Tobacco Cessation Through Dental Office Settings

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Abstract: There is increasing interest in broadly inclusive public health interventions that involve low-cost, self-help materials and minimal support from professionals. Dental health care workers (DHCWs) are a largely untapped resource for providing advice and brief counseling to tobacco-using patients, and there are good reasons to believe that they can be effective in this role. The results of our randomized clinical trials have shown that a brief dental office-based intervention can be effective in helping smokeless tobacco users to quit and smokers to reduce their use and become more ready to quit. A third clinical trial tested the effectiveness of two methods of disseminating the smokeless tobacco intervention to DHCWs throughout the western United States. Workshops were more effective than self-study in effecting behavior change, although our analyses indicate that self-study was more cost-efficient. These studies have demonstrated the viability of using dentists and dental hygienists to provide brief cessation advice and supportive materials in the context of regular oral health visits to encourage their patients to quit. The results of these studies also support the timeliness of further dissemination and diffusion of this program to practitioners, dental schools, and dental hygiene programs.

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The Scope of the Problem

Although cigarette smoking has declined from the 1960s through the 1980s, reports from the Centers for Disease Control indicate that smoking prevalence has remained relatively stable through the 1990s. According to the 1998 Behavioral Risk Factor Surveillance System, the median prevalence of current cigarette smoking was 22.9 percent nationwide; state-specific prevalence rates ranged from 14.8 percent in Arizona to 52.0 percent in Alaska.\(^\text{19}\)

According to the 1998 National Household Survey on Drug Abuse,\(^\text{20}\) the prevalence of lifetime smokeless tobacco (ST) use is 17.2 percent in the total population. The percent of the total population that used ST in the last month is 3.1 percent: 5.9 percent for males, 0.5 percent for females. Of particular concern is the high prevalence among adolescent males. The 1999 Youth Risk Behavior Survey found that 19 percent of white male high school students had used ST at least once in the previous thirty days.\(^\text{19}\)

The hazards associated with cigarette smoking have been well documented. Cigarette smoking is the single leading preventable cause of premature death in the United States. Each year, over 400,000 deaths in this country are attributable to smoking.\(^\text{21}\) Since 1960, the rate of smoking-related deaths has steadily increased. Between 1960 and 1990, deaths from lung cancer among women have increased by more than 400 percent—exceeding breast cancer deaths in the mid-1980s.\(^\text{22}\) Another harmful consequence of smoking involves nonsmokers exposed to environmental tobacco smoke (ETS) as a result of their proximity to individuals who smoke. Meta-analyses published in the *British Medical Journal* have shown a direct link between ETS and lung cancer, heart disease, and other serious illnesses.\(^\text{23}\) Annually, exposure to ETS causes an estimated 3,000 deaths from lung cancer among American adults.\(^\text{24}\)

Tobacco use has also been directly implicated in numerous oral morbidities, including oral cancer, stomatitis nicotina, oral leukoplakia, periodontitis, gingival recession and soft-tissue changes\(^\text{25}\) (see also articles by Drs. Banoczy and Georgia Johnson in this issue). After examining the relevant epidemiologic, experimental, and clinical data, the U.S. Surgeon General concluded that the oral use of smokeless tobacco can cause cancer and a number of noncancerous oral morbidities, as well as lead to nicotine addiction and dependence.\(^\text{26}\) Given the overwhelming evidence of detrimental effects of tobacco use, dental health care workers (DHCWs) are increasingly concerned with their patients’ use of cigarettes and smokeless tobacco. At the same time, DHCWs are in a unique position to provide salient, proximal information about tobacco use and oral health, which can motivate tobacco users to quit. Studies have shown that almost 80 percent of daily smokeless tobacco users have an identifiable soft tissue lesion,\(^\text{27}\) and tobacco use is directly related to oral cancer.\(^\text{27}\) These observable, measurable oral phenomena, in the context of the oral examination, provide a “teachable moment” that can be a powerful motivational tool to use with tobacco users.

More than 80 percent of dental health care workers report either raising the issue of tobacco cessation\(^\text{28}\) or believing it is the dentists’ responsibility to address the topic.\(^\text{29}\) However, recent studies confirm that they do not actually implement activities. Tomar, Husten, and Manley\(^\text{30}\) found that only 24 percent of current smokers and 18 percent of smokeless users reported that their dentists had advised them to quit using tobacco. Our discussions with dentists and hygienists and our survey\(^\text{17}\) have revealed some of the barriers perceived by dentists. First, dentists are more comfortable dealing with ST users because of visible tissue changes attributable to the use of chew or snuff. They are less comfortable dealing with smokers because intervention may be seen as an overextension of the scope of practice and one that may antagonize and alienate patients. Second, although dentists and hygienists are more comfortable intervening with ST than with smoking, both dentists and hygienists report that they do not have confidence in their intervention skills and that they lack supporting materials.\(^\text{17}\) Providing training and materials to dental professionals can offset these concerns, particularly since patients now expect and appreciate appropriate inquiries about tobacco use and offers of assistance with cessation.\(^\text{17}\) After receiving training and patient materials, the oral health professionals in our studies reported increased confidence in addressing tobacco use. We have also demonstrated significant reductions in reported ST use by patients receiving this intervention.\(^\text{15,16}\)
Conceptual Framework for Brief Office-Based Tobacco Interventions

The intervention developed in our studies is based on social learning theory and derived from previous multicomponent interventions in tobacco cessation. While most of the research on applying cognitive behavioral programs comes from an extensive research literature on smoking cessation, the basic elements appear to apply equally well to smokeless tobacco cessation.31,32 The efficacy of cognitive behavioral programs may derive from their provision of coping skills training33,34 and the motivational benefits of support from the counselor. These influences can strengthen the self-determination of participants and help them cope with withdrawal and stress experienced during tobacco cessation. Cognitive behavioral counseling employs strategies and tactics derived from descriptive research on the quitting process35 and intervention research.34,36,37

Cognitive behavioral interventions developed and evaluated extensively for smoking cessation have also been successfully adapted for use with ST cessation.38 While group cessation programs led by a facilitator can be effective in getting ST users to quit,37,39,40 relatively few users will attend. Cognitive behavioral cessation programs have been extended using self-help guides mailed to interested users, thus providing a model for developing other cost-effective minimal interventions that increase reach to this population.

Interventions in Health Care Settings

Health care settings have long been used to successfully deliver tobacco cessation services to patients and extend the reach of tobacco cessation interventions. Many of these interventions have been effective in motivating and assisting patients to reduce their tobacco use. Primary care physicians, pediatricians, and nurses have been found to be effective in delivering cessation advice to their patients.41-44

Dental offices provide a unique opportunity to expand the reach of health care and self-help cessation programs. Although there are few direct comparisons assessing the relative effectiveness of different types of health care providers in producing tobacco cessation, one study found that dentists were more effective than physicians in helping smokers to quit.7 The results of our research suggest that dental health care workers can be as effective, or more effective, than other types of health care professionals in assisting smokeless tobacco users to quit as well.14,16,45

Video Self-Help Materials

Videos are commonly used in a variety of settings to provide information on health behaviors.46,47 According to the U.S. Department of Commerce, Bureau of the Census, 82 percent of households had a videocassette recorder (VCR) in 1996,48 making videotapes a convenient and powerful method for disseminating instructional information. Videos can deliver both motivational messages and educational information in ways that are engaging and nonthreatening. Videos developed specifically for the needs and characteristics of particular populations may be particularly credible for both participants and providers.46 Research has shown that watching a motivational, self-help video on tobacco cessation was a significant predictor of sustained abstinence.49 Videos also ensure some degree of standardization of curriculum, as each person receives the same information, an advantage for research.

Telephone Support

Research has shown that brief telephone calls can be another effective tool in initiating and maintaining tobacco cessation.50,51 We recently completed a self-help smokeless tobacco study comparing two levels of intervention and found that subjects who received two supportive phone calls had a significantly higher quit rate at six-week (43 percent vs. 25 percent) and six-month follow-up (36 percent vs. 26 percent) than did subjects who did not receive phone support.52 In our dental office-based tobacco cessation projects, we asked the dental hygienist to call each patient approximately two weeks after an office visit to provide very brief telephone support. The goal of this follow-up call was to encourage patients to read the self-help materials and watch the video.
Nicotine Replacement for Tobacco Cessation

Reviews of the literature and meta-analyses indicate that Nicotine Replacement Therapy (NRT) can greatly enhance smoking cessation (see also the article by Dr. Christen in this issue). In a recent review of ninety-four NRT trials, Silagy et al. concluded that all commercially available forms of NRT (nicotine gum, transdermal patch, nicotine nasal spray, nicotine inhaler, and nicotine sublingual tablets) are effective as part of a strategy to promote smoking cessation. The authors state that NRT increases quit rates by 150-200 percent, regardless of setting. The authors also report that all the trials of NRT included at least some form of brief advice to the smoker, and suggest that at least a minimal amount of support be given to the smoker to ensure the effectiveness of NRT.

There is limited evidence that NRT is effective for helping dental patients to quit smoking. Cohen et al. assigned fifty private practice dentists to one of four groups. All four groups received instruction in an intervention protocol consisting of assessment, advice, setting a quit date, and checking on the patients’ progress. In addition, one group offered free nicotine gum, one group had reminder stickers placed in the patients’ charts to prompt intervention, and one group had both reminders and nicotine gum. The fourth group served as a control. Significantly higher quit rates were observed at twelve months for the two groups receiving free nicotine gum. Of subjects available for assessment, there were 16 percent confirmed quits in the nicotine gum groups compared to only 7.7 percent in the control group and 8.6 percent in the reminder only group.

The Clinical Practice Guidelines for Treating Tobacco Use and Dependence recommend the use of NRT in conjunction with counseling to maximize quit rates. These guidelines also provide recommendations for health care administrators, insurers, and purchasers to include smoking cessation treatment (i.e., drug therapy and counseling), as covered services for all their health insurance subscribers and to reimburse fee-for-service clinicians for providing empirically validated tobacco cessation treatment. Pharmacotherapies, such as Buproprion SR (Zyban), have also been found to be effective for tobacco dependence treatment. NRT is available by prescription and/or over-the-counter and may be prescribed by dentists. Currently, a physician must prescribe other forms of pharmacotherapy (e.g., Zyban/Buproprion SR).

Tobacco Cessation in Dental Settings

Researchers from Oregon Research Institute (ORI) have conducted three large-scale tobacco cessation studies in HMO (with the Kaiser Permanente Center for Health Research) and private practice dental settings to evaluate the impact of brief counseling associated with oral health care. Two randomized clinical trials conducted by ORI have shown the effectiveness of a brief intervention for smokeless tobacco users. A third clinical trial tested the effectiveness of two methods of disseminating the smokeless tobacco intervention to dental health care workers throughout the United States.

Description of the Intervention

The intervention was adapted from, and expanded upon, the National Cancer Institute’s original “4 As” (Ask, Advise, Assist, Arrange) and brief office-based tobacco cessation guidelines, specifically for use in dental offices. The protocol consisted of the following five steps:

1. **Check the tobacco use status of all patients.** Assess the tobacco use of all patients, both new and returning. This assessment will include asking patients about their current use of all tobacco products, previous quit attempts, and current readiness to quit.

2. **Relate oral health findings to tobacco use.** Either during or after the oral exam, procedure, or periodontal exam, the dentist or hygienist will show the patient any tobacco-related oral health problems, and/or educate the patient about the oral health effects of tobacco use. Record all tobacco-related conditions in the patient’s chart.

3. **Urge the patient to quit all tobacco use.** Advise all patients to quit their use of all tobacco products. Clear, concise, and direct advice to quit is encouraged. The dentist or hygienist will per-
sonalize the message by referring to the patient’s oral health. They will provide direct advice to quit for those who are ready and support to others to consider quitting in the future. The dentist or hygienist will ask patients interested in quitting to set a quit date. All tobacco cessation activities should be recorded in the patients’ charts.

4. **Supply self-help materials to patients.** Give all tobacco users written cessation guides and one motivational video to take home. The written materials provide information on oral health effects of tobacco and specific quitting tips. The video, entitled “In Good Taste,” is approximately fifteen minutes long and contains motivational and self-help information on quitting. The dentist or hygienist should also discuss nicotine replacement therapy with patients and refer them to information in the self-help packet.

5. **Encourage patients via follow-up.** Provide feedback to patients on a regular basis either by telephone or mail and at recall or subsequent office visits. Answer questions and provide encouragement to those interested in quitting. Support those unable to quit, and praise both quitters and those who relapse for making an effort. Also remember to praise adolescents and young adults who do not use tobacco and encourage continued non-use.

### Training Program

For our intervention studies, we provided instruction to participants via personalized workshops. Each workshop was two to three hours in length and was presented by a team of researchers and a dental hygienist. The goals of the workshops were to decrease perceived barriers to providing cessation services and increase tobacco cessation-related behaviors. The training program consisted of didactic information on epidemiology of tobacco use, constituents of smokeless and smoked tobacco, oral health effects of tobacco use, and the intervention model; video vignettes modeling clinician/patient interactions; dynamic role plays to reinforce acquisition of technical skills; question and answer time; and provision of patient materials. Workshops were limited to thirty participants, with an optimal size of fifteen to twenty to encourage active participation and individual attention.

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**Tobacco Cessation Research in Dental Settings**

### Smokeless Tobacco Cessation in HMO Dental Clinics

In a study conducted in seven HMO dental clinics in the Portland area, in conjunction with the Kaiser Permanente Center for Health Research, we assessed the effect of providing advice and cessation materials to over 500 patients using smokeless tobacco during a regular hygiene visit. Patients were randomly assigned within clinics to either receive the intervention or usual care (the latter became the control group). Clinic staff attended a two-hour workshop, and the intervention consisted of all the components described above. Hygienists were responsible for carrying out the intervention, while the dentist was encouraged to reinforce the cessation message. After prophylaxis, chewers in the intervention condition were asked to watch a motivational/self-help video in the office and received monthly informational newsletters by mail. In addition, project staff contacted patients in the intervention group by phone two weeks after the office visit to provide further encouragement to quit.

At a three-month follow-up, 19.2 percent of intervention patients reported no tobacco use, compared to 11.7 percent in the regular care (control) group (p < 0.01; chi-squared analysis). Continuous abstinence from tobacco at three and twelve months was significantly greater in the intervention than in the control group (18.4 percent vs. 12.5 percent; p < 0.05). The results of this study show that the provision of advice supplemented with written materials and a video can have a significant short-term impact on reducing smokeless tobacco use. Although the one-year differences did not reach significance, we suspect this was due to within-clinic contamination, with dental staff providing the intervention to subjects in the control group as well as in the intervention group.
Tobacco Cessation in a Private Practice Dental Setting

In a second study, we assessed the effect of a brief office-based intervention on over 4,000 smokers and 600 smokeless users in seventy-five private practice dental offices in Oregon. Based on our experience in the HMO study, we randomly assigned practices into intervention or control groups in order to limit patient contamination. Dental office staff attended a three-hour workshop. The intervention described above was modified for use with both smokeless tobacco users and smokers, and specialized videos and written materials were developed for smokers and smokeless tobacco users. The video and patient packet were given to each tobacco-using patient to take home. Participants in this study did not receive newsletters by mail, but hygienists were encouraged to follow up with their patients by phone and/or mail and at each subsequent office visit. The hygienist was asked to make one follow-up phone call to encourage the use of the take-home materials and quitting.

Comparisons of the results of this study using a chi-squared analysis confirmed the effectiveness of a brief office intervention in getting smokeless tobacco users to quit at three-month follow-up (17.8 percent vs. 8.8 percent for control group; p<0.01); at twelve-month follow-up (16.5 percent vs. 8.8 percent for control group; p<0.01); and for continuous quit at both three and twelve months (10.2 percent vs. 3.3 percent for control group; p<0.001). No significant differences were found for smokers between groups.

Although the intervention was not effective in helping smokers to quit, it facilitated several other outcomes. It is commonly agreed that tobacco cessation is a process through which tobacco users must be assisted, with the ultimate goal of cessation, rather than focusing exclusively on quitting and abstinence. Our secondary outcomes indicated that smokers in the intervention group were more likely to have made a quit attempt (41.1 percent vs. 35.8 percent, p<0.05), and to be thinking of quitting in the next thirty days (33 percent vs. 26.2 percent, p<0.01) than smokers in the control group.

The limited effectiveness on smoking cessation in this study may be due to a number of factors. The prevalence of smoking among our sample was almost half that reported for the state of Oregon, and this sample may represent a unique group of smokers because they were more likely to be highly educated, employed, and covered by dental insurance. Smokers have been “saturated” with antismoking messages delivered regularly by the media and other health care providers, which may reduce the response to this intervention. In addition, the cessation message was delivered primarily by dental hygienists, who do not feel as comfortable discussing the oral health effects of smoking as those related to ST use. Finally, even though there is now strong evidence for the efficacy of Nicotine Replacement Therapy, it was not a focus of the intervention.

Our research has shown that feedback from the oral examination, direct advice to quit, provision of written materials, and a follow-up call or repeated contact at recall visits can significantly impact patients’ tobacco use. Dental hygienists and dentists can be effective in helping smokeless tobacco users to quit and smokers to reduce their tobacco use. The next step in our research was to develop and evaluate different methods for disseminating this successful program to dental hygienists and dentists in fee-for-service clinics.

Disseminating the Dental Office-Based Tobacco Cessation Program

In a recently completed study, we assessed the effectiveness of two methods (workshops and self-study materials) for disseminating our successful smokeless tobacco cessation program. Over 1,000 dental hygienists from twenty U.S. cities in twelve states were sent recruitment materials inviting them to participate in a self-study course or attend a workshop. Cities were stratified by size, and randomized to one of three conditions: self-study, workshop, or delayed instruction (delayed receipt of self-study materials). The self-study consisted of a workbook with exercises and a final quiz (used to obtain continuing education credit) and a video describing and modeling the behaviors and skills described in the workbook. A set of patient materials was also included with the self-study materials. The workshop consisted of a workbook with exercises and a final quiz (used to obtain continuing education credit) and a video describing and modeling the behaviors and skills described in the workbook. A set of patient materials was also included with the self-study materials. The workshop condition used the same format as that conducted in our private practice study, described above, although the intervention focused primarily on smokeless tobacco. The workshops took place in seven cities in the western United States.

Behavior and attitudes of hygienists were measured prior to enrollment and at three and twelve months after instruction. Attitudes of employer den-
tists were also measured prior to enrollment and at twelve months after instruction. Changes from pre- to post-training in three sets of behaviors were used to evaluate the effectiveness of the training: Routine Behaviors regarding SLT (e.g., assessing, documenting, and discussing hazards of use); Cessation Counseling techniques (e.g., advising patients and discussing strategies to quit); and Perceived Barriers (attitudes to providing cessation services).56 More than 1,000 registered hygienists in twenty cities (thirteen states) completed a telephone survey assessing these behaviors and attitudes regarding ST cessation.56

Overall, 37 percent of hygienists who were mailed recruitment materials enrolled in training. There were no significant differences in enrollment due to type of training offered or size of city. Analyses of the twelve-month post-training data using repeated measures analysis of variance showed that hygienists who attended the workshop or received the self-help materials were more likely to increase the extent of their direct cessation advice (p<0.05) and perceived fewer barriers to giving cessation advice (p<0.001) than hygienists in the delayed instruction condition. Additionally, hygienists who attended the workshop were more likely to increase the extent of their direct cessation advice than were those who received the self-study materials (p<0.01). These results show that a training program for DHCWs can be disseminated nationally and that DHCWs can learn to carry out the intervention, whether they attend a workshop or learn via a self-study manual and video.

Our recently completed cost-effectiveness analyses showed that the self-study condition was inexpensive (only $35 per enrolled subject, including the costs attributable to hygienist time, and $16 without factoring in time), whereas the workshop condition was, at minimum, three times more expensive to provide. Self-study is also the more cost-effective way to achieve behavior change than via workshops, even though workshop participants are more likely to adopt the desired behavior than people using self-study materials. Another way to look at the cost-benefit analysis is to evaluate the incremental cost per unit of change in the composite scale of desired behavior at twelve-month follow-up. This cost was $82 for self-study vs. delayed instruction and $134 for workshop vs. self-study.

These studies have demonstrated the viability of using dentists and hygienists to provide advice and supportive materials to encourage smokeless tobacco users to quit in the context of regular oral health visits. The results of these studies also support the timeliness of further dissemination of this program. Our smokeless tobacco cessation program is effective, and we have encouraged diffusion to the dental community through publications (like the Journal of the American Dental Association), presentations at state and local dental society meetings, and workshops to dental health care workers across the United States.

**Future Directions**

We are continuing our tobacco cessation research in dental settings. Our current research is focusing on improving and adapting our existing intervention and training programs. Our goals are to increase the effectiveness of the dental office-based cessation intervention for patients who smoke and adapt the intervention for use in public health dental clinics and with special populations (e.g., minorities, recent immigrants, homeless, and HIV-positive patients). We have recently begun a study to evaluate our intervention with tobacco users in a large public health dental clinic in Portland, Oregon. The smoking rate is very high in the clinic (44 percent), and we anticipate intervening with 200 smokers and chewers over a six-month period.

We plan to improve the intervention for smokers by teaching dentists and dental hygienists brief motivational interviewing techniques, instructing them in the proper use of Nicotine Replacement Therapy and other forms of pharmacotherapy for tobacco cessation, and providing patients with two brief sessions of telephone support/counseling as a follow-up to their office visit. Each of these components has been demonstrated to be effective in tobacco cessation research, although they have not been used together and evaluated in a dental office setting.

We hope to adapt the program for use with special populations by adapting motivational and cessation materials for this population (including translating the materials into Spanish, Russian, Bosnian, and Vietnamese). We will solicit input from DHCWs and patients at the clinic as to what motivates and assists patients to quit and identify issues, barriers, and lifestyle factors that interfere with cessation. The Public Health Dental Clinic study will be completed...
by June 2002, and, if effective, we hope to expand our work with this population.

In addition to our study in public health clinics, we are developing an interactive computer-based training program designed to train dental health care workers in brief office-based tobacco cessation interventions. Although our research showed that self-study was more cost-effective than workshops in training hygienists to conduct this type of intervention, the self-study format required following the program in a linear fashion while coordinating the study guide with a videotape. In addition, the self-study format does not provide the opportunity for questions and interaction that commonly takes place in a workshop setting. An interactive computer-based training program can address many of these issues. The interactive program will be designed so that dentists, dental hygienists, dental assistants, and students can all make use of the training, as the interface will allow the material to be specifically tailored to their professional role.

There are several advantages for a computer-based training program. It can be used privately, at any time, yet provides an interactive training experience. Computer-based training can also reduce some of the burden on clinical faculty in dental schools and dental hygiene programs. This type of technology can incorporate video, graphics, text, and sound as well to teach and model behavioral skills for dealing with an addictive behavior—something that faculty may not feel is an area of expertise. Finally, our computer-based program will contain built-in assessments to determine the level of comprehension of the user. These assessments can be incorporated into existing curriculum, continuing education, or research.

Conclusions

Our randomized clinical trials have shown that a brief dental office-based intervention can be effective in helping ST-using patients to quit and smokers to reduce their use and become more ready to quit. Dissemination of the program was successful in that a large percentage of hygienists were interested in receiving the training, and both the workshops and self-study increased cessation counseling and decreased perceived barriers. Workshops were more effective than self-study in effecting behavior change, although our analyses indicate that self-study was more cost-effective. An interactive computer-based training program may be able to combine the personalization that is characteristic of workshops with the ease and cost-effectiveness of self-study materials.

As behavioral researchers and educators, we are attempting to bring about behavior change, both among patients and DHCWs. In some ways, it has been harder to change dental health care workers’ behavior. We have found that it is important to change attitudes and behaviors early in the educational process because tobacco cessation is unfamiliar territory for most DHCWs. Education, the opportunity to practice, and routine use of the skills are needed to change behavior and practice patterns. DHCWs must first believe that they can adequately address a situation before they are willing to try incorporating new behaviors into routine practice. This has been referred to as “self-efficacy,” and one must acknowledge and address practical and perceived barriers before turning to skill development.

It is extremely important to disseminate successful tobacco intervention educational programs to dental schools. We have focused on training DHCWs who are already in practice, but these skills would best be incorporated into the dental school and dental hygiene program curriculum in workshop format, self-study, or as an interactive computer-based program.

Tobacco use is the major preventable cause of disease and death in our society. Although the cessation rate for brief office-based models may seem modest, if all dental health care workers provided cessation services and were able to assist 10 percent of their tobacco-using patients to quit, the impact would be immense. For all patients’ sake, we must continue to work towards universal adoption of tobacco cessation intervention at each clinical encounter.

REFERENCES


