

Smoking Cessation: Integration of Behavioral and Drug Therapies

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Family physicians should take advantage of each contact with smokers to encourage and support smoking cessation. Once a patient is identified as a smoker, tools are available to assess readiness for change. Using motivational interviewing techniques, the physician can help the patient move from the precontemplation stage through the contemplation stage to the preparation stage, where plans are made for the initiation of nicotine replacement and/or bupropion therapy when indicated. Continued motivational techniques and support are needed in the action stage, when the patient stops smoking. Group or individual behavioral counseling can facilitate smoking cessation and improve quit rates. Combined use of behavioral and drug therapies can dramatically improve the patient's chance of quitting smoking. A plan should be in place for recycling the patient through the appropriate stages if relapse should occur. (*Am Fam Physician* 2002;65:1107-14,1117. Copyright© 2002 American Academy of Family Physicians.)

▶ A patient information handout on how to stop smoking, written by the author of this article, is provided on page 1117.



Despite increased research on smoking, heightened awareness of the consequences of smoking, and considerable publicity about litigation against tobacco companies, statistics published within the past five years indicate that 23.5 percent of adults in the United States continue to smoke.¹ Even more alarming is the increase in smoking among persons 18 to 24 years of age, almost 33 percent of whom currently use tobacco. In this age group, smoking rates increased by 32 percent between 1991 and 1997.²

Although 70 percent of patients who smoke say they would like to quit, only 7.9 percent are able to do so without help.³ The advice of a physician alone can improve the smoking cessation rate to 10.2 percent.⁴ The combined use of nicotine replacement, bupropion (Zyban), and social or behavioral support can increase the quit rate to 35 percent.⁵

Smoking cessation treatment is effective and should be offered to smokers at every office or clinic visit. This article outlines a practical approach that can increase the likelihood of successful smoking cessation.

Identification of the Smoker and Assessment of Readiness to Quit

It is important to add a question about smoking to the questions routinely asked while a patient's vital signs are being taken. Physicians have been shown to be three times more likely to intervene when they know that a patient smokes.⁶

Further assessment using a modified CAGE questionnaire (*Table 1*)⁷ or an abbreviated form of the Fagerström test (*Figure 1*)^{8,9} can provide information about whether a patient is addicted to or physically dependent on nicotine.¹⁰ Once the diagnosis of nicotine dependence is made, the next step is to assess the patient's readiness to change. The five-stage transtheoretical model for readiness to change can be applied to addictive behaviors such as smoking.¹¹ The five stages in this model are precontemplation, contemplation, preparation, action, and maintenance.

In the precontemplation stage, a patient does not believe that smoking is a problem or refuses to consider smoking cessation. In the contemplation stage, the patient recognizes that smoking is a problem and wants to stop. During the

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preparation stage, the patient makes specific plans to stop smoking, such as setting a quit date and determining how smoking cessation will be accomplished. In the action stage, the patient stops smoking. Finally, the maintenance stage is marked by the patient's continued abstinence from smoking. Relapse to smoking behavior is common. Patients often cycle through the stages of change several times before reaching stable abstinence.¹¹

Motivational Interviewing

PRECONTEMPLATION STAGE

To select the most appropriate interventions, the family physician needs to know the patient's present readiness to change. Offering a prescription for nicotine replacement to a patient who is in the precontemplation stage is unlikely to be successful, because doing so essentially asks the patient to move from precontemplation to action without going through the necessary intervening stages. Rather, the physician should encour-

age the patient in the precontemplation stage to think about his or her smoking and to consider the possibility that smoking is a problem that needs attention.

Brief interventions can be effective in the precontemplation stage and as the patient moves from one stage to the next.¹² Effective interventions include the following:

1. Educate the patient about the effects of smoking.
2. Recommend changes in behavior.
3. List options for achieving behavioral change.
4. Discuss the patient's reactions to the physician's feedback and recommendations.
5. Follow up to monitor and reinforce behavioral change.

This process, known as "motivational interviewing," uses empathy rather than confrontation. It acknowledges that the patient, not the physician, is responsible for changing behavior.¹³

CONTEMPLATION STAGE

If further discussion on the return visit reveals that the patient now agrees that smoking is a problem and would like to consider quitting, the patient has entered the contemplation stage. Interventions to consider at this stage include providing further education about the effects of smoking and encouraging the patient to consider the positive aspects of not smoking, such as improved health, a more positive self image, and economic savings.

PREPARATION STAGE

Once the patient agrees that the benefits of not smoking outweigh the pleasure derived from smoking and has decided to quit, he or she has entered the preparation stage. At this point, it is appropriate to discuss various nicotine replacement systems, the possible use of bupropion, and the need for social and family support. The physician should also help the patient develop a clear plan for smoking cessation.

TABLE 1
CAGE Questionnaire for Smoking*

1. Have you ever tried to, or felt the need to, **C**ut down on your smoking?
2. Do you ever get **A**nnoyed when people tell you to quit smoking?
3. Do you ever feel **G**uilty about smoking?
4. Do you ever smoke within one-half hour of waking up (**E**ye-opener)?

*—Two "yes" responses constitute a positive screening test.

Adapted with permission from Lairson DR, Harrist R, Martin DW, Ramby R, Rustin TA, Swint JM, et al. Screening for patients with alcohol problems: severity of patients identified by the CAGE. *J Drug Educ* 1992;22:337-52.

Tasks for the patient and physician during the preparation stage may include the following¹⁰:

1. Setting a definite quit date. Often, a meaningful date, such as a birthday or anniversary, provides the patient with increased motivation.

2. Gathering support for smoking cessation. The patient should let family members and other significant persons know that he or she has decided to quit smoking on a certain date, and should ask those individuals for help. The physician might encourage the patient to take part in a support group or a community or agency program that focuses on smoking cessation.

3. Preparing the environment. The patient should be counseled to remove cigarettes, ashtrays, and other smoking-related paraphernalia from his or her home, car, and office. The patient should ask others not to smoke in his or her presence.

4. Formulating plans to avoid triggers. When prompted, many patients can identify images, rituals, sensory experiences, and emotional rewards that they associate with smoking. The physician and patient can begin to discuss healthy substitution behaviors that might help prevent relapse. Counseling patients to avoid alcohol is a good strategy because drinking lowers inhibitions, thereby reducing the chance of successful smoking cessation.

5. Selecting a nicotine replacement system, if needed.

6. Initiating bupropion, if needed. If bupropion is part of the smoking cessation plan, treatment should be initiated one to two weeks before the quit date.

ACTION AND MAINTENANCE STAGES

The action stage begins on the quit date. By this date, bupropion should have been started (if used), the nicotine replacement system of choice should be on hand (if used), and the patient's environment should have been cleared of smoking-related materials.

During the action stage, behavioral support through self-help or professionally run group

Once a patient is in the preparation stage for quitting smoking, it is appropriate to discuss specific smoking cessation methods.

meetings, frequent office visits, and/or telephone calls from support personnel can enhance the effectiveness of the cessation attempt.¹⁴ The purpose of these contacts should be to support continued smoking cessation in the recently abstinent smoker. These contacts should be made at least weekly in the first month, and again when the patients stops nicotine replacement and bupropion therapy.

It is important for the patient to report perceived benefits from having stopped smoking, side effects of medications, and current or anticipated difficulty in maintaining absti-

Brief Fagerström Test for Nicotine Dependence

Answer the two questions below. Check your total score against the scoring key.

1. How soon after waking do you smoke your first cigarette?

- Less than five minutes (3 points)
- 5 to 30 minutes (2 points)
- 31 to 60 minutes (1 point)

2. How many cigarettes do you smoke each day?

- More than 30 cigarettes (3 points)
- 21 to 30 cigarettes (2 points)
- 11 to 20 cigarettes (1 point)

SCORING KEY: 5 to 6 points = heavy nicotine dependence; 3 to 4 points = moderate nicotine dependence; 0 to 2 points = light nicotine dependence.

FIGURE 1. Abbreviated Fagerström Test for Nicotine Dependence. Family physicians can use this quickly administered tool to evaluate intensity of nicotine dependence or addiction in their patients.

Adapted with permission from Rustin TA. Pharmacologic treatment of nicotine dependence. In: The certification review course in addiction medicine for the American Society of Addiction Medicine. Chevy Chase, Md.: American Society of Addiction Medicine, 1998; based on information in Heatherton TF, Kozlowski LT, Frecker RC, Fagerström KO. The Fagerström Test for Nicotine Dependence: a revision of the Fagerström Tolerance Questionnaire. Br J Addict 1991;86:1119-27.

Smoking Cessation

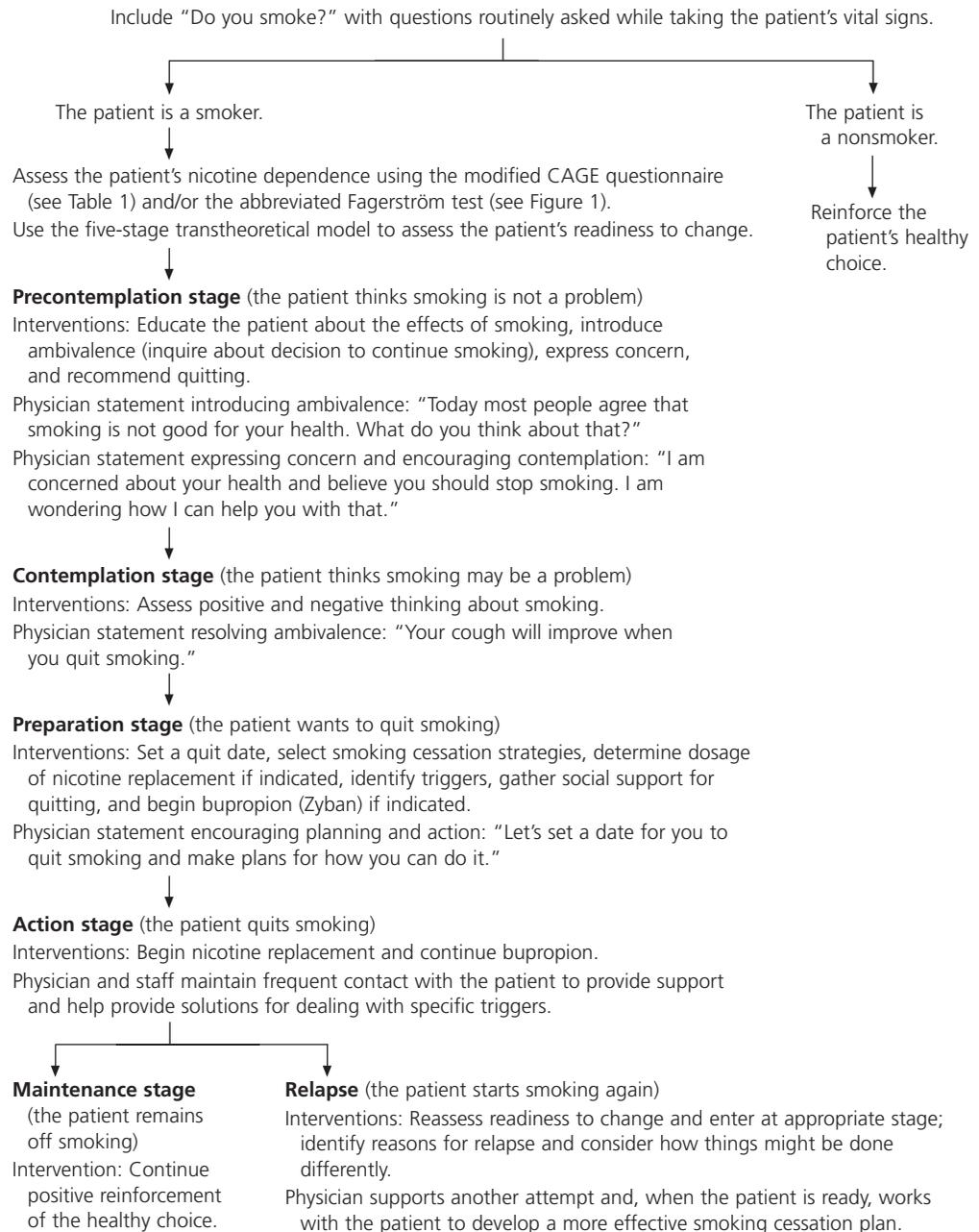


FIGURE 2. A suggested approach to smoking cessation, based on the transtheoretical model for readiness to change.

nence. Healthy substitution behaviors may help to prevent relapse.

A suggested approach to smoking cessation, based on the transtheoretical model, is outlined in *Figure 2*.

Pharmacotherapy

Signs and symptoms of nicotine withdrawal include irritability, anxiety, decreased heart rate, increased appetite, food cravings, restlessness, and difficulty concentrating.¹⁵ In patients with moderate or high nicotine dependence (*Figure 1*),^{8,9} medications that lessen these signs and symptoms can help to prevent relapse in the early stages of smoking cessation¹⁰ (*Table 2*).

NICOTINE REPLACEMENT

Nicotine replacement by any delivery system has been shown to double the smoking cessation rate.¹⁶ Currently, four forms of nicotine delivery are available: patch, gum, inhaler, and nasal spray. Some data indicate that use of a combination of delivery methods, such as the gum and the patch, may be useful in heav-

ily nicotine-dependent smokers.¹⁷ Nicotine replacement is initiated on the quit date.

Nicotine Patch. A number of transdermal nicotine replacement systems (Habitrol, Nicoderm CQ, Nicotrol) are available over the counter. The results of the Fagerström Test for Nicotine Dependence can be used to determine the appropriate starting patch strength for a patient.⁹ However, the proper initial dose can be determined more quickly using the patient's score on the abbreviated Fagerström test (*Figure 1*^{8,9}): a score of 5 to 6 warrants use of the 21-mg nicotine patch; a score of 3 to 4 means that the 14-mg nicotine patch is appropriate for initial therapy; and a score of zero to 2 indicates initial use of the 7-mg nicotine patch.⁸

Adverse reactions to transdermal nicotine replacement systems seldom cause discontinuation of therapy. From 30 to 50 percent of patients experience mild skin irritation under the patch. In most patients, this problem can be alleviated by rotating patch application sites. Sleep disruption is usually resolved by removing the patch at bedtime.¹⁶

TABLE 2
Effective Pharmacotherapy for Nicotine Withdrawal

<i>Drug and delivery system</i>	<i>Initial dosage</i>	<i>Maintenance dosage</i>	<i>Duration of therapy</i>	<i>Approximate cost*</i>
Nicotine replacement				
Patch (Habitrol, Nicoderm CQ, Nicotrol)	One patch per day (21 mg, 14 mg, or 7 mg, depending on degree of nicotine dependence)	Taper to next lowest patch strength in 4 to 6 weeks.	8 to 12 weeks	\$89 to 124
Gum, 4-mg strength (Nicorette)	10 to 15 pieces per day	Five to eight pieces per day	8 weeks to 5 years	73
Inhaler (Nicotrol Inhaler)	Four inhalers per day	Four inhalers per day, with gradual tapering of use	8 to 12 weeks	123
Nasal spray (Nicotrol NS)	Four sprays per hour	Eight to 80 sprays per day, with gradual tapering of use	8 to 12 weeks	\$170 to 255 (four to six bottles)
Bupropion (Zyban)	150 mg per day for 3 days	150 mg twice daily	8 to 12 weeks	96

*—Estimated cost to the pharmacist for 30 days of treatment, based on average wholesale prices (rounded to the nearest dollar) in Red book. Montvale, N.J.: Medical Economics Data, 2001. Cost to the patient will be higher, depending on prescription filling fee.

It is important to discourage patients from smoking while they are using the nicotine patch. The combination of smoking and nicotine patch use results in discomfort from higher nicotine levels; more importantly, it increases the likelihood of relapse to virtually 100 percent.¹⁸ Concerns about sudden cardiac death as a result of concomitant smoking and nicotine patch use have been allayed by two clinical trials^{19,20} that showed no increase in morbidity or mortality associated with nicotine patch use in smokers with heart disease.

Nicotine patches should be used for about eight to 12 weeks. Tapering to the next lowest dose (e.g., 21 mg to 14 mg) can be done after four to six weeks. The patient who starts with the 7-mg patch should continue using that patch for six weeks.

Nicotine Gum. Nicotine polacrilex (Nicorette) is available over the counter in 2-mg and 4-mg strengths. The gum is most effective in the 4-mg strength, with initial use of 10 to 15 pieces of gum per day. After two weeks, most patients can change to the 2-mg strength.

The most important adverse events associated with nicotine gum appear to be gastrointestinal side effects from swallowing large amounts of nicotine when the gum is used improperly. Nicotine gum is intended to be parked in the buccal area and chewed once or twice every few minutes. If the gum is chewed too quickly, nicotine is swallowed with saliva, and nausea or dyspepsia can result.

Nicotine Inhaler. A nicotine inhalation system (Nicotrol Inhaler) has recently become

available by prescription. The nicotine is primarily absorbed through the oral cavity (36 percent) and the esophagus and stomach (36 percent), rather than through the lungs (4 percent). Currently, four inhalers a day must be used to achieve adequate nicotine levels. Hence, frequent dosing is required, with each inhaler containing 500 puffs. Side effects include mouth and throat irritation.²¹

Nicotine Nasal Spray. Nicotine replacement can also be accomplished with a nasal spray (Nicotrol NS), which is available by prescription. The use of four sprays per hour or a maximum of 80 sprays per day is recommended. Nasal and throat irritation, rhinorrhea, and nausea are common side effects.

Comparison of Delivery Systems. Data are lacking on which nicotine delivery system is most effective. Because all four systems appear to be efficacious, patient preference usually determines the choice of nicotine replacement modality. For example, the patient who needs to be doing something with his or her hands may prefer the nicotine inhaler over the nicotine patch. The patient who is concerned about gaining weight may prefer to use nicotine gum, which has been shown to delay (but not prevent) weight gain associated with smoking cessation.²²

BUPROPION

Bupropion and nicotine replacement have been shown to have similar positive effects on quit rates. Combined use of these agents appears to be the most effective treatment for nicotine dependence.

Bupropion inhibits the uptake of norepinephrine, serotonin, and dopamine. The mechanism by which bupropion enhances the ability of patients to abstain from smoking is unknown; however, the drug is believed to reduce the urge to smoke through its effect on the norepinephrine and dopamine neurotransmitter systems.

One controlled trial⁵ found that bupropion therapy resulted in a 12-month abstinence rate of 30 percent, compared with 16 percent

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for nicotine replacement therapy alone. Combination therapy using bupropion plus nicotine replacement resulted in an even higher 12-month quit rate (36 percent).

Bupropion therapy is initiated in a dosage of 150 mg per day for three days. The dosage is then increased to 150 mg twice daily. The quit date should be set for one to two weeks after bupropion therapy is initiated. Bupropion therapy is usually continued for eight to 12 weeks after the patient has quit smoking.

Contraindications to the use of bupropion include a history of seizure disorder and the presence of eating disorders or uncontrolled hypertension. The most common side effects of the drug are dry mouth and sleep disturbance. Nicotine-dependent patients with comorbid depression may benefit from bupropion therapy.²²

OTHER DRUGS

Silver acetate, which causes cigarettes to have a bad taste, has been used as a smoking cessation aid for many years. The literature contains no support for this agent as an effective adjunct.²³

Alprazolam (Xanax) and other benzodiazepines have been used to reduce the anxiety associated with nicotine withdrawal. However, treatment with benzodiazepines has not been shown to improve smoking cessation rates.

Clonidine (Catapres) initially appeared to be useful in the treatment of nicotine withdrawal,²⁴ but long-term quit rates did not improve when this drug was used alone.¹⁵

The addition of mecamylamine (Inversine), a ganglionic blocker classified as an antihypertensive agent, to transdermal nicotine replacement has been shown to improve the abstinence rate in smokers, compared with use of the patch alone.²⁵

Dealing with Relapse

Most patients relapse within the first six to 12 months of a smoking cessation attempt. If a patient relapses, the physician needs to encourage the patient to try again. It is useful

If bupropion is to be used in smoking cessation, the drug should be started one to two weeks before the planned quit date.

to review the treatment plan to determine what did and did not work.

A patient may not return immediately after a relapse and may smoke for months before another visit. At that point, the patient's readiness to change needs to be reevaluated, and the smoking cessation process must be repeated.

Nicotine dependence is a tenacious and difficult addiction to treat successfully. Clearly, perseverance on the part of the patient and the physician is most effective for achieving permanent abstinence. The use of nicotine replacement and bupropion can improve results, and the application of readiness-to-change strategies and motivational interviewing techniques are essential for success.

Behavioral therapy and support in a group setting have been shown to improve quit rates. Individual counseling can also be effective. A supportive telephone call during the first few days of abstinence may help the patient who is trying to quit smoking.^{26,27}

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REFERENCES

1. State-specific prevalence of cigarette smoking among adults, and children's and adolescents' exposure to environmental tobacco smoke—United States, 1996. *MMWR Morb Mortal Wkly Rep* 1997; 46:1038-43.
2. Rigotti NA, Lee JE, Wechsler H. US college students' use of tobacco products: results of a national survey. *JAMA* 2000;284:699-705.
3. Cigarette smoking among adults—United States, 1993. *MMWR Morb Mortal Wkly Rep* 1994;43: 925-30.
4. Jorenby DE, Fiore MC. The Agency for Health Care Policy and Research smoking cessation clinical practice guideline: basics and beyond. *Prim Care* 1999;26:513-28.
5. Jorenby DE, Leischow SJ, Nides MA, Rennard SI, Johnston JA, Hughes AR, et al. A controlled trial of

- sustained-release bupropion, a nicotine patch, or both for smoking cessation. *N Engl J Med* 1999; 340:685-91.
6. Fiore MC. Smoking cessation. Rockville, Md.: U.S. Dept. of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, Centers for Disease Control and Prevention, 1996. Clinical practice guideline no. 18; AHCPR publication no. 96-0692.
 7. Lairson DR, Harrist R, Martin DW, Ramby R, Rustin TA, Swint JM, et al. Screening for patients with alcohol problems: severity of patients identified by the CAGE. *J Drug Educ* 1992;22:337-52.
 8. Rustin TA. Pharmacologic treatment of nicotine dependence. In: *The certification review course in addiction medicine for the American Society of Addiction Medicine*. Chevy Chase, Md.: American Society of Addiction Medicine, 1998.
 9. Heatherton TF, Kozlowski LT, Frecker RC, Fagerström KO. The Fagerström Test for Nicotine Dependence: a revision of the Fagerström Tolerance Questionnaire. *Br J Addict* 1991;86:1119-27.
 10. Rustin TA. Assessing nicotine dependence. *Am Fam Physician* 2000;62:579-84,591-2.
 11. Prochaska JO, DiClemente CC, Norcross JC. In search of how people change. Applications to addictive behaviors. *Am Psychol* 1992;47:1102-14.
 12. Barnes HN, Samet JH. Brief interventions with substance-abusing patients. *Med Clin North Am* 1997;81:867-79.
 13. Miller WR, Rollnick S. *Motivational interviewing: preparing people to change addictive behavior*. New York: Guilford, 1991.
 14. Fiore MC, Novotny TE, Pierce JP, Giovino GA, Hatzianandreu EJ, Newcomb PA, et al. Methods used to quit smoking in the United States. Do cessation programs help? *JAMA* 1990;263:2760-5.
 15. Rustin TA. Management of nicotine withdrawal. In: *Principles of addiction medicine*. 2d ed. Chevy Chase, Md.: American Society of Addiction Medicine, 1998: 487-95.
 16. Prochazka AV. New developments in smoking cessation. *Chest* 2000;117(4 suppl):169S-75S.
 17. Kornitzer M, Boutsen M, Dramaix M, Thijs J, Gustavsson G. Combined use of nicotine patch and gum in smoking cessation: a placebo-controlled clinical trial. *Prev Med* 1995;24:41-7.
 18. Gourlay SG, Forbes A, Murriner T, Pethica D, McNeil JJ. Prospective study of factors predicting outcome of transdermal nicotine treatment in smoking cessation. *BMJ* 1994;304:842-6.
 19. Joseph AM, Norman SM, Ferry LH, Prochazka AV, Westman EC, Steele BG, et al. The safety of transdermal nicotine as an aid to smoking cessation in patients with cardiac disease. *N Engl J Med* 1996; 335:1792-8.
 20. Nicotine replacement therapy for patients with coronary artery disease. Working Group for the Study of Transdermal Nicotine in Patients with Coronary Artery Disease. *Arch Intern Med* 1994;154: 989-95.
 21. Fant RV, Owen LL, Henningfield JE. Nicotine replacement therapy. *Prim Care* 1999;26:633-52.
 22. A clinical practice guideline for treating tobacco use and dependence: a US Public Health Service report. The Tobacco Use and Dependence Clinical Practice Guideline Panel, Staff, and Consortium Representatives. *JAMA* 2000;283:3244-54.
 23. Lancaster T, Stead LF. Silver acetate for smoking cessation. *Cochrane Database Syst Rev* 2000;(2): CD000191.
 24. Glassman AH, Jackson WK, Walsh BT, Roose SP, Rosenfeld B. Cigarette craving, smoking withdrawal, and clonidine. *Science* 1984;226:864-6.
 25. Rose JE, Behm FM, Westman EC, Levin ED, Stein RM, Ripka GV. Mecamylamine combined with nicotine skin patch facilitates smoking cessation beyond nicotine patch treatment alone. *Clin Pharmacol Ther* 1994;56:86-99.
 26. Lancaster T, Stead LF. Individual behavioural counselling for smoking cessation. *Cochrane Database Syst Rev* 2000;(2):CD001292.
 27. Carlson LE, Taenzer P, Koopmans J, Bultz BD. Eight-year follow-up of a community-based large group behavioral smoking cessation intervention. *Addict Behav* 2000;25:725-41.