7-12)</td>
<td>30 (26-33)</td>
<td>2 (1-4)</td>
<td>9 (7-11)</td>
</tr>
<tr>
<td>Of patients who reported smoking, advised most or nearly all to stop</td>
<td>66 (60-71)</td>
<td>65 (60-70)</td>
<td>75 (71-80)</td>
<td>79 (74-84)</td>
<td>60 (55-65)</td>
</tr>
<tr>
<td>Of patients who reported using ST, advised most or nearly all to stop</td>
<td>75 (70-80)</td>
<td>75 (70-80)</td>
<td>83 (78-88)</td>
<td>74 (80-87)</td>
<td>84 (79-89)</td>
</tr>
<tr>
<td>Provided any tobacco use cessation services for their patients†</td>
<td>29 (25-33)</td>
<td>29 (25-33)</td>
<td>48 (44-52)</td>
<td>9 (7-11)</td>
<td>32 (28-35)</td>
</tr>
<tr>
<td>Completed formal training in tobacco use cessation</td>
<td>14 (11-17)</td>
<td>14 (11-17)</td>
<td>21 (18-25)</td>
<td>12 (10-15)</td>
<td>23 (20-26)</td>
</tr>
<tr>
<td>Felt very well/well-prepared to assist patients in stopping tobacco use‡</td>
<td>20 (16-23)</td>
<td>20 (16-23)</td>
<td>28 (24-31)</td>
<td>12 (9-14)</td>
<td>17 (14-20)</td>
</tr>
</tbody>
</table>

* Weighted to reflect the proportion of general dentists, periodontists, and pediatric dentists in active private dental practice in the United States in 1991.
† Responses varied by dentist type (χ², P < .05) but not by geographical region (χ², P > .05).
‡ Data represent the percentage of respondents and the 95 percent confidence interval.
§ Responses varied by dentist type (χ², P < .05) and by geographical region (χ², P < .05).

ences in possible explanatory variables such as the dentists' ages, gender and attitude scores. We considered a P-value of less than .05 as statistically significant.

We used logistic regression modeling to investigate the joint effect of explanatory factors on the outcomes of interest. As these were preliminary models, we did not include variables a priori. Instead, we used a forward selection procedure to identify variables for inclusion in the model. We used a P-value of greater than or equal to .05 as the entry criterion and used Hosmer-Lemeshow tests to evaluate the models' goodness of fit.

RESULTS

We found that the dentists who responded were mostly men (85 percent), white (89 percent) and solo practitioners (65 percent). The dentists' mean ages ranged from 44.1 years (± standard deviation, or SD, 10.9 years) for general dentists in Region 1 to 47.7 years (± SD 10.1 years) for pediatric dentists in Region 3. In 62 percent of the responding dentists' offices, a licensed dental hygienist worked at least six hours per week.

Asking about tobacco use.

While 89 percent of all dentists and 87 percent of dental hygienists asked at least one patient they had seen in the previous three months whether or not he or she smoked cigarettes, cigars or pipes, only 33 percent of all dentists and 25 percent of dental hygienists asked most or nearly all of their patients they had seen in the previous three months if they smoked (Table 1). While these percentages did not vary by geographical region, they did vary by dentist type, with 71 percent of periodontists, 33 percent of general dentists and 2 percent of pediatric den-

1672 JADA, Vol. 128, December 1997
DENTISTS PROVIDING TOBACCO CESSION SERVICES TO SMOKERS* AND ST† USERS.

<table>
<thead>
<tr>
<th>TOBACCO CESSION SERVICE</th>
<th>DENTISTS PROVIDING SERVICES TO SMOKERS (%)</th>
<th>DENTISTS PROVIDING SERVICES TO ST USERS (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussing specific strategies for quitting</td>
<td>49</td>
<td>48</td>
</tr>
<tr>
<td>Encouraging patients to set a quit date</td>
<td>26</td>
<td>35</td>
</tr>
<tr>
<td>Providing self-help or educational materials</td>
<td>32</td>
<td>35</td>
</tr>
<tr>
<td>Prescribing nicotine gum</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Prescribing nicotine transdermal patch</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td>Referring patients to cessation clinics or programs</td>
<td>14</td>
<td>11</td>
</tr>
</tbody>
</table>

- Patients who use cigarettes, cigars, or pipes.
- ST: smokeless tobacco, any form of snuff or chewing tobacco.

We found that 66 percent of all dentists asked at least one patient they had seen in the previous three months whether or not he or she used ST, 15 percent of all dentists and 9 percent of dental hygienists asked most or nearly all patients about ST use. These percentages varied by dentist type and geographical region. Periodontists (30 percent) were more likely to routinely ask about ST use than were general dentists and pediatric dentists (14 percent and 2 percent, respectively). Slightly more dentists in Region 2 (18 percent) than in Regions 1 and 3 (15 percent and 13 percent, respectively) asked most or nearly all of their patients about ST use.

We found that about half of all dentists reported that they always documented the patient's tobacco use status in the patient's dental record. And about half said they were more likely to ask new patients if they smoke as compared with asking returning patients if they smoke.

Advising patients to stop. We found that 66 percent of all dentists reported that they advised most or nearly all of their patients who reported smoking to stop. This percentage varied by dentist type and geographical region, with 53 percent of general dentists in Region 2 and 91 percent of pediatric dentists in Region 1 routinely providing advice to patients who smoke.

We also found that 75 percent of all dentists reported that they advised most or nearly all of their patients who reported using ST to stop. The percentage of dentists who routinely advised their patients who use ST ranged from 68 percent of pediatric dentists in Region 3 to 88 percent of pediatric dentists in Region 2.

We found that 60 percent of dental hygienists routinely advised most or nearly all smoking patients to stop, and 84 percent of dental hygienists advised most or nearly all patients using ST to stop.

Tobacco use policies, cessation services and education. Almost all of the practices of the dentists who responded to our survey had a policy banning tobacco use anywhere in the office by staff members (91 percent) or by patients (97 percent).

In our survey, we defined TUC services as any activities that help people do one or more of the following:
- contemplate stopping;
- decide to stop;
- actually stop;
- maintain tobacco-free behavior after having stopped;
- attempt to stop again after previous unsuccessful attempts.

We found that 29 percent of all dentists and 32 percent of dental hygienists provided TUC services. The provision of TUC services did not vary by geographical region, but it did vary by dentist type. Forty-eight percent of periodontists said they provided TUC services as compared with 29 percent of general dentists and 9 percent of pediatric dentists.

We found that while 14 percent of all of the dentists and 23 percent of the dental hygienists completed formal TUC training, training varied by dentist type and geographical region. Similarly, we found that 20 percent of all dentists and 17 percent of dental hygienists felt they were well-prepared to help patients stop tobacco use. More periodontists reported that they
had completed training and felt well-prepared (21 percent and 28 percent, respectively) than did general dentists (14 percent and 20 percent, respectively) and pediatric dentists (12 percent and 12 percent, respectively). We found that TUC education was most commonly provided through a continuing education course or program (63 percent), by a pharmaceutical company-sponsored educational program (58 percent), as part of a dental school curriculum (52 percent) or from an organized study club (23 percent). About 55 percent of all dentists who responded said that they were willing to receive TUC training.

The 497 dentists who provided TUC services within the previous three months to at least one patient interested in quitting smoking (n = 304) or using ST (n = 205) and who completed the long version of the mailed survey and telephone interview, said the services they most commonly provided were discussing specific strategies for quitting (49 percent to smokers, 48 percent to ST users), encouraging patients to set quit dates (26 percent to smokers, 35 percent to ST users) and providing self-help or educational materials (32 percent to smokers, 35 percent to ST users) (Table 2). Only a small percentage of dentists prescribed to patients nicotine gum (1 percent to smokers, 3 percent to ST users) or nicotine transdermal patches (16 percent to smokers, 9 percent to ST users) or referred patients to cessation clinics or programs (14 percent to smokers, 11 percent to ST users). About 60 percent of dentists who offered TUC services provided follow-up for patients trying to stop using tobacco, and 41 percent made patient education materials on tobacco use prevention and cessation available in the office's reception area.

We found that 805 dentists and not their office staff members—dental hygienists, dental assistants or office managers—usually provided these services (Figure). Only 6 percent of the responding dentists reported that their dental hygienist was the primary staff member who discussed specific strategies for quitting with patients. Five percent said the dental hygienist was responsible for encouraging a patient to set a quit date, and 10 percent reported that the dental hygienist was the staff member primarily responsible for providing self-help or educational materials for patients.

We found that dentists who completed the long version of the mailed survey and telephone interview reported that they felt that insurance companies that do not reimburse for TUC services, the lack of adequate reimbursement for the time it takes to try to get the patient to quit, not knowing where to send the patient for counseling and the lack of confidence in their ability to effectively help patients quit using tobacco were "a strong barrier" or "somewhat of a barrier” to providing TUC services (Table 3). About half of the dentists reported that these issues were not a barrier for them.

**Factors associated with tobacco-related practices.** We examined dentists' characteristics to identify those that were associated with tobacco advice patterns and cessation services. We detected the following statistically significant differences (P < .05). A higher percentage of white dentists (74 percent) advised most or nearly all smokers to quit than did nonwhite dentists (60 percent). More dentists in Region 1 advised most or nearly all smokers to quit (79 percent) compared with dentists in Region 2 (70 percent) or Region 3 (69 percent). Dentists who were current or occasional tobacco users advised most or nearly all smokers to quit less frequently (60 percent) than did dentists who did not use tobacco.
(76 percent). We observed similar trends for race and dentists’ tobacco use with regard to dentists advising most or nearly all ST users to quit. In addition, male dentists advised most or nearly all ST users to quit more frequently (79 percent) than did female dentists (69 percent). We found that fewer nonwhite dentists (19 percent) provided TUC services than did white dentists (30 percent). Dentists who employed one or more dental hygienists were more likely to provide TUC services in their practices (34 percent) than were dentists without at least one dental hygienist employed by their practice (22 percent).

Table 4 shows the relationships between dentists’ training and preparation to help patients stop tobacco use and the cessation services they provide in their practices. We found statistically significant differences (P < .05) in the percentage of dentists who advise most or nearly all of their patients to stop using cigarettes for three variables: degree of preparedness, completion of TUC training and willingness to complete TUC training. We observed significant differences in completion of TUC training and willingness to complete TUC training in the dentists who advised most or nearly all of their patients to stop using ST. We did not find statistically significant differences between the preparedness of dentists and the percentage of dentists advising most or nearly all of their patients to stop using ST.

We detected the most extreme differences in the percentage of dentists providing TUC services for all three variables. For example, we found that 56 percent of dentists who completed TUC training provided cessation services in their practices as compared with 24 percent of dentists who did not complete training. Similarly, we found that dentists who felt well-prepared to help patients stop using tobacco and those who were willing to receive TUC training were more likely to provide TUC services.

We developed two logistic regression models to investigate the joint effect of various factors on tobacco-related practices. The outcomes we modeled were if most or nearly all smokers were advised to quit and whether TUC services were provided. Some of the variables we considered for inclusion in both of these models were the dentist’s age, gender, race, year of graduation from dental school, years in practice, specialty, geographical region, degree of preparedness to help patients stop, previous formal TUC training, willingness to receive TUC training, involvement in community TUC activities, history of tobacco use and attitude score. Other variables we took into consideration were if the dentist’s practice was group or solo, if a dental hygienist was present, if a patient policy or a staff policy regarding tobacco use was present and the type of questionnaire the dentist completed.

In the first logistic regression model—smokers advised to quit—we found that the multivariate relationships were similar and in the same direction as those detected in the bivariate analysis. We included dental specialty, geographical region, race, willingness to complete TUC training and current or occasional tobacco use in the regression model. Formal training and whether the dentist felt prepared did not improve the model

| TABLE 3 |
| --- | --- | --- |
| BARRIER | A STRONG BARRIER (% OF DENTISTS) | SOMEWHAT OF A BARRIER (% OF DENTISTS) | NOT A BARRIER (% OF DENTISTS) |
| Insurance companies do not reimburse for the services | 22 | 27 | 51 |
| Lack of adequate reimbursement for the time it takes to try to get the patient to quit | 18 | 27 | 56 |
| Not knowing where to send the patient for counseling | 18 | 33 | 49 |
| Lack of confidence in ability to effectively help patients quit using tobacco | 12 | 42 | 46 |
| Amount of time required | 11 | 35 | 54 |
significantly. However, we felt that the attitude score was important and included it in the final regression model.

The variables we selected for the second regression model—TUC services provided—including dentist specialty, degree of preparedness to help patients stop, willingness to receive TUC training, previous formal TUC training and geographical region. We found that these relationships also were significant and in the same direction in the bivariate analysis. Additional variables in this model were whether the dentist had ever used tobacco, patient tobacco use policy and attitude score. We found that those dentists who had used tobacco, prohibited patient smoking and had a positive attitude regarding smoking prevention were more likely to provide TUC services. Race did not enter into this model.

We also found that the type of questionnaire the dentists responded to was related to the outcomes in both models. This relationship was complex in the first model, as pediatric dentists who responded to the telephone interview were less likely to advise most or nearly all smokers to quit than were pediatric dentists who filled out the mail questionnaire. We found that dentists who responded to the telephone interview were less likely to provide smoking cessation services than dentists who filled out the mail survey. Lack of fit was not detected for either model.

DISCUSSION

The NCI projects that if 100,000 physicians help 10 percent of their patients who smoke to stop each year, the number of smokers in the United States would drop by an additional 2 million people annually. Similarly, if dental professionals implemented office systems that institutionalized smoking cessation assessment and intervention, they could have a significant impact on this health problem. The recommended interventions to be performed by primary health care providers, including dental health providers, require only a few seconds to reinforce never-user and ex-user behavior, about a minute to encourage patients with low or moderate motivation and three minutes or less to help highly motivated patients who are receptive to offers to help them quit. However, estimates from our survey suggest that tobacco control activities currently are not a routine part of dental practice, activities and training vary by dentist type and geographical region, and we will not meet the Healthy People 2000 goal in this area.

AHCPR guidelines emphasize the importance of systematically identifying all smokers within a clinical practice setting. Specifically, they recommend that all primary care practitioners implement an office wide system that ensures that tobacco-use status is queried and documented at every patient visit. In our study, most dentists and dental hygienists asked at least one patient seen in the past three months if they smoked (89 percent and 87 percent, respectively) or used ST (66 percent of dentists). A much smaller percentage of dentists and dental hygienists routinely asked patients about tobacco use. We estimated that 33 percent of all dentists and 25 percent of dental hygienists asked most or nearly all of their patients if they smoked and that 15 percent of dentists and 9 percent of dental hygienists asked most or nearly all of their patients about ST use.

Our estimates are lower than other reports in the literature, which may, in part, be the result of differences in survey administration, sampling bias or how the questions were worded. In the 1994 ADA national survey, 40 percent of dentists routinely asked their patients about tobacco use. In a statewide survey of Minnesota dentists and staff members, 55 percent of dentists and 61 percent of dental hygienists routinely asked their patients about cigarette use, and 45 percent of dentists and 42 percent of dental hygienists routinely asked their patients about ST use. An NCI survey of dentists in 11 communities throughout the United States estimated that 51 percent of dentists asked new patients about smoking, 29 percent asked recall patients about smoking and 18 percent used a system to identify patients who smoked. All of these estimates indicate that asking about tobacco use and documenting tobacco use status in the patients’ records are not routine parts of dental practice.

The AHCPR guidelines stress the importance of urging all tobacco users to quit and encouraging clinic staff to reinforce the cessation message and support the patient’s quit attempt. In our study, not all dentists or dental hygienists routinely asked about tobacco use. However, if a patient was known to use tobacco products, most dentists (66 percent to smokers, 72 percent to ST users) and dental hygienists (60 percent to smokers, 84 percent to ST users) routinely advised them to stop. These estimates are similar to those reported in the Hatreiter...
and colleagues study and higher than those found in the ADA national survey. An encouraging finding, however, is that almost all of the practices of the dentists who responded to our survey had a policy banning tobacco use anywhere in the office by staff members (91 percent) or patients (97 percent).

According to the AHCPR guidelines, if a tobacco-using patient is willing to make a quit attempt, the clinician should ask the patient to set a quit date, prepare the patient for the quit date, encourage nicotine replacement therapy (nicotine gum or nicotine transdermal patches), provide self-help materials, provide key advice and refer the patient to a cessation specialist when such treatments are appropriate. In our study, less than one-third of dentists or dental hygienists provided any cessation services for patients. If dentists or dental hygienists provided services, they most commonly consisted of discussing specific strategies for quitting, setting a quit date and providing self-help or educational materials. Our estimates are higher than those in the 1990 Community Intervention Trial for Smoking Cessation, or COMIT, survey in which about half of the dentists counseled patients about the dangers of smoking, but very few dentists (5 percent or less) set quit dates, developed cessation plans, provided self-help materials, made referrals or arranged follow-up visits. Similarly, Hastreiter and colleagues described tobacco-related clinical practices as "rather ad hoc and somewhat superficial." In the ADA national survey, almost 60 percent of all private dentists routinely or most of the time asked their patients if they used tobacco products, while only 4 percent routinely provided some type of follow-up for their tobacco-using patients.

The pattern that emerges from our findings and other reports is that dentists and dental hygienists do not routinely ask about tobacco use or document use status in the patient's record. However, if they know that a patient uses a tobacco product, they are likely to advise them to quit but are not as likely to provide services to help them stop.

The reluctance on the part of dentists and dental hygienists to provide TUC services is probably multifactorial. In our study, only about one in five dentists and dental hygienists completed formal training in TUC or felt well-prepared to help patients stop tobacco use. Tobacco control education must be included in dental and dental hygiene curricula, and education is needed to increase dentists' and dental hygienists' comfort levels and willingness to provide these services to patients.

The findings from the exploratory logistic regression models we used suggest that the relationships between possible explanatory and confounding variables and the outcome variables (smokers advised to quit, TUC services provided) are complicated. We found that interaction terms were significant in both models and indicated that there are differential effects in subgroups of the sample. The multivariate analyses are consistent with the bivariate findings.
in that both suggest groups that can be targeted to improve TUC awareness among dentists.

To our knowledge, our article is the first in the dental literature with an adequate sample size to make comparisons by dentist specialty type. We found that periodontists were much more likely to routinely ask patients about their tobacco use than were general dentists and pediatric dentists. Although the majority of general dentists, pediatric dentists and periodontists routinely advised patients known to be tobacco users, periodontists were more likely to provide tobacco use cessation services for their patients. This may be related to the fact that a greater percentage of periodontists than general dentists and pediatric dentists completed formal training programs in TUC and felt well-prepared to help patients stop tobacco use. Another possible explanation is an association between periodontal diseases and tobacco use. 

We found that pediatric dentists were the least likely of the three dentist types to ask routinely about tobacco use, to provide cessation services or to complete formal training in TUC. However, if the responding pediatric dentists knew one of their patients used tobacco, 79 percent reported that they routinely advised the patient to stop. Several of these pediatric dentists commented that they only treat small children and, thus, routinely did not ask their patients about tobacco use. However, we feel that children in preschool and grade school should receive positive reinforcement to counter tobacco advertising and postpone initiation, as the earlier the age of initiation, the more likely the child is to become nicotine dependent for life.

Data from a 1991 national survey showed that the mean age for the first use of cigarettes was 14.6 years and that the mean age for becoming a daily smoker was 17.7 years. The prevalence of ST use in 1992 among 12- to 17-year-old males was 11.9 percent.10

As with all survey research, the possible effects of nonresponse and other sources of bias must be considered. Dentists who practice tobacco control activities may have been more likely to complete the survey than dentists who do not practice tobacco control activities.

In an attempt to minimize the potential for nonresponse bias, we made several attempts and used several methods to try to obtain responses. The regression modeling indicates that those who responded to later attempts (telephone interviews) were less likely to advise smokers to quit and less likely to provide smoking cessation services. Thus, the rates presented may overestimate tobacco control activities within U.S. dental practices.

**CONCLUSIONS**

Estimates from our survey suggest that tobacco control activities are currently not a routine part of dental practice, that activities and training vary by dentist type and geographical region and that the dental profession will not meet the Healthy People 2000 objective to increase the percentage of primary care and oral health care providers who routinely advise cessation and provide assistance and follow-up for all of their tobacco-using patients to at least 75 percent.27

Dr. McCormay is a research assistanf professor, Department of Statistics, University of Florida, Gainesville.

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