

An Algorithm for Smoking Cessation

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An algorithm for physician-based treatment for smoking cessation is presented based on the following guidelines: (1) Smokers who are not contemplating cessation need motivational interventions. (2) Smokers who are contemplating cessation need information about treatments. (3) Smokers ready for action need to set a quit date. (4) Formal therapy for smoking cessation is indicated only after a failed attempt. (5) Nicotine withdrawal symptoms or high scores on the Fagerstrom Tolerance Scale are indications for pharmacotherapy. (6) Transdermal nicotine with or without nicotine polacrilex is the preferred first-step pharmacotherapy. (7) Among smokers receiving nicotine replacement, group behavioral therapy should be encouraged but not be required. (8) Nondependent smokers (those who do not need pharmacotherapy but need treatment) should participate in group behavioral therapy. (9) Those who fail to quit with nicotine replacement and/or group behavior therapy should be screened for psychiatric and alcohol and other drug problems and should be referred for individual therapy. (Arch Fam Med. 1994;3:280-285)

In the last 10 years, several treatments for smoking cessation have been developed and scientifically validated.¹⁻⁴ In addition, several smoking cessation products have been successfully marketed. These two events have led to a substantial demand by physicians and health care organizations for guidelines for using smoking cessation therapies. Some guidelines and algorithms for integrating these treatments into smoking cessation protocols have been proposed.⁵⁻⁸ This report proposes an algorithm for smoking cessation based on the principles of matching patients to treatments, ie, using patient characteristics to choose the most effective treatment and stepped care, ie, exhausting less intensive therapies before using more intensive therapies. This algorithm differs somewhat from other algorithms in that it integrates many treatments into a simple, concrete protocol that can be used by primary care physicians, health maintenance organizations, and others.

The rationale and empirical evidence for the utility of each guideline is given below and various diagnostic and treatment procedures are recommended. Because of space constraints, these procedures are only briefly described.

INITIAL SCREENING AND TREATMENT

Smokers can be classified as precontemplators, contemplators, and action-stage smokers.⁹ Precontemplators are smokers who have no thoughts of stopping. For this group, the algorithm calls for physicians to elicit and discuss personal reasons for cessation and personal barriers to cessation and to provide written motivational materials⁹⁻¹² (**Figure**).

Contemplators are smokers who are considering cessation but have no concrete plans. For this group, the physician again needs to determine reasons for cessation and anticipated barriers. In addition, the physician should ask about prior quit attempts, therapies used, and the

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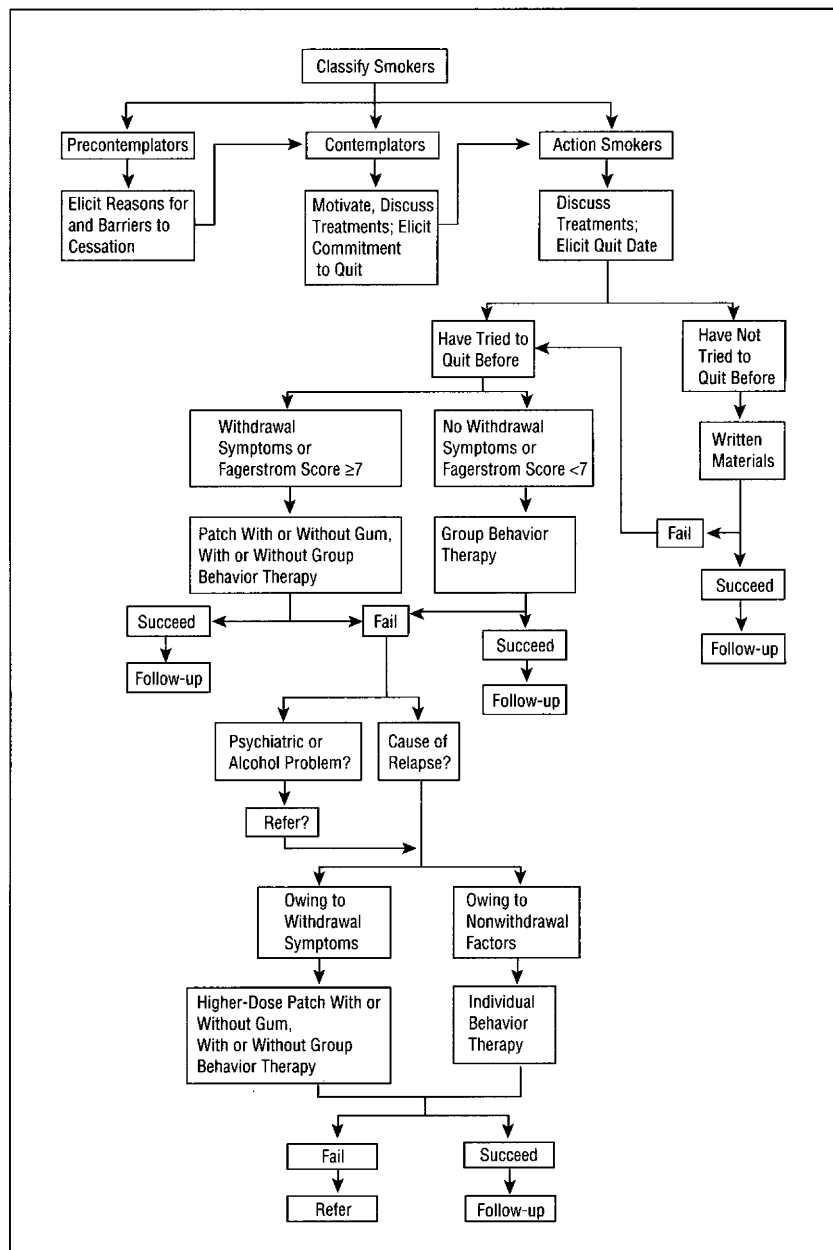
smoker's perceptions about therapies to use in the next attempt. The physician can then provide verbal or written information about these treatments. The physician should then attempt to elicit a commitment to attempt cessation in the near future, or, better yet, elicit a specific quit date. Even though a commitment to quit will be obtained in only a minority of smokers, making such a commitment appears to be an important motivational tool.⁹⁻¹² For those who do not wish to make such a commitment, an agreement to discuss cessation at later visits is indicated.

Smokers in the action stage are ready to quit. With these smokers, the physician should discuss treatment options and attempt to elicit a specific quit date. The physician should

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also ask about prior serious quit attempts (eg, those in which the smoker was trying to quit for good and stopped for at least 1 day). If the smoker has not previously tried to quit, simple brief advice and provision of written materials are all that are indicated. This is because 45% of individuals who have ever smoked have stopped smoking and more than 90% of them did so without any therapy¹³; thus, only minimal interventions may be necessary for many patients.

Minimal approaches, such as bibliotherapy (eg, brochures, booklets) and brief physician advice (5 to 10 minutes) typically increase long-term abstinence from 5% to 10% among individuals in no-intervention groups to 10% to 20% among those in minimal-intervention groups.¹⁴ Higher quit rates are achieved with more follow-up, especially if follow-up occurs soon after the quit date; eg, 2 to 7 days after cessation.¹⁴ Although the size of the therapeutic effect of minimal interventions may appear small, one must consider the small cost of the intervention in terms of time and money and the large benefit to patients of smoking cessa-



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tion. In addition, these success rates are not that different from the increase in 5-year survival rates for patients with lung cancer when patients receive time-consuming, expensive, and unpleasant chemotherapy, radiation, or surgery.

USE OF PHARMACOTHERAPY

More than 70% of current smokers have already tried to stop smoking and have failed.¹³ Although somewhat oversimplistic, failures at ces-

sation can be classified into those due to withdrawal symptoms and those due to situational factors.

The valid symptoms of nicotine withdrawal are anxiety, awakening at night, craving, depression, difficulty concentrating, hunger, impatience, insomnia, irritability, and restlessness.^{15,16} If the patient has failed to quit smoking, in substantial part because of these withdrawal symptoms, then pharmacotherapy is indicated. The rationale for this guideline is based on the

premise that the only proven smoking cessation pharmacotherapy, ie, nicotine replacement, is effective because it decreases withdrawal symptoms that precipitate relapse.¹⁷

ANOTHER possible indicator of the need for pharmacotherapy is a score of 7 or more on the Fagerstrom Tolerance Scale (FTS), an 8-item questionnaire that measures nicotine dependence.¹⁸ The rationale for using the FTS is that pharmacotherapy is best indicated for the more dependent smoker. The FTS has repeatedly been shown to predict differential response to nicotine polacrilex, ie, high-dependent smokers do poorly unless they receive nicotine polacrilex and low-dependent smokers are less helped by nicotine polacrilex.¹⁸ The FTS has less consistently predicted response to transdermal nicotine.¹⁹ Patients and physicians are often reluctant to complete forms such as the FTS. If physicians wish to ask patients questions from the FTS, the one that appears to have the best predictive validity is the question that classifies those who smoke in the first 15 minutes after arising as dependent.¹⁸

Several other possible indicators for the use of pharmacotherapy (eg, number of cigarettes per day or the number of prior unsuccessful attempts at smoking cessation) have not consistently predicted response to treatment.

At present, there are three viable options for pharmacotherapy: transdermal nicotine, nicotine polacrilex, and clonidine.^{1,3} Unfortunately, there have been only two publications comparing these treatments, both of which were abstracts that reported only preliminary results.^{20,21}

TRANSDERMAL NICOTINE

In the absence of definitive comparisons of these treatments, the algorithm considers transdermal nicot-

tine to be the preferred first-line therapy for seven reasons: (1) Transdermal nicotine is effective when given with brief physician advice; whether this is true for nicotine polacrilex and clonidine is unclear.¹⁹ (2) Transdermal nicotine more reliably decreases craving than nicotine polacrilex or clonidine.¹⁹ (3) Compliance appears to be higher with transdermal nicotine than with nicotine polacrilex or clonidine.⁵ (4) Transdermal nicotine has greater social acceptability than nicotine polacrilex.^{5,19} (5) Transdermal nicotine produces more constant and higher nicotine replacement than nicotine polacrilex.^{5,19} (6) Much of the data for the efficacy of clonidine are in abstracts or from short-term trials.^{22,23} (7) Clonidine appears to be of little help to male smokers.^{22,23}

NICOTINE POLACRILEX

The algorithm does not recommend nicotine polacrilex as a first-line option; however, nicotine polacrilex may be appropriate for those smokers who have a strong opinion that it is best for them, eg, they strongly believe they need something to do with their mouth. If nicotine polacrilex is used, fixed-schedule dosing (eg, 2 mg/h), higher doses (eg, 4 mg), avoidance of acidic beverages (eg, coffee and soda), and longer durations of therapy (more than 3 months) appear to be helpful.²³

The algorithm suggests adding nicotine polacrilex (2 mg) to transdermal nicotine because the combination produces a greater suppression of withdrawal symptoms than does transdermal nicotine alone.²⁴ The major determinant of whether to add nicotine polacrilex probably should be whether the smoker and physician believe the smoker will comply with its use.

CLONIDINE

The algorithm does not consider clonidine a first-line pharmaco-

therapy. Clonidine appears to be advantageous for a select group of smokers, ie, women who object to the rationale for nicotine replacement.²² However, not all clonidine studies have shown efficacy, and the US Food and Drug Administration has not approved its use for smoking cessation.

ADDING BEHAVIORAL THERAPY TO PHARMACOTHERAPY

The next issue is whether group behavioral therapy (BT) should be required when prescribing transdermal nicotine (details of BT are described in the next section). With nicotine polacrilex therapy, direct experimental studies have shown that adding BT increases quit rates by a factor of 1.6 to 1.8.²⁵ Although similar studies adding BT to transdermal nicotine therapy have not been reported, cross-study comparisons suggest the combination also increases quit rates by a factor of 1.6 to 1.8.²³ Overall, long-term cessation rates with transdermal nicotine and brief advice alone average about 20%; long-term cessation rates with transdermal nicotine and group BT average about 35% to 40%.³

Although these data support referral for BT, group BT is either geographically or financially unavailable for many patients and fewer than 10% of patients will follow-up on referrals to BT.⁴ In addition, as stated above, transdermal nicotine has been shown to be effective when given with brief physician advice alone.¹⁹ Thus, the algorithm calls for encouraging, but not requiring, BT. Because in many locations BT programs are conducted only a few times per year, the smoker and physician will need to discuss whether to wait until the next BT program begins to make an attempt to quit or quit at the present time without BT but while the patient is motivated. Unfortunately, the defining characteristics of smokers who most benefit from BT are unknown. Some au-

thors have suggested that BT is especially indicated in smokers with a history of psychiatric or alcohol and other drug problems⁶; however, this has not been empirically tested.

USE OF BT ALONE

Those smokers who have failed to quit but have had negligible withdrawal symptoms and little evidence of dependence (eg, a smoker who experiences a relapse 2 months after cessation owing to a stressful event) are best referred to a group BT program. Behavioral therapy in both group and individual formats and in varying intensities has been shown to be effective in many studies.⁴ Many public organizations provide low-cost, low-intensity group BT that is adequate for the majority of smokers. As stated above, the major problem with BT is its limited availability and acceptability. Unlike BT, other psychological therapies (eg, acupuncture, hypnosis, and 12-step programs) have not been shown to be consistently effective in controlled trials.^{2,4}

FAILED ATTEMPTS WITH TRANSDERMAL NICOTINE

If dependent smokers fail to quit with transdermal nicotine therapy, the algorithm calls for determining the causes of the relapse and screening for psychiatric and alcohol and other drug problems. In terms of the cause of relapse, the physician should determine whether the patient appeared to experience relapse because of withdrawal (eg, intense irritability) or some nonwithdrawal event (eg, receipt of bad news).

If the relapse was due to withdrawal, then the physician should consider adding nicotine polacrilex to transdermal nicotine if this has not already been done. If the smoker was already using transdermal nicotine and nicotine polacrilex, then the physician should consider using

Rules for Algorithm on Smoking Cessation

1. Smokers who are not contemplating cessation need motivational interventions
2. Smokers who are contemplating cessation need information about treatments
3. Smokers ready for action need to set a date to quit
4. Formal therapy for smoking cessation is indicated only after a failed attempt
5. Nicotine withdrawal symptoms or high scores on the Fagerstrom Tolerance Scale are indications for pharmacotherapy
6. Transdermal nicotine with or without nicotine polacrilex is the preferred first-step pharmacotherapy
7. Among smokers receiving nicotine replacement, group behavioral therapy should be encouraged but not be required
8. Nondependent smokers needing treatment should participate in group behavioral therapy
9. Those who fail to quit with nicotine replacement and/or group behavioral therapy should be screened for psychiatric and alcohol and other drug problems and should be referred for individual therapy

higher doses of transdermal nicotine (eg, a 35-mg dose consisting of a 21-mg patch and a 14-mg patch). Although this does not follow US Food and Drug Administration guidelines, preliminary studies have reported that higher doses are useful.²⁶ In addition, for a given dose of transdermal nicotine, blood nicotine levels will vary fivefold across smokers (eg, from 5 to 25 ng/mL, as opposed to the mean value of 16 ng/mL). It then makes sense that a substantial portion of smokers are obtaining suboptimal doses with the high-dose patch.¹⁷

If the relapse was due to a nonwithdrawal event and if the patient did not already participate in group BT, then requiring group BT in addition to transdermal nicotine therapy on the next attempt is recommended. The rationale for this is that the group BT should help the smoker deal with the nonwithdrawal cause of the relapse.

If the patient did participate in group BT on the last attempt and still had a nonwithdrawal cause of relapse, the patient should receive more intensive, *individual* psychological treatment by a therapist with expertise in smoking cessation. This could be done by a mental health or chemical dependency counselor, health educator, psychologist, or social worker. This is recommended because the antecedents and consequences of smoking can be very id-

iosyncratic and thus unresponsive to the generic recommendations made in group BT.⁴

Of course, both withdrawal and nonwithdrawal causes of relapse can occur concurrently; thus, some patients may require both nicotine polacrilex or a higher-dose patch and intensive psychological therapy.

FAILURES OF BT ALONE

The failure of nondependent smokers to stop smoking when receiving group BT alone should be handled in a manner similar to that for dependent smokers who failed to quit with transdermal nicotine therapy. With these smokers, the algorithm again recommends trying to decide if the failure is due to withdrawal or nonwithdrawal events. If it is the former, then the smoker should be treated with transdermal nicotine with or without nicotine polacrilex, as outlined above. If it is the latter, the smoker should receive individual, intensive psychological therapy.

SCREENING FOR PSYCHIATRIC AND ALCOHOL AND OTHER DRUG PROBLEMS

The algorithm calls for screening all those who failed to quit with first-line therapy for psychiatric and alcohol and other drug problems. This

recommendation is based on five findings: (1) Smokers have a substantially increased psychiatric or alcohol and other drug problem comorbidity.^{27,28} (2) Smokers with such comorbidity are much less likely to stop smoking.^{27,28} (3) Cessation of smoking in the absence of adequate treatment for or resolution of these problems is unlikely.^{27,28} (4) A recent study indicated that addressing psychiatric problems can enhance smoking cessation.²⁷ (5) Anecdotal evidence suggests that smoking cessation may precipitate psychiatric problems in smokers with a history of psychiatric disorders.²⁹

THUS, if the physician discovers *current* psychiatric or alcohol and other drug problems, he or she should decide if the problem appears to be significant enough that treatment of it should precede a cessation attempt. If the physician discovers a past problem, he or she should determine whether cessation of smoking might rekindle the past problem. If either appears possible, the physician should refer the patient to a psychiatrist before recommending another attempt to quit smoking.

If smokers with a present or past psychiatric or alcohol and other drug diagnosis are interested in quitting and have been properly screened, they should be encouraged to do so, ie, psychiatric and alcohol and other drug problems should not be seen as contraindications to smoking cessation.⁶ However, when they attempt to quit, these patients should be monitored closely. They should be seen at least once a week to identify early problems. These patients also should receive both pharmacotherapy (since they are likely to have greater difficulty with withdrawal^{27,28}) and group BT (since they are likely to need training in relapse skills).

REFERRAL

Smokers who fail to quit with all of the above therapies should be referred to a specialist in smoking cessation because the scientific basis for any further treatments is small. Such a specialist might be found by contacting departments of family practice, internal medicine, psychiatry, or psychology or volunteer agencies, such as the American Cancer Society, American Heart Association, or American Lung Association. Decisions about the use of unproven therapies, such as acupuncture, antidepressants, and hypnosis, can be made by the specialist.^{2,3}

RECYCLING

Most smokers make three or four attempts before they stop smoking; thus, many of the smokers whom physicians see will have tried several of the treatments in the algorithm. In deciding which level of care they should receive, the physician should carefully assess the adequacy of the prior treatments (eg, did the smoker actually read the cessation materials or actually stop smoking while using the patch).

SUMMARY

Many physicians have become interested in providing treatment for smoking cessation, yet have heard disparate messages, eg, most patients need only brief advice vs most need medication and many have psychiatric problems. The present algorithm is based on one interpretation of the literature; thus, readers may wish to consider other guidelines for smoking cessation.⁵⁻⁸

This algorithm was intended to integrate different treatments for smoking cessation into a stepped-care, patient-matching protocol that would be simple, concrete, and easily used by primary care physicians and health care organizations. The algorithm may appear complicated

when presented in full (Figure). However, it is actually based on a few decision rules that can be easily memorized or codified. These rules are listed in the **Table**.

Given the substantial interest in smoking cessation by patients, physicians, health care organizations, and policy makers, the well-documented efficacy of several treatments for smoking cessation that differ in cost and intensity, and the many benefits of smoking cessation, physicians need a logical approach to encourage patients to quit. The present algorithm proposes one way to integrate the literature into an action plan.

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