

In Brief

Smoking and other high-risk behaviors can result in devastating health consequences for patients with diabetes, in addition to patients with cardiovascular disease and cancer. The prevention and treatment of smoking should be a high priority for diabetes care providers. Effective strategies to implement behavioral change are discussed.

Avoiding High-Risk Behaviors: Smoking Prevention and Cessation in Diabetes Care

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Avoiding high-risk behaviors is an important area of focus for health care professionals. Smoking represents one of the most significant behavioral threats to the health of individuals because of the devastating consequences of tobacco use. The health effects of smoking are widely known in the general population, but the specific threats that smoking poses to the lives of diabetic patients deserve special attention. State-of-the-art diabetes care should include smoking prevention and cessation as a priority of treatment. This article will review the research about smoking and diabetes and provide recommendations about how to help patients avoid initiating or continuing smoking as a high-risk behavior.

Smoking has received substantial attention as a health behavior, and much is known about the effective prevention and management of this habit. However, there are other high-risk health behaviors that are linked to negative health outcomes and warrant attention in diabetes care. This article, using smoking as a specific model, will highlight how diabetes care providers can approach patients regarding behavioral changes to promote health.

The Cost of High-Risk Behaviors: The Effects of Smoking on Health

Cigarette smoking causes more than 400,000 deaths annually, accounting

for one of every five deaths in the United States.¹ Among smokers, ~43% of deaths for women and 52% of deaths for men are attributable to cigarette smoking.² Smoking is the leading *avoidable* cause of mortality and is one of the most important *modifiable* causes of premature death.¹ This loss of life due to smoking continues despite the decrease in smoking prevalence generally due to public health efforts and increased awareness regarding the health hazards of smoking.²⁻⁴ In addition to smoking, there are multiple high-risk behaviors, as demonstrated by the Behavioral Risk Factor Surveillance Survey, that have a powerful impact on health, including alcohol abuse, poor dietary practices, and sedentary lifestyles.⁵

What causes individuals to begin or continue such a risky behavior? Smoking is a behavior that is maintained by physical addiction, psychological dependence, and habit. Nicotine, the addictive substance in cigarettes, has various mood-altering effects that contribute to and reinforce the highly controlled or compulsive pattern of drug use through smoking.⁶ The pharmacological and biochemical effects of nicotine are powerful, with mood-lifting pleasurable effects along with tension-reducing effects. In addition, through conditioning, smoking becomes associated with daily events, situations, activities, and emotions.

Smoking becomes a ritualized means of coping, woven into daily life, with powerful and immediately reinforcing physical effects.^{7,8} Genetic factors have also been implicated in the initiation and cessation outcomes of smokers.⁹ In sum, powerful physical and psychological processes support compulsive nicotine use and make it difficult for smokers to quit.¹

Smoking bears similarities to other high-risk behaviors. Tobacco dependence and threat of physical withdrawal, for example, help to maintain smoking behaviors much like other substance abuse and dependence disorders. Smoking behavior is often conditioned and linked to activities of daily life and habits and is sometimes used as a way to cope with psychological stress, as are eating habits and dietary patterns. Many of the same methods used to address smoking have been used to prompt behavioral change, both addressing physical and psychological aspects of the high-risk behaviors while taking into account a patient's readiness to change (e.g., using motivational interviewing).

Smoking has a substantial impact on the morbidity and mortality of patients with diabetes. Smoking complicates the health and quality of life of diabetic patients and, in many cases, causes premature death. The American Diabetes Association (ADA) technical review on smoking and diabetes summarized the many risks associated with smoking.¹

One of the greatest risks of smoking is the increased risk of death and morbidity from macrovascular complications in diabetic patients. Patients with either type 1 or type 2 diabetes, compared to patients without diabetes, are already at increased risk for morbidity and mortality related to circulatory and cardiovascular disease. Mortality due to cardiovascular disease is greatly increased among smokers with diabetes. The risk for cardiovascular disease among smokers with diabetes is up to 14 times higher than that for smoking or diabetes alone.

Smoking is also associated with many diabetes complications. Smokers with type 1 diabetes commonly experience nephropathy, and smoking increases the risk of microalbuminuria in type 2 diabetes. Smoking is related to the development of nephropathy in type 1 and type 2 diabetes. Smoking is also a documented risk factor for both

the development and progression of various types of neuropathy, with increased risks ranging from 2.2- to 12-fold higher for smokers compared to nonsmokers. The relationship of cigarette smoking to retinopathy is less well defined than that with other microvascular complications of diabetes, but there are data to suggest that smoking reduces retinal blood flow and potentiates the hypoxic environment of the diabetic retina.

In addition to the negative impact smoking has on existing diabetic disease, nicotine may also play a role in the development of diabetes and interfere with insulin activity.¹

To reduce the high cost of smoking, health care professionals have a responsibility to help patients *avoid* or *modify* smoking behavior. Prevention of tobacco use and smoking cessation treatment is a cost-effective intervention that should be recommended for all patients with diabetes.¹

In the following sections, we discuss strategies for smoking prevention and cessation as a way to implement behavioral change into practice.¹⁰⁻¹² The discussion will be focused on the research and practice of facilitating sustained abstinence rather than more controversial approaches such as harm reduction strategies, which focus on reducing smoking for those smokers who are unable or unwilling to quit completely. Additional research is needed on interventions to reach recalcitrant smokers.

Avoiding High-Risk Behaviors: Saving Lives Through Prevention

What is the scope of the problem? Adolescence is a critical time with regard to initiating positive health habits and avoiding negative behaviors such as abusing alcohol or initiating smoking. For example, adolescents with diabetes begin smoking at a rate that is equal to nondiabetic individuals. The prevalence estimates of smoking among people with diabetes appear to be similar to those of the general population, at least at younger ages.⁵

Despite the health risks associated with smoking, ~26–28% of American adults continue to smoke, with variations reported for ethnic and sociodemographic groups. These figures mirror the prevalence of tobacco use among people with diabetes.¹³ Although research suggests that the prevalence of smoking among people with diabetes may decrease as the duration of the dis-

ease increases, this finding may be due in part to increased mortality associated with smoking and diabetes.¹³ Clearly, there is a need for prevention.

Prevention efforts need to begin early. Smoking is a behavior that often begins in adolescence; in fact, 70% of current adult smokers were regular smokers before age 18. Research suggests that the earlier one begins to smoke, the more likely that behavior persists into adulthood. Smokers who begin at an early age are more likely to become addicted to nicotine. Not surprisingly, these smokers also develop serious health conditions at younger ages compared to nonsmokers.² Particularly concerning are reports that suggest a higher prevalence of smoking among 18- to 34-year-olds, African Americans, and those with lower educational levels.⁵ Increased prevention and intervention efforts are needed to reach these groups.

Little has been written on the knowledge and decisional process regarding smoking behavior in adolescents with diabetes; however, the prevalence estimates suggest that there are substantial numbers of young adults with diabetes who are smoking. What is more troubling is that the majority of these diabetic adolescents initiated the smoking habit subsequent to a diagnosis of diabetes.^{14,15} A specific area for exploration is the increasing problem of adolescent girls who initiate smoking to manage weight. Inaccurate or underreporting may be a problem in this population. One study of adolescents with diabetes reported that 31% of diabetic adolescents admitted smoking, but even more (48%) were verified via testing to be smokers.¹⁴ The diagnosis of diabetes is not sufficient to deter many adolescents from beginning a deadly habit, and adolescents may not be willing to discuss this with health care professionals. Given the devastating effect of smoking on people with diabetes, it is very important to talk openly with adolescent patients and prevent the initiation of smoking, as well as obesity and alcohol abuse, among young patients who already have a complex disease to manage.

What can health professionals do to help adolescent patients avoid high-risk behaviors? Using smoking as an example, at the individual level, diabetes professionals should *ask* all patients about tobacco use at every

visit. If smoking were regarded as a “vital sign” to be checked at each medical contact, then smoking status would be consistently identified and documented in the chart.^{10,11} This screening system would serve as a reminder to professionals, and the attention given to smoking as a health behavior would communicate the value of preventing or quitting smoking to patients.

All health care providers should *advise* individuals with diabetes not to initiate smoking. This advice should be consistently repeated to prevent smoking and other tobacco use among children and adolescents with diabetes who are under the age of 21 years.¹⁰ Patients should be congratulated for abstinence from tobacco and reinforced with information about why avoiding smoking is particularly important for diabetic patients.

At the family level, diabetes professionals can talk with parents and family members about the importance of establishing behavioral standards, in this case a “no-smoking” standard, in the household. Parents should be educated about how parental smoking can affect their child’s general health and diabetes status. Parents can be powerful models regarding smoking behavior; they should be encouraged to quit smoking if they are current smokers. If they are nonsmokers, parents should talk with their children about their reasons for avoiding this high-risk behavior for the sake of their family’s health.

At an environmental level, diabetes professionals should ensure that the physical environment of the clinic or health care setting communicates the importance of health behaviors. With smoking as a focus, this can be accomplished by no-smoking policies, educational signs, and literature in the clinic. On a larger scale, professionals can support efforts to reduce accessibility of tobacco to young patients (increased cigarette costs, the enforcement of laws regarding cigarette sales to minors).

Given that many young adults may have already begun smoking, it is important to encourage honest reporting so that effective treatment can be offered. Although concerted efforts need to be made to prevent smoking, it is also important to address the established habit and promote cessation in individuals for whom this high-risk behavior is set (Table 1).

Table 1. Prevention of Tobacco Use and Treatment Recommendations for Smoking Cessation

This table offers strategies for addressing smoking within diabetes care. Practitioners can apply similar strategies to address other high-risk behaviors.

1. Assessment methods for monitoring smoking status

- All adolescent and adult individuals with diabetes should be asked about tobacco use. Documenting smoking status as a vital sign (current, former, never smoker) is a good way to collect important information over time. Routine assessment can provide multiple opportunities for intervention.

2. Interventions for smoking prevention

- Children and adolescent patients with diabetes should be strongly advised not to begin smoking. Repeat this advice often. Providers can enlist the help of family members and peers to help reinforce this message. Age-appropriate educational materials may be helpful, and clinic settings should promote a smoke-free environment.

3. Interventions for smoking cessation

- *Ask.* Diabetes care for smokers must routinely include assessment and counseling about the serious risks of smoking and diabetes.
- *Advise.* Patients who smoke should be strongly encouraged to quit, using examples and reasons that are personally salient to the patient. Smoking can be linked to illness/health, financial and social costs, impact on the family, and so forth.
- *Assess.* At each visit, diabetic smokers should be asked if they are willing to quit at this time.
 - ✓ If no, talk with patients about the *relevant* reasons for quitting, *risks* of continuing to smoke, *rewards* of smoke-free life, and *roadblocks* of successful quitting, and use *repetition* to remind them of the importance of quitting and your availability to help.
 - ✓ If yes, *assist* by providing patient with minimal, brief, or intensive cessation counseling as preferred and offer pharmacological aids as needed. Refer for additional services to support behavior change.
 - ✓ *Arrange* for follow-up contact to maintain positive changes in behavior.

4. Strategies for system effectiveness

- All diabetes health care providers should be trained and encouraged to implement the AHCPR guidelines regarding smoking.
- Systems should routinely implement follow-up procedures to provide support and problem-solving strategies to diabetic smokers who make attempts to quit. Patients are more likely to succeed in quitting with follow-up support.
- Reimbursement for treating tobacco dependence should be sought to ensure adequate time and attention is paid to this important behavioral issue.

Adapted from Ref. 10 and from Haire-Joshu D, Tibbs T, Glasgow R: Diabetes care and treatment of tobacco use. *Pract Diabetol* 20:16–20, 2001

Extinguishing High-Risk Behaviors: Saving Lives Through Treatment

Although smoking is an extremely harmful behavior, the benefits of quitting smoking are quite remarkable. Behavioral change can result in substantial increases in a patient’s quality of life and health. Both short-term benefits (such as improvement in one’s ability to smell and taste clearly, increased energy, and nicotine and carbon monoxide reduction) and long-term benefits (such as decreased risk of disease, financial savings, and decreased smoking-related complications) are significant. Quitting smoking decreases the risk of cardiovascular disease, cancer, stroke, and lung disease.¹⁶ Given the increased risks of complications and mortality among diabetic smokers, it is imperative to educate diabetic patients and provide smoking cessation services. Evidence

suggests the importance of quitting as early as possible in the course of diabetes, given the dramatic health benefits and reduced risk of mortality.^{3,17}

What can health professionals do to help patients make behavioral changes like quitting smoking? Smoking cessation must be a routine component of diabetes care.¹⁰ Research provides us with strong evidence about effective methods for smoking cessation.¹ The behavioral strategies for smoking cessation have applications to other areas of intervention. For example, the general strategies may also be relevant for addressing eating habits, exercise habits, or screening for alcohol or drug abuse.

It should be noted, however, that for alcohol or drug abuse, patients should be referred to specific services to intensively treat substance abuse. Thus, it is important to know when to

refer for more specialized treatment.

The following guidelines for making behavioral changes regarding smoking are based on the ADA position statement on smoking and diabetes¹⁰ and the Agency for Health Care Policy and Research (AHCPR) Clinical Practice Guidelines on Treating Tobacco Use and Dependence.¹

1. Ask every patient about smoking habits.
2. Advise every diabetic smoker to quit with personalized messages.
3. Assess willingness of diabetic smokers to quit at this time; success depends, in part, on patients' readiness to change.

If patients express unwillingness, have a brief discussion to enhance their motivation to quit. Address the 5 Rs: relevance, risks, rewards, roadblocks, and repetition. Discuss why quitting smoking is *relevant* for particular patients' diabetes and health at this time. Emphasize the *risks* of continued smoking. Highlight the *rewards* of quitting smoking. Talk about *roadblocks* or barriers to quitting and how these might be addressed. Use *repetition* to emphasize that quitting smoking is one of the most important things patients can do for their health.

4. If patients express willingness and are motivated to quit, then *assist* them in quitting. Provide counseling, pharmacotherapy, and referrals as needed. There is a relationship between the intensity of smoking cessation counseling and its effectiveness. The most effective techniques involve counseling by multiple health care providers, using individual or group counseling, having multiple contacts over time, and learning problem-solving or skills with social support.

In addition, there are effective pharmacological supplements used in combination with behavioral counseling. According to the recent AHCPR guidelines, five first-line pharmacotherapies have been identified as reliably increasing long-term smoking abstinence.^{1,10,11} These first-line medications include Bupropion SR, nicotine gum, nicotine inhaler, nicotine nasal spray, and nicotine patch. Two second-line pharmacotherapies that may be considered for use if first-line therapies are not effective include clonidine and nortriptyline. In the presence of special circumstances, such as certain diabetes complica-

tions or pregnancy, the risks of continued smoking need to be compared to the risks of nicotine replacement therapy or other pharmacological aids.

In addition to provider's advice during visits, referrals are also important to support patients' behavioral change. For smoking, this may include referral to a smoking cessation group or a psychologist for individual sessions aimed at behavioral change.

5. Arrange for follow-up contact, preferably within 1 week of the quit date, to promote long-term abstinence. (See Table 2.)

Several special treatment considerations may make it challenging for patients with diabetes to make behavioral changes and more specifically to quit smoking. Managing diabetes on a daily basis requires much attention and energy. Devoting additional efforts to make behavioral changes such as smoking may be difficult. Patients with diabetes have a variety of health behaviors to maintain, and many patients place an important emphasis on managing their weight and dietary choices. Unfortunately, after quitting smoking, many individuals experience some weight gain. Average weight gain tends to be 6–10 lb, with women gaining slightly more weight than men.¹⁸ Fears about weight gain may prevent diabetic smokers from trying to quit smoking, particularly women, obese patients, and those in poor metabolic control.¹⁹ Including weight concerns as part of smoking cessation counseling has improved program outcomes²⁰ and may be particularly useful in working with diabetic patients.

Finally, depression can be a barrier to successful behavior change. Depression is often comorbid, with negative health behaviors such as smoking, alcohol abuse, and eating disorders. In the case of smoking, research illustrates that depression is more common among smokers than nonsmokers²¹ and that depressive symptoms can interfere with successful smoking cessation efforts.^{22,23} Unfortunately, people with diabetes have a greater risk of depression compared to the general adult population.^{24,25} Thus, this may make quitting efforts more difficult for diabetic patients who are depressed. It is important to treat depressive symptoms through medication and/or psychotherapy so that attempts at

behavioral change are more likely to be maintained successfully.

Successful Avoidance of High-Risk Behaviors: The Importance of System Support and Structure

What can health care professionals do to ensure that their health care systems are structured to help patients avoid or modify high-risk behaviors? It is important to train staff to address high-risk behaviors at visits, to provide continued support to patients striving to make behavioral changes, and to ensure time and funding in the health care system to implement these strategies. The importance of intensive treatment and support by team members in diabetes care has been highlighted in recent studies.^{26,27}

Regarding smoking specifically, several strategies can be employed to help create and maintain effective systems for prevention and cessation. Research shows that the most effective smoking cessation interventions are repeated, provided by multiple health care professionals, and reinforced over time. First, all diabetes health care providers should be trained in the AHCPR guidelines regarding smoking cessation.^{11,12} If all diabetes care professionals are armed with smoking cessation training, then patients are more likely to receive the same strong message from various health care staff over many occasions. In addition to providing smoking cessation advice, diabetes care professionals should also be familiar with smoking cessation services and classes at local hospitals and in the community for effective referral.

Second, follow-up counseling to assess and reinforce quitting must be consistently implemented for all diabetic smokers. This is particularly important during the first 2 weeks after patients have tried to quit smoking because follow-up contacts have been shown to increase the likelihood of long-term cessation success. Contacts should focus on providing support and problem-solving.

Finally, health care providers should be reimbursed for treating tobacco dependence. Smoking cessation is cost-effective and clinically important.²⁸ The cost of not treating smokers with diabetes, measured by loss of quality of life, complications, and mortality, is very high. Health care professionals should continue to lobby for reimbursement from insurers. When systems recognize and

Table 2. Tips for Smoking Cessation Counseling

Below are a list of tips that can be used in practice to assist patients with smoking cessation and to arrange for long-term success. For the purposes of illustration, each suggestion will be related to the following case example:

Mr. R. is a 51-year-old man with type 2 diabetes who has been smoking 20 cigarettes per day for ~35 years and is interested in quitting smoking.

Assist

- Develop a quit-smoking plan together.
 - Set a quit date. Ideally, the quit date should be within 2 weeks. *Mr. R. set his quit date for next weekend, so that he has time to prepare.*
 - Determine the preferred type of counseling—minimal, brief, or intensive. Remember, more contacts from multiple professionals over time gives the greatest chance of success. Refer patients to an intensive behavioral program if they are willing. *Mr. R. requested intensive counseling during his visit and agreed to attend Stop Smoking classes at the hospital.*
 - Decide whether to use pharmacological aids. This depends on patients' health, contraindications, nicotine dependence, and previous successes or failures with aids. Recommend the use of approved pharmacotherapies found to be effective to increase smoking cessation success and reduce withdrawal symptoms. *Mr. R. preferred to use nicotine gum to help with withdrawal symptoms and cravings, because this had been helpful during a previous quit attempt.*
- Enhance support for patients' decision to stop smoking.
 - Positively reinforce patients' decision. *Mr. R. was reminded that he made a very important and positive step toward improved health. He was offered continued help and assistance from the clinic and staff.*
 - Encourage patients to tell family, friends, and coworkers about their quit date and to obtain support. *Mr. R. agreed that he would benefit from the support of his family, the encouragement of his nonsmoking friends, and the understanding from coworkers who had previously expected him to take smoke breaks.*
 - Because it is harder to quit smoking if there are other smokers in the household, encourage patients' housemates to quit also or to not smoke in patients' presence. *Although Mr. R. had asked his wife to quit smoking, she was not ready to do so at this time. However, she agreed to smoke outside on the porch, not in the house.*
- Discuss behavioral strategies.
 - Recommend the removal of tobacco products from patients' environment. Before quitting, encourage patients to avoid smoking in places where they spend a lot of time (e.g., work, home, car). *Mr. R. was advised to give away ashtrays and throw away cigarettes at home and at work.*
 - Abstinence is necessary, so advise patients to avoid taking "even a single puff" after the quit date. *Mr. R. understood this guideline because he had witnessed other smokers return to their habit after just one cigarette.*
 - Anticipate challenges to quit attempts, especially during the first few weeks. Educate patients about nicotine withdrawal symptoms (irritability, cravings, headaches). *Mr. R. and his provider discussed how he could handle critical times by using nicotine replacement therapy, stress management techniques/deep breathing, gum/straws/cinnamon sticks in his mouth, distracting activities, positive self-statements, and frequent reminders about important reasons to remain smoke-free.*
 - Discuss concerns about weight gain or other concerns related to diabetes. Develop a plan together about how to best manage these issues during a quit attempt. *Mr. R. planned to maintain his usual diet and agreed to contact this clinic with concerns about weight gain, should they occur.*
 - Because alcohol can cause a relapse, patients should consider limiting or abstaining from alcohol while quitting smoking. Reducing caffeine can also be helpful. Drinking lots of water may be a useful way to keep hands/mouth occupied, be well hydrated, and refrain from extra calories. *Mr. R. did not anticipate difficulties with these recommendations.*
 - Encourage patients to reward themselves for first days and weeks of success. *Mr. R. decided to save the money usually spent on smoking to reward himself with a new compact disc at the end of the first week and lunch with a friend at the end of the first month.*

Arrange for Follow-Up

- Schedule follow-up contacts, either in person or via telephone. *The clinic contacted Mr. R. by telephone during the first week for support and monitoring. He agreed to call the clinic at the end of the first month for follow-up contact and to request additional contact as needed. Long-term follow-up occurred during medical visits in the months after his quit date.*
- During contacts, discuss patients' successful efforts. *The provider congratulated Mr. R. for his success so far and commended him for effective coping. He was reminded that withdrawal symptoms are temporary and that discomfort would decrease in coming days and weeks.*
- Discuss current difficulties and upcoming challenges.
 - If tobacco use has not occurred, discuss patients' concerns about possible triggers or challenges. *Mr. R. was encouraged to consider how to avoid or handle challenges through problem-solving.*
 - If tobacco use has occurred, review the circumstances around the lapse. Encourage patients to recommit to total abstinence. Talk about the importance of viewing a lapse as a learning experience rather than a failure. Most smokers who have successfully quit report making several attempts (i.e., several learning experiences) before achieving their long-term goal of abstinence. *Mr. R. has had success so far, but he was able to discuss how a lapse during a previous quit attempt helped him be more attentive to triggers at this time.*
 - Assess patients' quit plan and pharmacotherapy use. *If Mr. R. experienced significant difficulties during his quit attempt, he and his provider could have considered more intensive treatment.*

Adapted from Ref. 12 and from Haire-Joshu D: Smoking cessation in diabetes. In *Practical Psychology for Diabetes Clinicians*. 2nd ed. Anderson BJ, Rubin RR, Eds. Alexandria, Va., American Diabetes Association, 2002, p. 103–112.

reimburse smoking cessation efforts, practitioners are able to provide effective treatment that results in better patient care and health.

Conclusions

Smoking is a high-risk behavior that results in devastating health consequences. The prevention and treatment of smoking should be a high priority for diabetes care providers. Behavior change, especially regarding a change-resistant behavior such as smoking, requires consistent attention over time from multiple providers. However, the benefits of quitting far outweigh the effort it takes to achieve such change.

Smoking is not the only behavioral issue that can be addressed for individuals with diabetes, and many of the same strategies to prevent and treat smoking behavior can be applied to other high-risk health behaviors. Diabetes practitioners have the opportunity to advise young patients to avoid developing negative behavior patterns and to offer assistance and referral to those patients who have developed problematic behaviors.

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