

Quality Resource Guide

Tobacco Cessation in the Dental Office

Author Acknowledgements

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The following commentary highlights fundamental and commonly accepted practices on the subject matter. The information is intended as a general overview and is for educational purposes only. This information does not constitute legal advice, which can only be provided by an attorney.

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The content of this Guide is subject to change as new scientific information becomes available.

Educational Objectives

Following this unit of instruction, the learner should be able to:

1. Describe the impact smoking has on systemic and oral health.
2. Describe the impact secondhand smoke has on children.
3. Recognize the behaviors associated with substance dependence.
4. Recognize the symptoms associated with nicotine withdrawal.
5. Be familiar with the stages of change model and the significance of the action stage.
6. Be familiar with pharmacotherapy for tobacco cessation.
7. Describe the 5A's approach for smokers willing to quit.
8. Describe the 5 R's approach for smokers unwilling to quit.

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Introduction

Although the number of smokers in the United States has steadily declined over the years, tobacco control is still an important issue in healthcare. In 2018 there were 34.2 million adults in the United States who smoked cigarettes. This translates to about 14 of every 100 U.S. adults aged 18 years or older (13.7%) smoking cigarettes.¹ Other tobacco products are also used by U.S. adults. In 2018, 9.6 million adults (4.0%) smoked cigars, 5.9 million adults (2.4%) used smokeless tobacco and 8.1 million (3.4%) used e-cigarettes.² Smoking-related disease affects more than 16 million Americans.³ Globally, tobacco remains a significant health issue. Contradictory to the decline in number of smokers in the United States, the number of smokers in Africa and the Mediterranean increased causing an increase in the total number of tobacco smokers worldwide. In 2012 there were 967 million smokers worldwide⁴ and in 2020 there were 1.3 billion smokers worldwide.⁵

The tobacco epidemic remains one of the largest public health threats the world has ever faced. Tobacco is responsible for more than 8 million deaths a year.⁵

In the United States smoking is the leading cause for mortality. The estimated number of U.S. deaths attributed to smoking and exposure to secondhand smoke is more than 480,000 annually.⁶

The adverse health effects associated with smoking are well documented. Cigarette smoke is known to contain over 4,000 chemical components including the toxins cyanide, benzene and formaldehyde. Exposure to these toxins is associated with adverse health effects, including cancer.

Approximately 50% of all Americans who are lifelong smokers will die from smoking related diseases.⁷ Relative risk is the probability of an event, such as cancer diagnosis, occurring in one group with a certain characteristic compared with another group without that characteristic. The relative risk of developing any cancer is two times higher in smokers and four times higher in heavy smokers compared to that of nonsmokers.⁸ A heavy smoker is defined as anyone who smokes 25 or more cigarettes daily.

Among smokers the relative risk for being diagnosed with lung cancer is an astonishing 25 times higher than nonsmokers. For comparative purposes, the relative risk of breast cancer among women who have a first degree relative (mother, sister, or daughter) with a history of breast cancer is about 2.⁹

Lung, laryngeal, oral and esophageal cancers are all directly related to smoking. Smoking is also a contributing factor for cancers of the pancreas, kidney, bladder and stomach. Thirty percent of all cancer deaths in the United States are directly attributed to smoking.¹⁰

In addition to cancer, there are other health consequences associated with smoking. Smoking is a major risk factor in the development of coronary artery disease (CAD) and atherosclerotic peripheral vascular disease.¹¹ Smoking causes a decrease in high density lipoproteins (HDL). HDL helps scavenge more atherogenic lipoproteins from systemic circulation thereby reducing risk for adverse cardiac outcomes. Decreased HDL levels leads to increase CAD. Smoking also causes a decreased elasticity in blood vessels and this is closely associated with the progression of cardiovascular disease.

Chronic Lower Respiratory Disease (CLRD) comprises three major diseases: chronic bronchitis, emphysema, and asthma. CLRD is characterized by shortness of breath caused by airway obstruction. Airway obstruction in chronic bronchitis and emphysema are irreversible. Smoking is the major contributor to CLRD. In 2014, the most recent year for which data is available, approximately 5.6% of all deaths in the U.S were attributed to CLRD and it was the 3rd leading cause of death.¹²

Reproductive health is also affected by smoking. Women who smoke have an increased risk for ectopic pregnancies, stillborn births and low birth weight babies.¹³ Cigarette smoke has an effect on the health of individuals indirectly exposed. Children exposed to secondhand smoke (sometimes known as environmental or passive smoke) are more likely to be diagnosed with pulmonary diseases such as asthma and flu.¹⁴ Exposure to second hand smoke also increases the risk of developing lung cancer in nonsmokers.¹⁵

The adverse health effects caused by smoking is significant. Smokers, on average, die about a decade earlier than non-smokers. Smokers who survive to the age of 70 die on average four years earlier than non-smokers.^{16,17}

Oral Health

Smoking adversely affects oral health. Studies comparing periodontal disease in smokers and nonsmokers reveal that smokers have more aggressive and more rapidly progressing disease, noted by increased periodontal pocket depths, greater periodontal attachment loss, and increased bone loss. Paradoxically, smokers have less bleeding on periodontal probing and decreased gingival inflammation, two of the clinical markers used to assess periodontal disease. Smoking may lead to increased periodontal disease by changing the normal host response. Such alterations include decreased neutrophil function, decreased CD4/CD8 cell ratio, and decreased salivary IgA and IgG levels. Additionally, there is also an increase in pro-inflammatory mediators and cytokines causing an increase in the both local and systemic inflammatory response.¹⁸

There is a suggested relationship between active smoking and prevalence of dental caries.¹⁹ There is also a suggested relationship of dental caries in children and exposure to secondhand smoke.²⁰ One study reported that secondhand smoke exposed children are 1.8 times more likely to have caries of deciduous teeth (representing active dental disease) and 1.4 times more likely to have dental fillings in deciduous teeth (representing treated dental disease) when compared to children who were not exposed to secondhand smoke.²¹

Cigarette smoking or any form of tobacco use is associated with oral cancer. Approximately 80% of patients with oral cancer have smoked or used tobacco products. Up to 50% of patients recently diagnosed with oral cancer have a significant history of alcohol use, another major risk factor for development of oral cancer. Alcohol and tobacco work synergistically increasing mucosal permeability to carcinogenic tobacco specific nitrosamines. Tobacco specific nitrosamines occur because of curing and processing tobacco.²²

Smoking associated health issues are widely publicized. People continue to smoke despite the well documented and publicized effects of tobacco on both systemic and oral health. Continued use of tobacco underscores the addictive qualities of nicotine, the active drug component obtained from smoking. Smoking is not a bad habit; smoking is an addiction with associated negative behavioral and social components. The Diagnostic and Statistical Manual of Mental Disorders (DSM) is the standard classification system used by mental health professionals in the United States. According to the most recent version, DSM- 5, there are eleven features associated with a diagnosis of tobacco use disorder.²³ (See **Table 1**)

Smokeless tobacco is as harmful and addictive as smoking tobacco. Gingival recession and oral leukoplakia are common findings in smokeless tobacco users. Smokeless tobacco contains tobacco specific nitrosamines, other nitrosamines, polyaromatic hydrocarbons, aldehydes and metals such as radioactive polonium. Smokeless tobacco can produce a chronic local inflammation and irritation and may have a tumor promoting or co-carcinogenic effect.²⁴ Smokeless tobacco use increases the risk of occurrence of cancer of the oral cavity, esophagus and pancreas.²⁵

The prevalence of smokeless tobacco use varies widely by region and sociodemographic factors. According to Howard-Pitney and Winkleby, rates of smokeless tobacco use in the United States are highest in the South and rural areas.²⁶ An estimated 3.8% of high school students in 2019 were current users of smokeless tobacco.²⁷ Among high school students, smokeless tobacco is more common among males (5.8%) than females (1.6%). Nationally about 3.3% of the adult population uses smokeless tobacco, most of these users are males.²⁸

The National Health and Nutrition Examination Survey (NHANES) is a program of studies designed to assess the health and nutritional status of adults and children in the United States. The survey is unique in that it combines interviews with laboratory tests, medical, dental, and physiological measurements. The NHANES III study, conducted from 1988 through 1994, examined racial subgroups of men who had used chewing tobacco regularly

Table 1 - Tobacco Use Disorder Criteria

A problematic pattern of tobacco use leading to clinically significant impairment or distress, as manifested by at least two of the following, occurring within a 12-month period:	
1.	Tobacco is often taken in larger amounts or over a longer period than was intended.
2.	There is a persistent desire or unsuccessful efforts to cut down or control tobacco use.
3.	A great deal of time is spent in activities necessary to obtain or use tobacco.
4.	Craving, or a strong desire or urge to use tobacco.
5.	Recurrent tobacco use resulting in a failure to fulfill major role obligations at work, school, or home (e.g., interference with work).
6.	Continued tobacco use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of tobacco (e.g., arguments with others about tobacco use).
7.	Important social, occupational, or recreational activities are given up or reduced because of tobacco use.
8.	Recurrent tobacco use in situations in which it is physically hazardous (e.g., smoking in bed).
9.	Tobacco use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by tobacco.
10.	Tolerance, as defined by either of the following: • A need for markedly increased amounts of tobacco to achieve the desired effect. • A markedly diminished effect with continued use of the same amount of tobacco.
11.	Withdrawal, as manifested by either of the following: • The characteristic withdrawal syndrome for tobacco. • Tobacco (or a closely related substance, such as nicotine) is taken to relieve or avoid withdrawal symptoms.

and who had quit. The study showed highly different chewing tobacco use and quit rates among different racial groups of men. Chewing tobacco usage in American Indians/ Alaskan natives was 7.8%, 6.8% in Whites and 3.1% in Blacks. Hispanics and Asians had a much lower rate of usage. The study also showed age at chewing tobacco onset occurred. The study concluded that smokeless tobacco prevention and cessation programs should be specific for the different racial groups and that smokeless tobacco cessation programs should be distinct from smoking programs.²⁶

More information on smokeless tobacco cessation can be found at the National Cancer Institute's Smokefree.gov website (<https://smokefree.gov/quitting-dip>).²⁹

Individual tolerance or dependence on nicotine differs between smokers. To assess strong nicotine dependence characteristics, Fagerstrom developed a nicotine tolerance scale.³⁰ (See **Table 2**, Nicotine

Dependence Characteristics). This scale is helpful in establishing dosages of nicotine replacement therapies in cessation efforts.

Tobacco use is more than a physical dependence on nicotine. In addition to the physical dependence on nicotine there also are psychological and behavioral dependences of smoking. The cigarette itself becomes a powerful reinforcer of the physical, psychological, and behavioral dependence associated with smoking. For an individual to successfully become tobacco free, the physical, psychological, and behavioral aspects of nicotine addiction must be addressed. In tobacco cessation, there is a strong association between the intensity of counseling and effectiveness. Higher abstinence rates are found among individuals who received longer counseling sessions (defined as 10 minutes or more). Higher tobacco abstinence rates were also associated with increased number of sessions. Even brief three minutes counseling sessions by

Table 2 - Nicotine Dependence Characteristics

- _____ 1. How soon after you awake to you smoke your first cigarette?
 0. After 30 minutes 1. Within 30 minutes
- _____ 2. Do you find it difficult to refrain from smoking in places where it is forbidden, such as the library, theater or doctors' office?
 0. No 1. Yes
- _____ 3. Which of all the cigarettes you smoke in a day is the most satisfying?
 0. Any other than the first one in the morning 1. The first one in the morning
- _____ 4. How many cigarettes a day do you smoke?
 0. 1-15 1. 16-25 2. More than 26
- _____ 5. Do you smoke more during the morning than during the rest of the day?
 0. No 1. Yes
- _____ 6. Do you smoke when you are so ill that you are in bed most of the day?
 0. No 1. Yes
- _____ 7. Does the brand you smoke have low, medium or high nicotine content?
 0. Low 1. Medium 2. High
- _____ 8. How often do you inhale the smoke from your cigarette?
 0. Never 1. Sometimes 2. Always
- _____ **Total Score**

Scoring Instructions: Add up your responses to all of the items. Total scores should range from 0 to 11, where 7 or greater suggests physical dependence on nicotine.

Table 3 - National and State Quit Lines/Chat Lines

National Cancer Institute: 1-877-44U-QUIT (1-877-448-7848)

- Smoking cessation counselors are available to answer smoking-related questions in English or Spanish, Monday through Friday, 9:00 a.m. to 9:00 p.m., Eastern time.
- Smoking cessation counselors are also available through LiveHelp, an online instant messaging service. LiveHelp is available Monday through Friday, 9:00 a.m. to 9:00 p.m., Eastern time
 - » https://livehelp.cancer.gov/app/chat/chat_launch.
 - » LiveHelp is also available in Spanish: https://livehelp-es.cancer.gov/app/chat/chat_launch

For information about state quit lines: 1-800-QUIT-NOW (1-800-784-8669)

- Specific services and hours of operation vary from state to state.

dentists, dental hygienists, physicians, and other health care providers have shown to be effective in helping individuals become tobacco free.³¹

The dental team as healthcare providers should counsel and advise our tobacco using patients of the oral and systemic health risks associated with tobacco use. We should also provide these patients with contact information for national

and state tobacco quit lines. (See **Table 3** Quit Lines). Many of these quit lines have an online chat feature. Quit lines are toll-free telephone numbers staffed by trained cessation counselors who determine the callers' stage of readiness to quit smoking (see Stages of Change section below). These cessation counselors follow a predetermined script based on the stage of change of the caller.

Counselors encourage the caller to set a quit date and arrange for follow-up support calls. The evidence based quit lines help individuals improve success in becoming tobacco free. More information on state, national and online quit lines can be found on the U.S. Department of Health and Human Services associated website <https://smokefree.gov/tools-tips/get-extra-help/speak-to-an-expert>.³²

There are many approaches to help individuals stop smoking. Despite the many programs available, sustained tobacco abstinence is difficult to achieve and relapse often occurs, especially within the first 12 months. About 7% of individuals who attempt tobacco cessation are tobacco free one year after quitting smoking.³³ Health care providers should not be discouraged about the rate of relapse and should remember tobacco dependence is a chronic disease requiring multiple interventions over time before permanent tobacco abstinence occurs.

Health care providers, including dental health care providers, are powerful motivators and facilitators in helping patients become tobacco free. Dental healthcare providers must understand the chronicity of tobacco dependence, need for multiple cessation interventions and the framework in which to facilitate behavior change. The individual must change lifestyles associated with tobacco use before he/she can become tobacco free. Changing tobacco associated lifestyles is difficult and requires perseverance.

With the understanding that not all individuals are at the same stage of readiness for change, Prochaska and co-workers developed a transtheoretical model of change often referred to as the Stages of Change model.³⁴ This model assumes that individuals move through a series of stages (pre-contemplation, contemplation, action, maintenance, and relapse) before adopting a healthier behavior, such as becoming tobacco free. Using this model, a clinician can help the individual develop customized cessation promotion strategies based on their stage of readiness to stop smoking. Studies show that approximately 20% of people are in the ready to act stage.³⁵ The model becomes useful for helping identify individuals at other stages and in helping move these individuals along the continuum to the action stage. The final stage of the transtheoretical model is the maintenance stage during which individuals work at maintaining their tobacco free status. (See **Table 4**, Stages of Change)

A limitation of the transtheoretical model is that individuals move from stages in a more fluid, non-linear manner. Underscoring the significance of this fluid movement between stages, it has been suggested that the model be referred to as the spiral of change. Because of this fluidity of movement between stages, treatment options should not be limited based solely on stage of change.

Cessation Strategies

Cessation strategies are employed when an individual reaches the preparation or action stages. There are numerous tobacco cessation strategies including self-management, aversive conditioning, nicotine fading, nicotine substitution, electronic cigarettes, and pharmacotherapies.

Aversive conditioning may include procedures such as smoking as many cigarettes as quickly as possible to produce unwanted physical effects such as nausea and vomiting. Other aversive actions include treating the cigarette with a noxious

Table 4 - Stages of Change Model or Transtheoretical Model of Behavioral Change

Pre-contemplation Stage - Individuals in this stage have no intent to change behaviors in the next 6 months. - Approximately 40% of individuals are in this stage. - Characteristics associated with this stage include resistance to change and no motivation to discuss changing behavior. - Individuals in this stage may be in denial about their behavior or believe the consequence of their behavior is not serious.
Contemplation - Individuals in this stage are ready to change behavior in the next 6 months. - Approximately 40% of individuals are in this stage of change. - Characteristics of this stage include recognition of the barriers and benefits associated with changing behavior.
Action - In this transitional stage, individuals are more likely to make behavioral changes in the next month. - These individuals are in the process of moving to the action stage and may exhibit some anxiety about the change.
Maintenance - These individuals have recently made behavioral change and are working to prevent a relapse. - Maintainers report a high level of self-efficacy.
Relapse - Individuals have had a lapse in behavior change. - Individuals often feel demoralized. - This stage presents great opportunity for learning about avoiding circumstances associated with and surrounding relapse.

substance such as bitter tasting silver nitrate or using silver acetate mouthwash. Both actions would make the act of smoking unpalatable and this is a form of aversive conditioning.

Nicotine fading is the practice of substituting one brand of cigarettes with another that has a lower nicotine yield. In nicotine fading, the goal is to reduce the total nicotine intake. Reduced nicotine intake may be jeopardized as some smokers may increase the total number of cigarettes smoked or smoke cigarettes more intensely.

There is not enough evidence to show aversive procedures or nicotine fading strategies alone to be very effective.³⁶

Nicotine substitution is the practice of substituting another substance, such as sugar free gum or mints in place of cigarettes.

Electronic cigarettes (e-cigarettes) are a battery powered device that heats a nicotine containing liquid to produce a vapor which is inhaled, or “vaped” (derived from the word vapor). The health effects of the nicotine vapor are not fully known but e-cigarettes are sometimes touted as a healthier alternative to traditional cigarettes because they do not emit tar, ash, and smoke. Some authors have suggested more oversight of the e-cigarette industry especially in the manufacturing of products appealing to minors, and in the marketing and sale of products to minors.³⁷ Other authors suggest a role for e-cigarettes in cessation. In a study by Siegel and co-workers, 66.8% of study respondents reported a reduction in the number of cigarettes smoked and 48.8% reported a periodic abstinence from smoking. Respondents using e-cigarettes more than 20 times per day had a quit rate of 70.0%. Of the respondents not smoking cigarettes at 6 months, 34.3% were not using e-cigarettes or any nicotine-containing products. The conclusion of the authors was e-cigarettes may hold promise as a smoking-cessation method and further study using more rigorous research designs is warranted.³⁸

More recently, a meta-analysis of 20 studies demonstrated that e-cigarettes were associated with significantly lower odds of quitting cigarettes than either nicotine-replacement therapy or no

cessation aid.³⁹ E-cigarettes are not recommended as a tobacco treatment method.

In 2016 the U.S. Food and Drug Administration (FDA) extended its authority under the Food, Drug and Cosmetic Act to regulate e-cigarettes (also referred to as electronic nicotine delivery systems or ENDS) as tobacco products. In 2017 the FDA decided to delay the enforcement deadline for this rule on ENDS and to investigate an initiative to lower the level of nicotine in combustible cigarettes to non-addictive levels. According to FDA Commissioner Scott Gottlieb, “Rendering cigarettes minimally addictive or nonaddictive, within a landscape including other, noncombustible products such as e-cigarettes, represents a promising foundation for a comprehensive approach to tobacco harm reduction. In working toward this vision, the FDA is committed to striking an appropriate balance between protecting the public and fostering innovation in less harmful nicotine delivery.”⁴⁰

Use of electronic nicotine delivery systems have been attributed to a rapid resurgence of the use of tobacco products in children and young adults.

In 2019, two of the largest surveys of tobacco use among youth found that e-cigarette use has hit the highest levels ever recorded. Among middle and high school students (youth users), 3.6 million were current users of e-cigarettes in 2020.⁴¹

More than 80% of current youth users use flavored e-cigarettes, with fruit, mint, candy, and menthol flavors among the most used and the users often cite the appealing flavors as the primary reason for using e-cigarettes.

Numerous pharmacotherapies exist to aid in tobacco cessation and should be used unless there is a significant contraindication. These pharmacotherapies are limited to three classes; nicotine replacement therapies, non-nicotine medications, and nicotine blockers.

Almost all smokers undergo withdrawal symptoms. Symptoms include headache, nausea, fatigue, irritability and depression. (See **Table 5**, Nicotine Withdrawal Symptoms) More pronounced withdrawal symptoms are generally associated with a longer smoking history and with increased number of cigarettes smoked. Nicotine withdrawal

Table 5 - Nicotine Withdrawal Symptoms

• Headache	• Difficulty concentrating
• Nausea	• Anxiety
• Constipation or diarrhea	• Depression
• Falling heart rate and blood pressure	• Increased hunger and caloric intake
• Fatigue, drowsiness and insomnia	• Increased pleasantness of the taste of sweets
• Irritability	• Tobacco cravings

Modified from reference 23

Table 6 - Prescription Nicotine Replacement Therapies

Nicotine Inhaler (Rx) 10 mg/cartridge (delivers 4 mg nicotine) Disp: one kit (42 cartridges) Sig: Use between 6 and 16 cartridges daily for 6-12 weeks and up to 6 months Best results with starting dose of 6 or more cartridges. Maximum dose is 16 cartridges/24 hr.
Nicotine Nasal Spray (Rx) 10 mg/mL Disp: one 10 mL bottle Sig: one dose* per hour Minimum recommended dose is 8. Maximum recommended dose is 40.

* Dose equals one puff per nostril (0.5 mg per puff). Bottle yields approximately 80 doses.

symptoms peak at 48 hours and may exist for six months. Therefore, nicotine replacement therapy is indicated for those with high nicotine dependence characteristics. As cited previously, nicotine dependence characteristics can be assessed using the Fagerstrom scale. (See **Table 2**, Nicotine Dependence Characteristic)

Nicotine replacement therapies (NRT) are available in over the counter and prescription formulations. These agents are effective in helping control the physical withdrawal symptoms of nicotine. The over the counter formulations include longer acting transdermal nicotine patches, and shorter acting nicotine lozenges and nicotine gum. Prescription formulations include shorter acting nicotine nasal spray and oral inhaler. (See **Table 6**, Prescription Nicotine Replacement Therapies).

Nicotine transdermal patches release specific amounts of nicotine over a 24-hour period and help maintain a baseline nicotine level. By contrast, shorter acting NRT release specific amounts of nicotine at a faster rate. This faster release rate mimics nicotine levels obtained by smoking.

All the commercially available forms of NRT (gum, transdermal patch, nasal spray, inhaler and sublingual tablets/lozenges) can help people who make a quit attempt to increase their chances of successfully stopping smoking. NRTs increase the rate of quitting by 50-70%, regardless of setting.⁴²

Combining a long acting NRT (transdermal patch) with a shorter acting NRT (gum, lozenge, nasal spray, or oral inhaler) improves compliance with the cessation program, promotes self-efficacy and helps maintain higher levels of nicotine, which more closely approximate the dosage and release rate obtained from smoking. This combined long and short acting NRT approach is more effective than a single NRT approach.

Patients should be cautioned to refrain from smoking or using electronic cigarettes while using any form of nicotine replacement therapy. Smoking, while using NRT, may lead to excessive nicotine levels which could result in a nicotine overdose. Symptoms associated with excessive nicotine include nausea, vomiting and dizziness.

Non-Nicotine Medications

The atypical antidepressant drug bupropion is often used in conjunction with NRT. Bupropion acts as a norepinephrine and dopamine reuptake inhibitor. The exact mechanism associated with tobacco abstinence is unknown but thought to be related to its noradrenergic and dopaminergic mechanisms. The FDA labeled bupropion sustained release in 1997 for use in tobacco cessation. The most recent data available shows there were over 24 million prescriptions dispensed in the United States retail market for bupropion in 2017.⁴³

Sustained release bupropion when used with NRT has shown to be more effective in tobacco cessation than either agent prescribed alone. Jorenby and co-workers compared abstinence rates in smokers prescribed either placebo, transdermal NRT, bupropion sustained release or bupropion sustained release and transdermal NRT. Twelve-month abstinence rates were 15.6% in the placebo group, 16.4% in the NRT alone group, 30.3% in the bupropion alone group and 35.5% in the bupropion and NRT group.⁴⁴ They concluded that bupropion sustained release used in conjunction with transdermal NRT had a synergistic effect that increased abstinence rates at 12 months.

First line pharmacotherapy for tobacco cessation is bupropion sustained release and one or more nicotine replacement therapies. Bupropion sustained release is contraindicated in person with a history of seizure disorder, eating disorders or in those with active or recent use of monoamine oxidase inhibitors (MAO) inhibitors.

Other agents such as clonidine or nortriptyline have been used in place of bupropion and in conjunction with NRT when first line pharmacotherapies were not effective. Although clonidine and nortriptyline are recommended by the U.S. Department of Health and Human Services Public Health Service guide Treating Tobacco Use and Dependence as second line therapy, their use has not been approved by the FDA for smoking cessation.⁴⁵

During smoking, a bolus of nicotine is released into the body and heightens cholinergic activity leading to a re-energized feeling. Dopamine and glutamate are also released in the process and are involved in endorphin production. The combined effects of the release of these neurotransmitters are arousal, appetite suppression, cognitive enhancement and reduction in anxiety and tension. Dependence producing effects of nicotine are associated with agonist activity on the neuronal nicotinic acetylcholine receptor located in the central and peripheral nervous systems.⁴⁶

Nicotine Blockers

Varenicline is a partial nicotinic acetylcholine agonist. It is believed that partial activation of the nicotine receptors will diminish withdrawal symptoms by enhancing dopamine levels, which become decreased when a smoking cessation attempt causes an absence of nicotine. A Cochrane Database of Systematic Reviews analysis of varenicline at standard dose noted an increased chance of successful long-term smoking cessation between two and threefold compared with pharmacologically unassisted quit attempts. Additionally, more participants quit successfully with varenicline than with bupropion.⁴⁶ (See **Table 7**, Non-Nicotine Pharmacotherapy) Currently, there are few studies of varenicline used in combination with other smoking cessation therapies and the findings are not in agreement. One study is included in the varenicline package insert reported combination therapy of varenicline with a transdermal nicotine patch led to an increased incidence of adverse events such as nausea and headache.⁴⁷

Chang et al conducted a meta-analysis of randomized control trials investigating whether combination of varenicline with nicotine replacement therapy is better than varenicline alone. They concluded combination therapy is more effective than varenicline alone, especially if pre-cessation treatment of nicotine patch is administered. Pre-cessation therapy was defined as administering nicotine patch 2 weeks before a target quit date.⁴⁸ Another study concluded

the efficacy of varenicline was not enhanced by the addition of nicotine patches, although further trials would be useful to exclude the possibility of research error.⁴⁹

It is beyond the scope of this article to review detailed prescribing information and the reader is advised to review prescriber information available from the manufacturer. The clinician should determine if there are any contraindications to treatment before recommending or prescribing pharmacotherapy.

Other Cessation Strategies

Hypnosis

Hypnotherapy can be a powerful tool in changing behavior when used in conjunction with other therapies such as cognitive behavioral therapy.⁵⁰ Hypnotherapy is often promoted as a strategy for tobacco cessation. A Cochrane Collaboration review on hypnotherapy and smoking cessation concluded there is insufficient evidence to determine whether hypnotherapy is more effective for smoking cessation than other forms of behavioral support or unassisted quitting. Further large, high-quality randomized controlled trials, and more comprehensive assessments of safety, are needed on this topic.⁵¹

Acupuncture, Acupressure, Laser Therapy and Electrostimulation

Acupuncture, acupressure, laser therapy and electrostimulation have all been promoted as tobacco cessation strategies. A Cochrane Collaborative review concluded there is no consistent, bias-free evidence that acupuncture, acupressure, or laser therapy have a sustained benefit on smoking cessation for six months or more. Electrostimulation is not effective for smoking cessation. Well-designed research into acupuncture, acupressure and laser stimulation is justified since these are popular interventions and safe when correctly applied, though these interventions alone are likely to be less effective than evidence-based interventions.⁵²

Table 7 - Non-Nicotine Cessation Pharmacotherapy

Bupropion HCl sustained release (Rx) 150 mg tabs Disp: 165 tabs Sig: 1 tab daily day 1-3 then 1 tab twice per day for 12 weeks* Patient should start bupropion 1-2 weeks before quit date. Maintenance dose (150 mg twice per day for 6 months) should be considered.
Varenicline Tartrate (Rx) 0.5 mg/1 mg Disp: one starter kit Sig: 1 tab (0.5 mg white tablet) daily day 1-3 then; 1 tab (0.5 mg white tablet) twice per day 4-7 then; 1 tab (1.0 mg blue tablet) twice per day 8 to end of treatment Patient should start varenicline 1 week prior to quit date.

* Bupropion is to be used in conjunction with nicotine replacement therapy

Treating Tobacco Dependence

The U.S. Department of Health and Human Services Public Health Service has published a systematic compilation of tobacco cessation recommendations and strategies. This guide, Treating Tobacco Use and Dependence, (TTUD) is for clinicians, tobacco treatment specialists and others involved in support and treatment of tobacco dependence. Their recommendations were made as a result of systematic review and analysis of published scientific literature. The guide is widely held as the standard of care in treatment of tobacco dependence.⁴⁵

Before tobacco users can be offered treatment, they must be identified. The TTUD guidelines separates individuals into three groups; those who currently smoke and wish to stop, those that currently smoke and do not wish to stop and lastly, those who have recently stopped using.

The 5 A's system is recommended for those individuals who use tobacco and are willing to quit. Each letter A represents a different intervention. These interventions are **Ask, Advise, Assess, Assist, and Arrange**.⁴⁵ (See Table 8)

The 5 R's system is recommended as the intervention for those unwilling to quit. The 5 R's are **Relevance, Risks, Rewards, Roadblocks and Repetition**.⁴⁵ (See Table 9)

Data has shown that even brief cessation interventions can have a long-lasting impact and serve as motivation for tobacco users. Tobacco dependence treatment is clinically effective and cost effective. Smoking-related illness in the United States costs more than \$300 billion each year, including \$170 billion for direct medical care, and \$156 billion for lost productivity.⁵³

Smoking intervention programs have been shown to be cost effective with approximately \$3 saved for every \$1 spent in preventive measures.⁵⁴ Tobacco cessation is clinically and cost effective and therefore it should be offered to all who smoke.

The amount of time spent reviewing a cessation plan with a patient will vary according to the patient's stage of change. To aid clinicians in this task, the TTUD includes time suggestions for interventions.

Table 8 - The 5 A's: These Interventions Are Used When an Individual Uses Tobacco and Is WILLING to Quit**A-1 ASK**

Question every patient about tobacco use and record the data. This information should be updated at every visit. Consider including the following information:

- Form of tobacco used (cigarettes, cigars, spit)
- Length using (years)
- Use per day (cigarettes smoked per day)
- Frequency of use (every 20 minutes or after meals)
- Interest in becoming tobacco free

A-2 ADVISE

Strongly urge all tobacco users to quit. Advice should be:

- Clear - "I think it is important for you to quit smoking now and I can help you."
- Strong - "As your clinician, I need you to know that quitting smoking is the most important thing you can do to protect your health now and in the future. Our staff and I will help you."
- Personalized - Tie tobacco use to current health/illness, and/or its social and economic costs, motivation level/readiness to quit, and/or the impact of tobacco use on children and others in the household.

A-3 ASSESS

- Determine the individual's willingness to make a quit attempt.
- If the patient is willing to make a quit attempt provide assistance (Assist is the 4th A!) If the patient is not ready to make a quit attempt yet, provide motivation to quit (Using the 5 R's)

A-4 ASSIST

Help prepare the individual for quitting.

For the patient:

- Set a quit date. The quit date should be within 2 weeks.
- Tell family, friends and co-workers about quitting and request understanding and support.
- Anticipate challenges especially during the critical first few weeks. Past quit experiences are useful in identifying what helped and what hurt in previous attempts. Discuss challenges and triggers to smoking and how to overcome them.
- Remove tobacco products from your environment. Avoid smoking in places where you spend a lot of time (work, home, car)

For the clinician:

- Provide intra-treatment social support. This may be as simple as stating "My office staff and I are available to assist you" and following up the interaction with a phone call 3-5 days later.
- Recommend the patient develop social support from spouse/partner, friends and co-workers.
- Provide the patient with supplementary educational materials. These materials are widely available and may even be downloaded from the Internet and customized.
- Recommend approved pharmacotherapies and explain how they will lessen withdrawal symptoms and increase chances for success.

A-5 ARRANGE

The clinician should arrange for follow up contact with the patient in the action stage.

- The contact may be in person (an office visit) or via the telephone. Follow up contact should occur soon after the quit date, preferably during the first week. A second follow up contact is recommended within the first month.
- During the follow up congratulate success.
- If tobacco use occurred, review circumstances and get a recommitment to total abstinence.
- Remind patient that a lapse is a learning experience and help them develop strategies to prevent further lapses.

Adapted from reference 45

The TTUD guideline characterizes tobacco cessation interventions into three categories: minimal, intermediate and intensive:

- Minimal interventions are provided by a primary care or other health care team member. The session is 3 minutes or less and includes information on and/or dispensing medication. Follow up is scheduled for the next routine visit.
- Intermediate interventions are characterized by 2 - 3 sessions of 3 - 10 minutes length including information on and or dispensing of medications. Intermediate interventions

can be provided via primary provider and/or telephone quit or instant messaging lines and are scheduled for 1 - 2 weeks after the quit date.

- Intensive interventions are characterized as requiring 4 or more sessions lasting more than 10 minutes in length. Intensive interventions include information on and or dispensing of medications. Intensive interventions can be provided via primary provider and or telephone quit or instant messaging and are scheduled to continue for 1 - 2 weeks after the quit date.

The TTUD guideline may be useful in planning the amount of time spent on cessation counseling and intervention.⁴⁵ (See **Table 10**)

Dental professionals are a vital and important part of the healthcare team and therefore have a responsibility to be familiar with the intervention strategies and pharmacotherapy used in tobacco cessation and to incorporate these strategies into their professional practice.

Table 9 - These Interventions are Used When an Individual Uses Tobacco and is UNWILLING to Stop at the Present

R-1 Relevance Find out why quitting is personally relevant. Motivational information has the largest impact when it is personally relevant. Are there health concerns? Are there children or grandchildren subject to secondhand smoke?
R-2 Risks Ask patients to identify potential negative consequences of tobacco use. Emphasize that smoking low-tar/low-nicotine cigarettes or use of other forms of tobacco (smokeless tobacco, cigars, and pipes) will not eliminate these risks.
R-3 Rewards Ask the patient to identify the potential benefits of being tobacco free. These may include benefits such as: • Improved health • Food will taste better • Improved sense of smell • Save money • Feel better about oneself
R-4 Roadblocks Have the individual identify barriers to quitting and address those barriers. Typical barriers might include: • Withdrawal symptoms • Fear of failure • Weight gain • Lack of support • Depression • Enjoyment of tobacco
R-5 Repetition The motivational intervention should be repeated every time an unmotivated patient visits the clinic setting. Tobacco users who have failed in previous quit attempts should be reminded that most people make repeated attempts before they successfully become tobacco free.

Table 10 - Clinical Practice Guidelines for the Management of Tobacco Use

Strategy	Counseling	Pharmacotherapy (NRT, bupropion, varenicline)	Typical Setting (individual or group)	Follow-up
Minimal	1 session < 3 minutes	Yes, with printed instructions on use	Primary care provider and/or other health care team members	Next routine visit
Intermediate	2 -3 sessions 3 - 10 minutes	Yes, with printed instructions on use	Telephone quitline or chatline and/or primary care provider	1 -2 weeks after quit date
Intensive Program	≥ 4 sessions > 10 minutes	Yes, with printed instructions on use	Cessation program or telephone quitline or chatline and/or primary care provider	1 -2 weeks after quit date

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POST-TEST

Internet Users: This page is intended to assist you in fast and accurate testing when completing the “Online Exam.” We suggest reviewing the questions and then circling your answers on this page prior to completing the online exam.

(1.0 CE Credit Contact Hour) Please circle the correct answer. 70% equals passing grade.

1. The behavioral model known as the stages of change model:

- a. is based on the idea that not all individuals are at the same stage of readiness to change.
- b. assumes that individuals move through a series of stages before adopting a healthier behavior, such as becoming tobacco free.
- c. can help the individual develop customized cessation promotion strategies based on their stage of readiness to stop smoking.
- d. is useful for helping identify smokers in non-action stages.
- e. All of the above

2. Tobacco smoking is causally related to which of the following diseases?

- a. diabetes mellitus
- b. Alzheimer's
- c. renal stenosis
- d. coronary heart disease
- e. None of the above

3. Nicotine patches:

- a. release nicotine at a faster rate than other nicotine replacement therapy.
- b. mimic the release pattern of nicotine from smoking.
- c. are considered long acting agents and help maintain baseline nicotine levels.
- d. require a prescription for purchase.

4. Nicotine withdrawal symptoms include:

- a. headache
- b. night sweats
- c. elevated blood pressure
- d. somnolence
- e. Choices a and b

5. Bupropion sustained release combined with nicotine replacement therapy such as the nicotine patch:

- a. has a synergistic effect in cessation.
- b. is first line pharmacotherapy for cessation.
- c. is contraindicated for use in individuals with a seizures disorder.
- d. is contraindicated for use in individuals with an eating disorder
- e. All of the above

6. Bupropion sustained release:

- a. acts as a norepinephrine and dopamine reuptake inhibitor.
- b. has an unknown mechanism of action associated with tobacco abstinence.
- c. is labeled by the U.S. Food and Drug Administration (FDA) for use in tobacco cessation.
- d. All of the above
- e. None of the above

7. There is an increased chance of long-term smoking cessation when varenicline at standard doses is used in conjunction with:

- a. aversion techniques
- b. acupuncture or acupressure
- c. electrostimulation
- d. All of the above
- e. None of the above

8. Varenicline:

- a. is a partial nicotinic acetylcholine agonist.
- b. is a complete nicotinic agonist.
- c. is considered a second line therapy for cessation.
- d. has an unknown mechanism of action.
- e. None of the above

9. The clinician should provide intra-treatment social support. Which intervention step of the 5A's interventions does the above statement best describe?

- a. Ask
- b. Advise
- c. Assess
- d. Assist
- e. Arrange

10. Which of the following modalities is not recommended for sustained smoking cessation?

- a. nicotine gum
- b. bupropion
- c. varenicline
- d. e-cigarettes (electronic nicotine delivery devices)
- e. nicotine inhaler

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