CARDIOVASCULAR HEALTH AND TOBACCO USE
A Resource from the American College of Preventive Medicine

A Clinical Reference
The following Clinical Reference provides evidence to support the Cardiovascular Health and Tobacco Use Time Tool.

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1. INTRODUCTION

Tobacco use continues to be the single most important preventable cause of premature mortality and morbidity in the United States. [1,2]

- Tobacco smoking is the most important preventable cause of cardiovascular disease.[3]

Prevalence of Cardiovascular Disease

Approximately 1 in 3 (about 80 million) American adults have one or more types of cardiovascular disease (includes hypertension, angina, prior infarction, heart failure, stroke and congenital cardiovascular defects). [4]

- Over age 60, prevalence of CVD is 3 in 4; above age 80 it is greater than 4 out of 5.
- Over 7 million inpatient cardiovascular operations and procedures were performed in 2006.

CVD accounted for 1 of every 2.8 deaths in the U.S. in 2005. [4]

- Nearly 2400 Americans die of CVD each day, an average of 1 death every 37 seconds.
- The probability at birth of dying from CVD is 47%, for cancer it is 22%.

Prevalence of Smoking

In 2007, an estimated 43.1 million, or 19.8% of adults (aged 18+) were current smokers. The annual prevalence of smoking declined more than 50 percent between 1965 and 2007. [5]

- Higher rate in men (21%) than women (18%)
- Prevalence of current smoking in 2006 was highest among American Indians/Alaska Natives (32.2%), intermediate among non-Hispanic whites (21.8%) and non-Hispanic blacks (22.6%), and lowest among Hispanics (15.1%) and Asians (10.3%, largely due to the rate of 4.6% in Asian women).

Smoking Intensity

Over half of smokers (53%) smoke less than 15 cigarettes a day; just over a third smoke between 15 and 24 cigarettes a day. [6]

- The percentage of light smokers (<15 cigarettes per day) increased by 66% between 1974 and 2006. Over the same time-period, the percentage of heavy smokers (i.e., >24 cigarettes per day) decreased by 52%.

Prevalence of Use of Other Tobacco Products Among Adults

In 2006, 29% of those 26 or older had used some form of tobacco product in the last month; prevalence was almost 50% higher in those 18 to 25 years of age (44%). [7]

- Men have higher non-cigarette tobacco use; cigar use was highest – 12%, followed by smokeless tobacco – 5% and pipes – 1%).

Prevalence data is summarized in a report called, “Trends in Tobacco Use” available on the American Lung Association website.

Second Hand Smoking

NHANES data from the 1988-1994 survey to the 1999-2004 survey period showed that the prevalence of exposure as measured by serum cotinine levels declined from 84% to 46%. [8]

- It was highest for those aged 4--11 years (60.5%) and 12--19 years (55.4%) compared with those aged ≥20 years (42.2%).
- It reflects a positive trend, but more than 2 of every 5 people (126 million) were still exposed involuntarily to second hand smoke.
2. ETIOLOGY OF TOBACCO-RELATED HARMS

Cigarette smoke is a complex mix of more than 4000 chemicals, including polycyclic aromatic hydrocarbons and oxidant gases that are known to be cardiotoxins. [9]

- However, the nature and relative toxicity of many of these chemicals remains poorly understood; thus, the pathways linking smoking with CVD are also not completely understood. One thing that is understood is that it is a very complex relationship.
- Tobacco smoke is both prothrombotic and atherogenic, increasing the risks of acute myocardial infarction, sudden cardiac death, stroke, aortic aneurysm and peripheral vascular disease. [10]
- Even very low doses of exposure increase the risk of acute myocardial infarction. [11]

Nicotine
Chronic exposure to high levels of nicotine has been observed to play a pathogenic role in the induction and progression of cardiovascular disorders including cardiomyopathy and peripheral vascular disease. [12]

- Nicotine alters the function of vascular endothelium, initiates the adhesion cascade and stimulates vascular inflammatory events to induce atherosclerosis and hypertension.
- Also may induce direct coronary spasm and ischemia, and induce arrhythmias.

Nicotine also plays a key role in causing the addiction that results in continued exposure to other hazardous components of tobacco smoke.

- Nicotine inhaled in cigarette smoke reaches the brain faster than drugs that enter the body intravenously. Smokers become physically addicted to nicotine; they also link smoking with many social activities, making smoking a difficult habit to break. [13]
- This understanding of the profound effects that nicotine and other components in tobacco smoke have on brain function is one of the major advances in our understanding of the harmful effects of tobacco. It helps explain the tolerance, withdrawal, compulsive use, and relapse-prone features of tobacco addiction and why it must be treated as a chronic disease.

Carbon Monoxide
Inhaled CO binds swiftly to hemoglobin, reducing the oxygen-carrying capacity of the blood and inhibiting the release of the oxygen that is bound to hemoglobin. [14]

- Carboxyhemoglobin levels in smokers average 5%, but may be as high as 10%, compared with 0.5–2% in nonsmokers.
- Results in a compensatory increase in red cell mass and blood viscosity, which increases the likelihood of thrombus formation – the most important mechanism involved in initiating acute cardiovascular events. [15]

Platelet activation
Cigarette smoking contributes to thrombosis by promoting platelet activation and aggregation and through stimulating prothrombotic changes in clotting factors. [16]

- Levels of circulating fibrinogen, a strong predictor of coronary events, are also increased in smokers. [17,18]
- Increases in fibrinogen levels act in tandem with the increased red cell mass from long-term CO exposure, increasing blood viscosity and enhancing platelet activation, which, in turn, promotes atherogenesis.[18,19]

Oxidative stress is now considered a pivotal factor in atherogenesis. [20]

- Occurs when the production of oxidants is greater than the production of endogenous antioxidants, such as nitric oxide (NO). [21]
- Cigarette smoke is a rich source of oxidant chemicals and it also stimulates the production of oxidants that leads to an increased rate of destruction of ‘protective’ antioxidants in smokers. [21]  
- The protective effect on endothelial function [22], and controlling inflammation is reduced. [23]  
- Smokers also have higher levels of oxidized LDL, which accelerates the formation of atherosclerotic lesions. [24]
Nitric oxide
Oxidants in cigarette smoke also decrease NO release and bioavailability. [21]
• Smoking is associated with reduced basal NO production. [25]
• A strong relation between cigarette smoking and impaired endothelium-dependent vasodilation of different blood vessels has been shown -- one of the earliest events in the process of atherosclerosis. [26]

Inflammation
Smoking also promotes a chronic inflammatory state. [27]
• Current smokers with no evidence of coronary artery disease have significantly increased white blood cell counts compared with nonsmokers. [27]
• Elevated white cell counts are associated with a greater long-term cardiovascular risk. [28]

Atherosclerosis
Studies that have monitored the development of atherosclerosis in smokers and nonsmokers have documented the accelerated process in smokers. [29]
• Serial coronary arteriography has shown that active smoking promotes the formation of new lesions and accelerates progression of existing coronary artery disease.

Cell damage:
Cigarette smoking damages cardiac cells by two processes: myocardial cell necrosis and smoke cardiomyopathy, which can lead to cell necrosis with long term use. Hypoxia is the basic mechanism for both. [30]
• Initially, smoke cardiomyopathy is not characterized by necrotic phenomena but, instead, by alterations in intracellular structures like mitochondria and ribosomes, which carry out metabolic and respiratory pathways that strongly depend on oxygen availability.

Second-hand smoke
Second-hand smoke is qualitatively different from the mainstream smoke inhaled by smokers through their own cigarette. [31]
• Side stream smoke from a burning cigarette is far more toxic, with concentrations of known toxins such as oxidant gases higher by several multiples than mainstream smoke.
• Thus, the mechanisms of action are the same but the effects are magnified out of proportion to exposure: at an exposure to smoke of 1% of the equivalent of smoking 20 cigarettes per day the excess risk is as much as a third of that of the person who smokes 20 cigarettes per day. [32]
• Even brief exposure to SHS can cause blood platelets to become stickier, damage the lining of the blood vessels and decrease coronary flow velocity, increasing the risk of heart attack. [33]
• Also interferes with endothelial function, and flow-mediated vasodilation.

Other risk factors:
There is also a complex interaction between smoking and other classical and nonclassical (e.g. visceral adiposity, hypoadiponectinemia) risk factors.
• Patients who smoke are prone to multiple cardiovascular risk factors and are at the greatest risk of premature death from CVD. [34]
3. HEALTH EFFECTS OF SMOKING

Impact of Smoking on Mortality:
Smoking is responsible for approximately one in five deaths in the United States. From 1997 to 2001, smoking killed an average of approximately 443,000 people each year in the United States alone. [35]
- Estimated 269,655 male and 173,940 female deaths annually.
- 35% related to CVD.
- Cigarette smoking results in a 2-3 fold increase in risk of dying from CHD. [36]
- As many as 30% of all coronary heart disease (CHD) deaths in the United States each year are attributable to cigarette smoking, with the risk being strongly dose-related. [37]
- Half of all smokers who don’t quit by middle age die from a tobacco-related disease. [38]
- Cigarette smoking reduces life span by an average of 7 years, and tobacco consumption accounts for a shortening of disease free life by 14 years. [38,39]
- A CDC analysis found that the loss of years of life was even greater; compared to nonsmokers, men who smoked died an average of 13.2 years earlier and women 14.5 years earlier. [40]

Second Hand Smoking:
Responsible for approximately 46,000 (ranging 22,700-69,600) heart disease deaths in adult nonsmokers annually in the United States. [41]

Impact of Smoking on Cardiovascular Disease:
A large number of epidemiological, clinical and laboratory studies in a range of settings among different population groups have provided consistent and compelling evidence of the leading role of tobacco smoking in the genesis of both acute cardiovascular events and atherosclerotic disease.

Smoking has been shown to have a greater impact on acute, typically thrombotic, events than on atherogenesis. This is most marked in young and middle-aged adults, where smoking is responsible for approximately 50% of premature acute myocardial infarctions (AMIs). [20]
- 2 out of 3 sudden cardiac deaths due to acute coronary thrombosis occur in cigarette smokers. [42]

Smoking has been shown to promote the development and progression of CVD [43] and, in people with established CAD, it is an important predictor of future CV events. [44]

Current smoking results in:
- 2 to 4-fold increase in risk of developing coronary heart disease (CHD) and a 2-3 fold increase in risk of dying from CHD. [45]
- 2 to 3-fold increase in the likelihood of having a nonfatal AMI in current smokers compared with nonsmokers, and an increased risk of sudden cardiac death. [46,47]
- Doubling of the risk for stroke and 7 to 10-fold increase in likelihood of developing peripheral vascular disease (PVD); also increases the rate of progression of PVD to symptomatic disease, a decade earlier than in nonsmokers. [45,48]
- 2 to 9-fold increase in risk for abdominal aortic aneurysm (AAA) in a dose–response fashion. [49]

Current smokers with PVD also have twice the amputation rate of nonsmokers [50], an increased risk of graft failure following bypass surgery [51], and increased postoperative mortality. [52]

About 8.6 million people in the U.S. have at least one serious illness caused by smoking. That means that for every person who dies of a smoking-related disease, there are 20 more people who suffer from at least one serious illness associated with smoking. [53]
- One of these is diabetes – smoking increases the risk of developing diabetes. [53a]

Smokers also have worse outcomes than nonsmokers in other less acute coronary settings, such as after bypass surgery. [54,55]
Tobacco smoking compounds the impact of other major cardiovascular risk factors. [56]
• When smoking is present with another risk factor, a higher risk generally results than would have resulted from simply adding together the independent risks. [55]

The person who smokes often has one or more additional risk factors: there is substantial evidence for risk factor clustering, and the smoker is more likely than the nonsmoker to also have elevated lipids and hypertension. [57] Thus, smoking is often only one of several risk factors that must be addressed simultaneously.

Smoking has been consistently shown to increase BP; quitting can help lower it. [58,59]

Second hand smoke (SHS) is underestimated in its impact on risk. [60]
• Epidemiological evidence clearly indicates that exposure to SHS is linked to an increase in CVD.
• Nonsmokers exposed to second hand tobacco smoke at home or work have a 25-30% higher risk for heart disease than those not exposed. [33,61]

Extensive clinical and experimental research have described the acute cardiovascular effects -- platelet activation, endothelial dysfunction, inflammation, atherosclerosis development and progression, increased oxidative stress, decreased energy metabolism, and increased insulin resistance. [62]
• These effects are, on average, 80% to 90% that of chronic active smoking.
• Second hand smoke appears to be capable of precipitating the acute manifestations of CVD (atherothrombosis) and may also have a negative impact on the outcome of patients who suffer acute coronary syndromes.

Evidence from cities that have implemented 100% smoke-free laws has shown that myocardial infarction admissions rapidly declined after law implementation. This decline is, in part, explained by the acute cardiovascular effects of SHS, many of which are rapid and nearly as large as smoking. [63]

Costs:
• In 2004, tobacco use was estimated to cost the United States $193 billion, including $97 billion in lost productivity and $96 billion in direct health care expenditures, or an average of $4,260 per adult smoker. [64]
4. CARDIOVASCULAR DISEASE -- ROLE OF RISK FACTORS

Prevalence of risk factors
The 2003 CDC BRFSS survey showed that over 1 in 3 adults over 18 had at least 2 CVD risk factors and the prevalence increased with age. [65]
- Only 1 in 33 adults met the standard for a healthy lifestyle (no smoking, healthy weight, regular physical activity and consumption of 5 fruits and vegetables per day. [66]

Data from the Medical Expenditure Panel Survey (MEPS) 2004 showed that of adults who had been told by a doctor that they had CVD, nearly 1 in 5 were smokers who continued to smoke and only 1 in 5 engaged in all 3 recommended behaviors – nonsmoking, regular physical activity and maintaining a healthy weight. [67]

Impact of Risk Factor Burden on CVD
A systematic review found that 4 lifestyle changes can affect mortality risk in CVD patients: [68]
- smoking cessation -- a 36% reduction (RR, 0.64; 95% CI, 0.58 to 0.71),
- increased physical activity -- a 24% reduction in mortality risk (RR, 0.76; 95% CI, 0.59 to 0.98),
- moderate alcohol use -- a 20% reduction in mortality risk (RR, 0.80; 95% CI, 0.78 to 0.83), and
- dietary changes -- a 44% reduction in mortality risk (RR, 0.56; 95% CI, 0.42 to 0.74).

A number of large prospective studies have documented the benefits of a healthy lifestyle and lower CVD risk factor burden on CVD outcomes and longevity. [69]
- These include Framingham, The Interheart Study, The Chicago Heart Association Detection Project, The Multiple Risk Factor Intervention Study, the U.S. Health Professionals Follow-up Study, and the Nurse’s Health Study.

The Interheart Study analyzed more than 11,000 myocardial infarctions and found that 8 factors -- abnormal lipids, smoking, hypertension, diabetes, abdominal obesity, inactivity, lack of consumption of fruits and vegetables, and alcohol -- accounted for more than 80% of the risk for an MI. [70]

The Chicago Heart Association Detection Project in Industry has followed people from a young age (18-39 yrs) for over 30 years. Key findings include:
- Incidence of CHD and CVD was rare in those with favorable levels of 5 major risk factors (BP, cholesterol, BMI, diabetes, and smoking) at a young age. [71]
- Mortality rates were much higher in those who had elevated risk factors in early adulthood. [72]
- After age 60, the impact of the risk factor burden increases rapidly both men and women. [73]
- Lower risk factor burden in middle age was also associated with better QOL at older ages, and lower Medicare costs. [74]

The Framingham Heart Study showed that the lifetime risk for CVD, as well as longevity, is highly associated with risk factor burden at age 50. [75]
- Remaining lifetime risk for atherosclerotic CVD events was 5% in men and 8% in women with optimal risk factors at age 50, compared with 69% in men and 50% in women with ≥2 major risk factors at age 50 (current smoking, stage 2 hypertension, cholesterol ≥240 mg/dL, diabetes).
- Men and women with optimal risk factors had a median life expectancy 10 years longer than those with ≥2 major risk factors at age 50.
- 36% of those with optimal risk factor levels survived to the age of 85 versus only 5% of men and 15% of women surviving to age 85 with adverse levels of 4 of the 5 major risk factors. [76]

The Atherosclerosis Risk in Communities Study from the NHLBI showed that >90% of CVD events in black subjects and approximately 70% in white subjects were explained by elevated risk factors. [77]

The Multiple Risk Factor Intervention Trial (MRFIT) Study and Chicago Heart Association Detection Project cohorts found that those with low risk factor burden had a 73- 85% lower risk for CVD mortality, a
40-60% lower total mortality rate, and 6 to 10 years' greater life expectancy than those who were not low risk status. [78]

The Nurses' Health Study showed that with 3 of 5 healthy lifestyle factors, risk for CHD over a 14-year period was reduced by 57%; with 4, risk was reduced 66%; and with all 5 factors, risk was reduced by 83%. [79]

In the Health Professionals Follow-up Study, low risk was defined as (1) absence of smoking, (2) BMI <25 kg/m², (3) physical activity ≥30 min/d, (4) moderate alcohol consumption (5 to 30 g/d), and (5) top 40% of a healthy diet score. [80]

- Over 16 years, men who met all 5 lifestyle factors had only 87% lower risk for CHD as men whose lifestyle achieved no lifestyle factors.
- 62% of coronary events in this cohort may have been prevented with better adherence to these 5 healthy lifestyle practices.
- Among men taking medication for hypertension or hypercholesterolemia, 57% of all coronary events may have been prevented with a low-risk lifestyle.
- Compared with men who did not make lifestyle changes during follow-up, those who adopted ≥2 additional low-risk lifestyle factors had a 27% lower risk of CHD.
- A majority of CHD events among US men may be preventable through adherence to healthy lifestyle practices, even among those taking medications for hypertension or hypercholesterolemia

The NHANES II Mortality Follow-Up Study found that the risk for death from CHD was 51% lower for men and 71% lower for women with none of 3 major risk factors (smoking, hypertension, and elevated total cholesterol [≥240 mg/dL]) compared to those with 1 or more risk factors. [81]

- It was estimated that 64% of all CHD deaths among women and 45% of CHD deaths in men could have been avoided with optimal levels of the 3 risk factors.

In the Women’s Health Study, a healthy lifestyle with no smoking, healthy weight, moderate alcohol, regular exercise, and healthy diet significantly reduced risk of ischemic stroke. [82]

The need for early lifestyle intervention:

- Individuals with a low 10-year risk for CHD, but a high lifetime risk, have a greater subclinical disease burden and a greater rate of atherosclerotic progression than individuals with low 10-year and low lifetime risk, even at younger ages. [83]

**Lifestyle Interventions:**
Lifestyle modification is effective in improving many cardiovascular risk factors, and among those at high risk for cardiovascular disease (CVD), the benefits of lifestyle modification are proportionally higher. [84,85]

The Lifestyle Heart Trial has provided conclusive evidence of that intensive lifestyle changes can lead to regression of coronary atherosclerosis after 1 year. [86]

- Intensive lifestyle changes included 10% fat, whole foods, vegetarian diet, aerobic exercise, stress management training, smoking cessation, and group psychosocial support
- At 5 year follow-up of 48 patients with moderate to severe coronary heart disease who were randomized to lifestyle change or usual-care, results showed that: [87]
  - The average diameter stenosis was reduced by 8% with the intervention vs a 28% increase in the usual care group
  - 25 new events occurred in the intervention group vs 45 in the usual care group, which had 8 fewer patients.
  - 23 of the 28 patients had experienced regression at 1 year with the intensive intervention.
5. EFFECT OF SMOKING CESSATION ON CVD

Smoking cessation almost completely reverses the risk of CVD from smoking -- the single most effective and lifesaving intervention available for those at risk of and with existing cardiovascular disease. [54,88]
- Cessation rapidly reduces the risk of cardiovascular events including fatal events.

Several studies have shown that quitting improves longevity and reduces the risk of recurrent events. [69]
- A systematic review of cohort studies found that smoking cessation was associated with a 36% reduction in mortality risk in CAD patients (a 50% reduction in mortality risk overall). [68]
- Estimated to increase life expectancy by 2.8 years for men, 2.3 years for women. [89]
- Risk declines rapidly, approaching nonsmoker within 3 years. [90]
- Similar rapid decreases in risk are also seen for ischemic stroke. [91,92]

The Nurses' Health Study showed that women who quit smoking experienced a rapid decline in the risk of death from coronary heart disease and stroke, with 61% of the benefit of cessation on CHD death and 42% of the benefit on stroke death realized within 5 years of stopping smoking. [93]

The benefits of cessation begin to be realized almost immediately a smoker quits. [54]
- Within just 2 weeks of cessation, fibrinogen concentration and the rate of fibrinogen synthesis are both reduced. [94]
- There is reduced platelet volume [95] and platelet aggregability. [96]
- A significant reduction in white blood cells occurs [96] and a more favorable lipid profile begins to develop, with an increase in HDL, an increase in the HDL/LDL ratio, and a decrease in LDL. [97,98]
- Hemodynamic parameters change in a favorable direction: significant reductions occur in mean arterial pressure, heart rate and arterial compliance. [99]

With CVD:
Cessation is especially effective for those with established cardiovascular disease.
- A systematic review provided strong evidence that quitting smoking after AMI or cardiac surgery can decrease a person's risk of death by at least a third. [11]
- The risk of sudden cardiac death falls swiftly, within hours. The risk of AMI is significantly reduced within a few years of quitting. [54]
- Cessation also reduces arrhythmic death for patients with post-AMI left ventricular dysfunction [99] and significantly reduces the risk of recurrent cardiac arrest. [100]

Following Bypass Surgery:
Using 30-year follow-up data, smoking cessation after coronary artery bypass surgery was associated with a life expectancy gain of 3 years. [101]
- Smoking cessation had a greater effect on reducing the risk of mortality than the effect of any other intervention or treatment.

Benefits from quitting are seen even after many years of heavy smoking, as well as in those who have already developed smoking-related diseases or symptoms. [37]

Smokers with intermittent claudication who stop smoking demonstrate reductions in PVD progression.
- In a Swedish study that followed 343 patients with claudication over 7 years, rest pain developed only in current smokers, not in any ex-smokers. [100]

Stroke risk:
Compared with current smokers, male ex-smokers have a reduced risk of nonfatal stroke.
- In the Physicians' Health Study and, after adjusting for age and treatment assignment, ex-smokers had a lower RR of total nonfatal stroke (RR: 1.2; 95% CI: 0.95–1.63) than currently smoking physicians (RR: 2.0 for < 20 cigarettes per day; RR: 2.5 for ≥ 20 cigarettes per day). [102]
6. ROLE OF THE CLINICIAN IN SMOKING CESSATION

Several studies have demonstrated the enormous potential of physician recommendations to influence patients’ lifestyle behaviors, including smoking cessation. [103]

Healthcare settings provide an important teachable moment for smoking cessation intervention. In the physician’s office, patients are often conscious of their health and most receptive to risk factor intervention, providing an important opportunity for change. [104]

- PCPs manage the majority of patients with chronic conditions; see 3 out of 4 adults at least once a year; average is 2-3 times per year. [105]
- The public perceives physicians as extremely credible and reliable sources of information regarding health behaviors. [106,107]

Advice from a physician has consistently been shown to lead to attempts to improve lifestyle, including smoking cessation. [108-110]

- Data from the 2001 National Health Interview Survey showed that just being advised by a provider to quit smoking doubles a patient’s chances of success in (self-reported) smoking cessation. [111]
- The probability of quitting in the next 12 months increased from 6.9 to 14.7%.

A particularly important time to encourage lifestyle change is after a cardiovascular event or upon the discovery of existing CVD or diagnosis of some other chronic disease. [112]

- Unfortunately, physicians often underestimate the importance and power of their role as health behavior change counselors.
7. PHYSICIAN PRACTICES – SMOKING CESSATION

The Partnership for Prevention places office based smoking cessation in the top tier of preventive activities for primary care, making it a priority for primary care prevention improvement. [112a,112b]

Advising Patients Who Smoke to Quit

Most physicians report that they usually or always assessed tobacco use and advise their smoking patients to quit, but very few use specific counseling behaviors or follow-up visits. [113,114]

- Following dissemination of the original U.S. smoking cessation clinical practice guideline, there was an increase in the frequency of asking about smoking, and providing advice to quit.
- But more in depth counseling on quit methods, referral to specialists or services, or arranging for follow-up to address smoking was still not affected. [115]
- This is consistent with health professionals’ general lack of knowledge and confidence to provide effective interventions. Time is also cited as a barrier to more in depth interventions. [116]

The percentage of current smokers who reported receiving advice to quit from a physician in 2002 and 2003 for available states ranged from 66.4% in Iowa to 79.5% in New Hampshire. [117]
- The median was 71.3%.

Behavioral Risk Factor Surveillance System (BRFSS) 2000 data showed that almost 55% of smokers were advised to quit smoking over the course of the year, but that it occurred in less than a quarter of clinical encounters. [118]

- Data from the Current Population Survey (1999) found that 59% of smokers in the US who had seen their physician in the previous year had been advised to quit. [119]
- The National Health Interview Survey showed that the prevalence of smokers being advised to quit by healthcare provider increased from 53% in 2000 to 61% in 2005. [120]

Physicians were more likely to advise sicker patients, indicated by poorer health status, and patients with commonly recognized smoking-related diseases (CVD, respiratory, cerebrovascular). [121]

Male patients were twice as likely to report being asked about smoking in clinic visits than women and male smokers were also twice as likely to be advised to quit. [122]
- Similarly, white smokers were much more likely to be advised to quit than other ethnicities. [120]

Counseling

The 2001 National Health Interview Survey showed that of smokers who did receive advice to quit, only 38% received assistance to quit smoking. [123]

- Smokers were less likely to report assistance to quit smoking if they were younger or Black, or if they had a high or middle level of socioeconomic disadvantage.

Only a minority of physicians is familiar with the “5A” intervention protocol recommended by the clinical practice guidelines, and fewer put them to use. [38]

Data from the National Ambulatory Medical Care Survey (1995), an annual survey of a random sample of US office-based physicians found that only 1 in 5 smokers received any cessation counseling. [124]

The lowest rates of treatment are seen in the populations with the highest rates of tobacco use. [125]

The Legacy Survey of family physicians showed that self reports of giving advice to quit are a little higher than patient surveys:
PHYSICIAN PERFORMANCE RELATED TO SMOKING PATIENTS

Percent who “Usually” Engage in Specific Cessation Activities:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask about smoking status, and advise to quit</td>
<td>86%</td>
</tr>
<tr>
<td>Assess willingness to quit</td>
<td>63%</td>
</tr>
<tr>
<td>Discuss pharmacotherapies</td>
<td>68%</td>
</tr>
<tr>
<td>Discuss counseling options</td>
<td>37%</td>
</tr>
<tr>
<td>Recommend nicotine replacement therapy</td>
<td>31%</td>
</tr>
<tr>
<td>Discuss enlisting support for quitting</td>
<td>29%</td>
</tr>
<tr>
<td>Monitor patient progress in attempting to quit</td>
<td>27%</td>
</tr>
<tr>
<td>Prescribe other medication</td>
<td>25%</td>
</tr>
<tr>
<td>Provide brochures/self help materials</td>
<td>24%</td>
</tr>
<tr>
<td>Arrange follow-up visits with patient to address smoking</td>
<td>17%</td>
</tr>
<tr>
<td>Refer to others for treatment</td>
<td>13%</td>
</tr>
<tr>
<td>Refer to a quitline</td>
<td>7%</td>
</tr>
</tbody>
</table>

Barriers to providing smoking cessation services

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients lack motivation</td>
<td>63%</td>
</tr>
<tr>
<td>Limited coverage for interventions</td>
<td>54%</td>
</tr>
<tr>
<td>Limited reimbursement for physician’s time</td>
<td>52%</td>
</tr>
<tr>
<td>Takes too much time</td>
<td>41%</td>
</tr>
<tr>
<td>Few cessation programs and resources</td>
<td>39%</td>
</tr>
<tr>
<td>Limited understanding of codes</td>
<td>36%</td>
</tr>
<tr>
<td>More immediate problems take priority</td>
<td>35%</td>
</tr>
<tr>
<td>Patients usually fail to quit</td>
<td>35%</td>
</tr>
</tbody>
</table>

Percent of Family Physicians by Practice Reporting High Confidence.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess patient willingness to quit</td>
<td>68%</td>
</tr>
<tr>
<td>Discuss treatment options with patients</td>
<td>75%</td>
</tr>
<tr>
<td>Select prescription medications</td>
<td>74%</td>
</tr>
<tr>
<td>Refer to others for treatment</td>
<td>34%</td>
</tr>
<tr>
<td>Motivate patients to consider quitting</td>
<td>49%</td>
</tr>
<tr>
<td>Monitor patient progress</td>
<td>36%</td>
</tr>
</tbody>
</table>

From: A comprehensive, national survey commissioned by the American Legacy Foundation

Reasons for poor performance

Reasons clinicians avoid helping smokers quit include time constraints, lack of expertise, lack of financial incentives, respect for a smoker’s privacy, fear that a negative message might lose customers, pessimism because most smokers are unable to quit, stigma, and clinicians being smokers. [38]

Another study of barriers to providing smoking interventions found: a belief that they are not effective; poor intervention skills; a belief that patients do not want their physicians to intervene; and little time to fit intervention into their practice, especially when reimbursement for these services is not provided. [126]

There are also disparities in physician activity based on age, gender, race, and ethnicity. [126a,126b]

Improving Physician Practices

Ways to counter clinicians’ pessimism about cessation include the knowledge that: [38]

- Smoking cessation must be managed like a chronic disease, meaning educating, changing behaviors, dealing with relapses, overcoming barriers, needing support, and so on.
- Most smokers require multiple quit attempts before they succeed.
- Unrealistic expectations by both patients and physicians are part of the problem.
- Rigorous studies show long-term quit rates of 14% to 20%, with 1 report as high as 35%.
• Cessation rates for users of telephone quit lines and integrated health care systems are comparable with those of individual clinicians.
• No other clinical intervention can offer such a large potential benefit.
8. PATIENT PRACTICES – CARDIOVASCULAR HEALTH AND SMOKING CESSATION

Most CVD patients are not taking advantage of lifestyle interventions:
Data from the Medical Expenditure Panel Survey (MEPS) 2004 showed that of people diagnosed with heart-related disease: [67]

- Nearly 1 in 5 (18%) continue to smoke,
- 2 out of 3 (66%) are overweight,
- Half (54%) do not engage in moderate physical activity 3 times per week,
- Fewer than 1 in 5 (18%) engage in all 3 positive behaviors (active, non-smoking, at a healthy weight), and 1 in 15 (6.5%) are not engaging in any of the recommended behaviors.

The 2000 BRFSS found that only 1 in 33 (3%) had healthy levels of all 4 lifestyle behaviors that are keys to preventing CVD -- non smoking, healthy weight, 5 fruits and vegetables per day, and regular physical activity. [127]

Between 1965 and 2006 the proportion of former smokers more than doubled. By 2006, 50% of ever smokers 18 years and older reported having quit smoking. In 2006, the proportion of former smokers was similar for men and women and increased with higher level of education (42% for < 12 years of education to 71% among college graduates). [6]

Most current smokers would like to quit, and many try.
More than two thirds (70%) of adult smokers want to quit, and just over half of everyday adult smokers quit for at least one day in 2007. [125,128]

- The median proportion of everyday smokers who quit for one day or more for all states was 51.8% in 2007. [128]
- CDC data from 2006 showed that 44% quit for at least 1 day in the preceding year because they were trying to quit smoking completely. [6]

Few who try to quit use effective methods
Only 20%-30% of quitters use an effective behavioral counseling or pharmacologic treatment. [125]

Data from the 2000 National Health Interview Survey showed that of smokers who tried to quit in the previous year only 22% used pharmacotherapy, and only 1% used behavioral therapy. [129]

- Those who were advised to quit by their doctor were more likely to use either.
9. QUIT METHODS

Successful treatment combines counseling with pharmacotherapy (nicotine replacement therapy with or without psychotropic medication such as bupropion). [130]

- Nicotine replacement therapy comes in long-acting (patch) or short-acting (gum, lozenge, nasal spray, or inhaler) forms.

Pharmacotherapy

Numerous pharmacotherapies now exist for the treatment of tobacco dependence. [130]

- The most widely used is nicotine replacement therapy (NRT) but newer, highly targeted treatments, such as varenicline, are becoming more widely available.
- Currently, there are seven medications approved by the FDA to aid in quitting smoking.
- Nicotine patches, nicotine gum and nicotine lozenges are available over-the-counter, and a nicotine nasal spray and inhaler are currently available by prescription.
- Buproprion SR (Zyban) and varenicline tartrate (Chantix) are non-nicotine pills.
- Combination therapy (i.e., patch and/or bupropion plus short-acting NRT) has been shown to be more effective than single-drug therapy for many patients. Varenicline is the exception, as it is not used in combination with other medications (except in trials).
- Varenicline is now considered a first-line medication for treating tobacco dependence. [156]

Tobacco cessation typically causes nicotine withdrawal symptoms such as irritability, anxiety and hunger in many patients. [130,131].

- Nicotine replacement is a logical approach to try to reduce these negative effects.
- NRT is well-established in smoking cessation and includes a wide range of delivery systems including gum, transdermal patch, nasal spray, inhaler and lozenge.
- None of the NRT products delivers nicotine at the same speed or dose as delivered by cigarettes, but all NRT products are of proven with approximately equivalent efficacy, improving the likelihood of long-term abstinence by 50–170% over the placebo (ORs range from 1.5 to 2.7).

For patients with CVD

A combination of long-term behavioral support [132] and pharmacologic therapy with buproprion, with or without nicotine replacement [133], or varenicline should be offered to all patients with CVD.

Nicotine replacement therapy is just as safe and effective in patients with cardiovascular disease as in those without. [134]

- Clinical trials of NRT in patients with underlying, stable coronary disease indicate that NRT does not increase cardiovascular risk. [135]
- NRT should be offered to all smokers with cardiovascular disease with only very few provisos and precautions – as in patients in the ICU or with significant arrhythmias or unstable angina; and patients immediately post-CABG. [130,154]

Need to deal with relapses

The addictive nature of nicotine leads to a high relapse rate. Over 85% of smokers say that cigarettes are addictive. Quitting smoking often requires multiple attempts. Using counseling or medication alone increases the chance of a quit attempt being successful; the combination of both is even more effective. [130]

- The expert panel recommends the use of combined medication therapies, such as the patch combined with gum and/or bupropion (Zyban), as recommended by a healthcare provider.
- A recent study showed significantly increased cessation rates using the patch, nicotine inhaler, and bupropion together, with NRT used “as long as it takes” in suppressing cravings. [155]
10. EFFECTIVENESS OF INTERVENTIONS

Success rates for smoking cessation are improving due to many factors, including more consistent messages, price of cigarettes and the greater availability of comprehensive support programs. [135a]

Without assistance, the quit rate is about 3%. Simple advice to quit can increase this rate by 2 to 3%, resulting in a quit rate of 5% to 6%. More in depth counseling improves success rates further. [136]

Brief advice from a physician – as brief as a minute or so – can prompt quit attempts in up to 40% of patients and substantially increases the probability of success (by approximately 2-3%). [137]
- Nursing staff can reinforce these messages and provide more support and follow-up counseling.
- Referral to other support services including telephone quitlines can also be made.

More intensive interventions produce a greater effect. In general, physician-based primary-care interventions have yielded cessation rates of 10% to 20%, a threefold to fivefold increase over the 1-year maintained cessation rate of 4% seen in the general population. [130]

One of the strongest keys to success is the adoption of a smoke-free home (nearly 5-fold increase in success vs those whose homes were not smoke-free). [130a]

Counseling Interventions
A systematic review of the effects of individual counseling on smoking cessation showed that individual counseling for 6 months or longer resulted in a 1.6 times greater likelihood of successful cessation. [143]

There is a dose–response relationship between quit rates and the intensity of counseling (that is, more or longer sessions improve quit rates). [130]
- Quit rates seem to plateau after 90 minutes of total counseling contact time. [138]
- Helpful components of counseling include problem-solving guidance for smokers (to help them develop a plan to quit and overcome common barriers to quitting) and the provision of social support as part of treatment.
- Complementary practices that improve cessation rates include motivational interviewing, assessing readiness to change, offering more intensive counseling or referrals, and using telephone “quit lines”. [138]

An intensive intervention (2 months of nurse-initiated counseling calls) following heart attack or bypass surgery doubled the cessation rate over a brief intervention. [139]

Combination therapy
Combination therapy with counseling and medications is more effective at increasing cessation rates than either component alone (see Table below). [130]

Implementation
Strategies that improve rates of tobacco cessation counseling and interventions in primary care settings include implementing a tobacco user identification system; providing education, resources, and feedback to promote clinician intervention; and dedicating staff to provide tobacco dependence treatment and assessing the delivery of this treatment in staff performance evaluations. [130]

Interventions are particularly effective when patients have suffered a smoking related event.
- Smoking cessation programs initiated during hospitalization for cardiac events are associated with a 50% long-term (more than 1 year) cessation rate, and the addition of modest telephone-based counseling can increase this percentage to 70% in a cost-effective manner. [140,141]

Although most former smokers prefer quitting cold turkey, less than 5% will have long term success. [142]
- One group of studies found that counseling alone had an estimated success rate (portion of quitters still not smoking at follow-up) of 14.6%.
A separate group estimated that medication alone had a success rate of 21.7%, compared to rates as high as 27.6% for medication and counseling together. However, using a smoking cessation medication and counseling program leads to higher success rates than either method alone. [130]

Pharmacotherapy Success Rates, 2008 Guidelines
These comparisons should be viewed as suggestive rather than definitive as the included studies may have differed on important factors such as population and year. Head-to-head comparisons of medications in individual studies may offer additional information.

<table>
<thead>
<tr>
<th>METHOD</th>
<th>SUCCESS RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>95% CI</td>
</tr>
<tr>
<td><strong>Cold Turkey/Self Help</strong></td>
<td>3-5%</td>
</tr>
<tr>
<td><strong>2008</strong></td>
<td>Success rate at 6 month postquit.</td>
</tr>
<tr>
<td>Monotherapies</td>
<td></td>
</tr>
<tr>
<td>Varenicline (2 mg/day)</td>
<td>33.2</td>
</tr>
<tr>
<td>Nicotine Nasal Spray</td>
<td>26.7</td>
</tr>
<tr>
<td>High Dose Nicotine Patch (&gt;25 mg; standard or long term)</td>
<td>26.5</td>
</tr>
<tr>
<td>Long Term Nicotine Gum (&gt;14 weeks)</td>
<td>26.1</td>
</tr>
<tr>
<td>Varenicline (1 mg/day)</td>
<td>25.4</td>
</tr>
<tr>
<td>Nicotine Inhaler</td>
<td>24.8</td>
</tr>
<tr>
<td>Clonidine</td>
<td>25.0</td>
</tr>
<tr>
<td>Bupropion SR</td>
<td>24.2</td>
</tr>
<tr>
<td>Nicotine Patch (6-14 weeks)</td>
<td>23.4</td>
</tr>
<tr>
<td>Long Term Nicotine Patch (&gt;14 weeks)</td>
<td>23.7</td>
</tr>
<tr>
<td>Nortriptyline</td>
<td>22.5</td>
</tr>
<tr>
<td>Nicotine Gum (6-14 weeks)</td>
<td>19.0</td>
</tr>
<tr>
<td>Combination Therapies</td>
<td></td>
</tr>
<tr>
<td>Long Term Nicotine Patch (&gt;14 weeks) + Gum or Spray</td>
<td>36.5</td>
</tr>
<tr>
<td>Patch + Bupropion</td>
<td>28.9</td>
</tr>
<tr>
<td>Patch + Nortriptyline</td>
<td>27.3</td>
</tr>
<tr>
<td>Patch + Inhaler</td>
<td>25.8</td>
</tr>
<tr>
<td>Patch + Second Generation Antidepressants</td>
<td>24.3</td>
</tr>
<tr>
<td>Patch + Inhaler + Bupropion ++</td>
<td>35.0</td>
</tr>
<tr>
<td>Placebo</td>
<td>13.8</td>
</tr>
</tbody>
</table>


Bupropion
A double-blind, placebo-controlled study of 893 smokers showed that those who received bupropion (150 mg/d for 3 days, then 150 mg twice daily) with or without a nicotine patch resulted in significantly higher quit rates (36% and 30%, respectively) than the patch alone (16%) which was no different than the placebo group (16%). [144]

Varenicline
Increased long-term cessation rates by 2-3 fold compared with pharmacologically unassisted quit attempts. [156]
• Success rates higher than with bupropion in head to head trials.
• It appears to have some efficacy in relapse prevention, particularly when taken for 6 months.

More:
Summary of evidence from the Society for Research on Nicotine and Tobacco:
http://www.treatobacco.net/en/page_170.html
11. MEDICATION INFORMATION

There is insufficient data to rank-order the 7 medications, therefore, choice of a specific first-line pharmacotherapy must be guided by factors such as clinician familiarity with the medications, contraindications for selected patients, patient preference, previous patient experience with a specific pharmacotherapy (positive or negative), and patient characteristics (e.g., history of depression, concerns about weight gain). [130]

Suggestions for the Clinical Use of Medications for Tobacco Dependence Treatment

<table>
<thead>
<tr>
<th>Pharmacotherapy</th>
<th>Precautions/Contraindications</th>
<th>Side Effects</th>
<th>Dosage</th>
<th>Duration</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotine Patch</td>
<td></td>
<td>Local skin reaction Insomnia</td>
<td>21 mg/24 hours</td>
<td>4 weeks then 2 weeks</td>
<td>Prescription and OTC only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14 mg/24 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7 mg/24 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicotine Gum</td>
<td></td>
<td>Mouth soreness Dyspepsia</td>
<td>1-24 cigs/day-2 mg gum (up to 24 pcs/day)</td>
<td>Up to 12 weeks</td>
<td>OTC only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25+cigs/day-4 mg gum (up to 24 pcs/day)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nicotine Nasal Spray</td>
<td></td>
<td>Nasal irritation</td>
<td>8-40 doses/day</td>
<td>3-6 months</td>
<td>Prescription only</td>
</tr>
<tr>
<td>Nicotine Inhaler</td>
<td>Local irritation of mouth and throat</td>
<td></td>
<td>6-16 cartridges/day</td>
<td>Up to 6 months</td>
<td>Prescription only</td>
</tr>
<tr>
<td>Nicotine Lozenge</td>
<td>Local irritation of throat Hiccups Heartburn/Indigestion Nausea</td>
<td>First a.m. cigarette after 30 minutes from waking: 2 mg (up to 20 pcs/day)</td>
<td>First a.m. cigarette before 30 minutes from waking: 4 mg (up to 20 pcs/day)</td>
<td>12 weeks</td>
<td>OTC only</td>
</tr>
<tr>
<td>Bupropion SR</td>
<td>History of seizure History of eating disorders Use of MAO inhibitors in past 14 days</td>
<td>Insomnia Dry mouth</td>
<td>150 mg every morning for 3 days then 150 mg twice daily (Begin treatment 1-2 weeks pre-quit)</td>
<td>7-12 weeks maintenance up to 6 months</td>
<td>Prescription only</td>
</tr>
</tbody>
</table>

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Clinical guidelines for prescribing pharmacotherapy for smoking cessation:

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who should receive pharmacotherapy for smoking cessation?</td>
<td>All smokers trying to quit, except in the presence of special circumstances. Special consideration should be given before using pharmacotherapy with selected populations: those with medical contraindications, those smoking fewer than 10 cigarettes/day, pregnant/breastfeeding women, and adolescent smokers.</td>
</tr>
<tr>
<td>What are the first-line pharmacotherapies recommended?</td>
<td>All five of the FDA-approved pharmacotherapies for smoking cessation are recommended, including bupropion SR, nicotine gum, nicotine inhaler, nicotine nasal spray, and the nicotine patch.</td>
</tr>
<tr>
<td>What factors should a clinician consider when choosing among the five first-line pharmacotherapies?</td>
<td>Because of the lack of sufficient data to rank-order these five medications, choice of a specific first-line pharmacotherapy must be guided by factors such as clinician familiarity with the medications, contraindications for selected patients, patient preference, previous patient experience with a specific pharmacotherapy (positive or negative), and patient characteristics (e.g., history of depression, concerns about weight gain).</td>
</tr>
<tr>
<td>Are pharmacotherapeutic treatments appropriate for lighter smokers (e.g., 10-15 cigarettes/day)?</td>
<td>If pharmacotherapy is used with lighter smokers, clinicians should consider reducing the dose of first-line nicotine replacement therapy (NRT) pharmacotherapies. No adjustments are necessary when using bupropion SR.</td>
</tr>
<tr>
<td>What second-line pharmacotherapies are recommended?</td>
<td>Clonidine and nortriptyline (not an FDA approved indication, though listed in the PHS Guidelines as second-line therapy).</td>
</tr>
<tr>
<td>When should second-line agents be used for treating tobacco dependence?</td>
<td>Consider prescribing second-line agents for patients unable to use first-line medications because of contraindications or for patients for whom first-line medications are not helpful. Monitor patients for the known side effects of second-line agents.</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Which pharmacotherapies should be considered with patients particularly concerned about weight gain?</td>
<td>Bupropion SR and nicotine replacement therapies, in particular nicotine gum, have been shown to delay, but not prevent, weight gain.</td>
</tr>
<tr>
<td>Are there pharmacotherapies that should be especially considered in patients with a history of depression?</td>
<td>Bupropion SR and nortriptyline appear to be effective with this population.</td>
</tr>
<tr>
<td>Should nicotine replacement therapies be avoided in patients with a history of cardiovascular disease?</td>
<td>No. The nicotine patch in particular is safe and has been shown not to cause adverse cardiovascular effects.</td>
</tr>
<tr>
<td>May tobacco dependence pharmacotherapies be used long-term (e.g., 6 months or more)?</td>
<td>Yes. This approach may be helpful with smokers who report persistent withdrawal symptoms during the course of pharmacotherapy or who desire long-term therapy. A minority of individuals who successfully quit smoking use ad libitum NRT medications (gum, nasal spray, inhaler) long term. The use of these medications long term does not present a known health risk. Additionally, the FDA has approved the use of bupropion SR for a long-term maintenance indication.</td>
</tr>
<tr>
<td>May pharmacotherapies ever be combined?</td>
<td>Yes. There is evidence that combining the nicotine patch with either nicotine gum or nicotine nasal spray increases long-term abstinence rates over those produced by a single form of NRT. NRT and bupropion may also be combined</td>
</tr>
</tbody>
</table>


**More:**
Clinical guidelines for prescribing pharmacotherapy for smoking cessation
[http://www.ahrq.gov/clinic/tobacco/prescrib.htm](http://www.ahrq.gov/clinic/tobacco/prescrib.htm)

Suggestions for the clinical use of pharmacotherapies for smoking cessation
12. RECOMMENDATIONS

All major health care agencies and associations recommend routine tobacco use cessation counseling for adults and adolescents.

The US Preventive Services Task Force recommends that clinicians ask all adults about tobacco use and provide tobacco cessation interventions for those who use tobacco products. [138]

- They also recommend use of the "5-A" behavioral counseling framework for engaging patients in smoking cessation discussions: 1) Ask about tobacco use; 2) Advise to quit through clear personalized messages; 3) Assess willingness to quit; 4) Assist to quit; and 5) Arrange follow-up and support.

Specific recommendations of the American College of Preventive Medicine include: [145]

1. Tobacco usage history should be obtained at all patient visits.
2. Nonsmokers, especially children and adolescents, should be encouraged not to start.
3. Office and medical record systems to identify patients who use tobacco should be employed.
4. Physicians and other office staff should advise all tobacco users to quit.
5. Physicians and other office staff should identify and assist smokers who are willing to quit.
6. Physicians and other office staff should provide motivational interventions for smokers who are not willing to quit.

10 key recommendations from the 2008 Clinical Practice Guidelines: [130]

1. View tobacco dependence as a chronic disease that requires repeated intervention and multiple attempts to quit.
2. Consistently identify and document tobacco use status and treat every tobacco user seen in a health care setting.
3. Tobacco dependence treatments are effective. Encourage every patient willing to make a quit attempt to use the counseling and medication approaches recommended in this Guideline.
4. Even brief interventions are effective. Every patient who uses tobacco should receive at minimum a brief intervention beyond advice to quit.
5. Individual, group, and telephone counseling are effective, and their effectiveness increases with number of sessions. Two components of counseling are essential: problem solving/skills training and social support.
6. There are several effective medication options for tobacco dependence including 7 first-line (5 nicotine and 2 non-nicotine); clinicians should encourage their use by all patients attempting to quit smoking, except if contraindicated or with specific populations for which there is insufficient evidence of effectiveness (i.e., pregnant women, smokeless tobacco users, light smokers, and adolescents).
7. Certain combinations of first-line medications have been shown to increase the effectiveness of smoking cessation treatments. Clinicians should consider using these in appropriate patients:
   - Long-term (>14 weeks) nicotine patch + other NRT (gum and spray).
   - The nicotine patch + the nicotine inhaler.
   - The nicotine patch + bupropion SR.
8. The combination of counseling and medication is more effective than either alone. Clinicians should encourage all individuals making a quit attempt to use both counseling and medication.
9. Telephone quitline counseling is effective and should be promoted as the minimum counseling approach.
10. If a tobacco user is currently unwilling to make a quit attempt, clinicians should use the motivational treatments presented in the Guideline to increase future quit attempts.
New Recommendations from the 2000 Clinical Practice Guideline to the 2008 Update: [146]

1. Format of Psychosocial Treatments: Tailored materials, both print and Web-based, appear to be effective in helping people quit. Clinicians may choose to provide tailored, self-help materials to their patients who want to quit.

2. Combining Counseling and Medication: The combination of counseling and medication is more effective than either alone. Whenever feasible and appropriate, both counseling and medication should be provided to patients trying to quit smoking. There is a strong relation between the number of sessions of counseling and the likelihood of successful cessation. Clinicians should provide multiple counseling sessions, in addition to medication, to patients trying to quit smoking.

3. For Tobacco Users Not Willing To Quit Now: Motivational intervention techniques appear to be effective in increasing the likelihood of a future quit attempt. Clinicians should use motivational techniques to encourage smokers to consider making a quit attempt in the future.

4. Nicotine Lozenge: The nicotine lozenge is an effective smoking cessation treatment that patients should be encouraged to use. Go to the FDA Web site (http://www.fda.gov) for additional information on safe and effective use.

5. Varenicline: Varenicline is an effective smoking cessation treatment that patients should be encouraged to use. Go to the FDA Web site (http://www.fda.gov) for additional information on safe and effective use.

6. Specific Populations: The recommended interventions have been shown to be effective in a variety of populations. They should be recommended for all individuals who use tobacco except when medically contraindicated or with specific populations in which medication has not been shown to be effective (pregnant women, smokeless tobacco users, light (<10 cigarettes/day) smokers, and adolescents).

7. Light Smokers: Light smokers should be identified, strongly urged to quit and provided counseling treatment interventions.

EFFECTIVENESS OF THESE GUIDELINES:
A randomized, controlled trial of the effectiveness of Guideline implementation at eight community-based primary care clinics showed a significant improvement in quit rates in smokers (16% vs 6% at 2 months, 11% vs 4% abstinence for 6 months). [146a]

- The intervention included a tutorial for intake clinicians, group and individual performance feedback for intake clinicians, use of a modified vital signs stamp, an offer of free nicotine replacement therapy, and proactive telephone counseling.
- It was mostly implemented by non-physician staff.
13. SMOKING CESSATION COUNSELING IN PRIMARY PRACTICE

THE STANDARD OF CARE

Firstly, clinicians must realize that providing brief advice in the form of the five As (ask, advise, assess, assist, arrange) is a standard of care with demonstrated efficacy in helping patients quit smoking. This intervention can be delivered in minutes, and the responsibility can be shared among the physician, nursing staff, and extra-office treatment providers (e.g. tobacco specialty services, telephone quit-lines, pharmacists, and counselors). [130]

The Clinical Practice Guidelines emphasize that every patient who uses tobacco should be treated; they all have the potential to successfully quit, and every clinician should commit to delivering treatments that can help. [130]

- The first step is determining tobacco use status of every patient.
- Simply asking whether or not a patient uses tobacco products not only increases the rates of clinician intervention, but it also increases abstinence rates compared to controls who were not asked about their tobacco use status.
- This status should be documented in the medical record.
- Providers should advise all tobacco users to quit and then assess their willingness to make a quit attempt.
- Persons who are ready to make a quit attempt should be assisted in the effort.
- Follow up should then be arranged to determine the success of quit attempts.

Patient-centered counseling methodology was developed for smoking interventions, but is as applicable to counseling for diet change or exercise as it is to smoking.

- Such an intervention process can be adapted to any time frame but optimally takes 5 to 10 minutes for each issue, of which just one should be addressed at a time. [147]
- Five strategies have been shown to be successful in helping smokers quit:
  o building and maintaining the commitment to quitting,
  o substituting other activities for smoking,
  o making their personal environment less conducive to smoking,
  o receiving support (personal and professional), and
  o increasing awareness of and valuing the rewards of quitting.

ELEMENTS FOR BRIEF INITIAL CESSATION COUNSELING:

1. Discuss reasons for quitting and endorse their importance
   - As you quit and face hard times, it may help you recommit to quitting smoking.
2. Review past attempts and relapses
   - How did you manage urges to smoke?
   - What led to your relapse?
   - Did you use medications regularly?
   - What could you do differently?
3. Set a quit date
4. Coping with urges
   - What could you do when an urge hits to avoid smoking?
   - Suggestions – drink water, do household chores, do a puzzle, talk yourself through the urge, take a short walk, etc.
5. Environmental change
   - Can you get rid of all your cigarettes starting on your quit day?
   - If you live with others, can the inside of your home and your car be smoke-free?
6. Get support
   - Is there a friend or family member who would be willing to support you; someone you can call when you are tempted to smoke or just to report your progress?
   - Could we help you with either an in-person visit or some telephone calls?
   - Do you know about websites, quitlines, or group programs?
7. Medications for heavier smokers (in general, 10 or more per day)
   • Review the medication options and precautions.
   • Are you willing to use a medication? Do you have a preference?

READINESS TO QUIT AND STAGES OF CHANGE [130]
The Stages of Change Model (also known as the Transtheoretical Model) is useful in recognizing that nicotine dependence is a chronic, relapsing disorder with most tobacco users requiring five to seven attempts before they finally quit for good.
   • The model integrates stages of readiness to change with decision balance (pros and cons of smoking), self-efficacy, and key cessation strategies.
   • Effective public health computer-based interventions have been developed from the model. The self-help book, "Changing for Good", is a great primer on the model.

Many patients do not realize that it usually takes several attempts to stop using tobacco and will need motivation to attempt to quit if they have been unsuccessful in the past.
   • It is useful to think of tobacco cessation as a process rather than an event.

Once a person has been identified as a tobacco user, his or her readiness to quit can be determined.
   • This is important because tobacco users who are not considering quitting need different interventions and messages than those who are ambivalent about quitting or those presently interested in quitting.

There are 5 stages in the readiness to change model:
   • Precontemplation: No change is intended in the foreseeable future. The individual is not considering quitting. Strategy is to
   • Contemplation: The individual is not prepared to quit at present, but intends to do so in the next six months.
   • Preparation: The individual is actively considering quitting in the immediate future or within the next month.
   • Action: The individual is making overt attempts to quit. However, quitting has not been in effect for longer than six months.
   • Maintenance: The individual has quit for longer than six months.

The 5 A's approach to counseling:
The Guidelines recommend the 5A strategy for smoking cessation treatment -- Ask, Advise, Assess, Assist and Arrange.
   • They are simple steps that lead to a plan to quit and manage relapses.
   • They are best suited to practices that have someone trained in the behavioral counseling strategies used for smoking cessation.
   • For practices that do not have someone with training in tobacco cessation services and counseling, an option is to use of the first two A's (ask and advise) and then refer the patient to available community services.

The five steps:
1. Ask the patient if he or she uses tobacco,
   • Imperative that clinicians ask EVERY patient about tobacco use status at EVERY visit.
   • Do you currently use tobacco?
     o If "NO," ask: Have you ever used tobacco? If "no," arrange follow-up. If "yes," Assess: Have you recently quit? Any challenges? If the answer is "no," go to Assist: encourage continued abstinence and arrange follow-up. If the answer is "yes," Assist: provide relapse prevention and Arrange follow-up.
     o If "YES," Advise to quit. Then Assess: Are you willing to quit now? If the answer is no, Assist: intervene to increase motivation to quit and arrange follow-up. If the answer to the question, "Are you willing to quit now?" is "yes," Assist: provide appropriate tobacco dependence treatment and Arrange follow-up.
• An alternative is to ask: “Have you ever smoked? If yes, “When did you last smoke?”
  o This is because light smokers may self-identify as non-smokers when asked simply "Do you smoke?" http://www.ajpm-online.net/article/S0749-3797(08)01009-X/abstract

2. Advise him or her to quit,
• Once tobacco use has been identified, clinicians should advise all tobacco users to quit.
• Even brief advice to quit by a clinician results in greater quit rates.
• Smokers cite it as an important motivator for attempting to stop smoking.
• Clinician’s advice should be clear and strong. For example,
  • "As your physician, I must tell you that the most important thing you can do for your health is to stop smoking."
• Advice should be personalized to the individual’s own situation (e.g. medical condition, family status, costs of tobacco).

3. Assess willingness to make a quit attempt,
• Follow the ADVISE message with the simple question, "Are you willing to try to quit at this time?"
• If the patient is willing to make a quit attempt at this time, go to "Assist"
• If not willing to try at this time -- provide further encouragement to quit, reassure them that assistance is available.
  o The Guidelines suggest using a strategy based upon the "5 R’s" relevance, risks, rewards, roadblocks, and repetition

4. Assist him or her in making a quit attempt,
• Can assist with either a brief or intensive intervention
• The longer the person-to-person contact, and the more overall contact, and the greater the number of visits, the more successful the treatment outcome.
• In 3- to 10-minutes, a clinician can provide a counseling session that can significantly impact quit success.
• Developing a quit plan:
  o Set a quit date -- ideally within 2 weeks; tell family, friends, and coworkers about the quit attempt and request support.
  o Review past quit attempt experiences -- reuse strategies that were helpful and avoid situations that led to relapse.
  o Anticipate challenges -- particularly during the first few weeks (e.g., withdrawal symptoms such as negative mood, urges to smoke, and difficulty concentrating).
  o Remove tobacco products -- from the environment
  o Tobacco and alcohol -- avoiding or limit alcohol in the first few weeks because it is so strongly related to relapses.
  o Counseling -- problem-solving/skills training, provide support and encouragement, help develop other support

5. Arrange for follow-up contacts to prevent relapse.
• Schedule a follow-up contact soon after the quit date, preferably within the first week because risk of relapse is highest within the first 2 weeks.
• If the patient has used tobacco, discuss the circumstances surrounding the relapse and attempt to elicit a recommitment to quitting.
• Remind that a relapse should be viewed as a learning experience, part of the chronic nature of tobacco dependence and not a sign of personal failure.
• Reassure that it may take multiple attempts to successfully quit and with each relapses he or she learns more about what to do in the next attempt.
SHARPENING COUNSELING SKILLS
It's really a conversation about pros and cons, benefits and risks, and strategies to overcome barriers.

ASKING:
- Use open ended questions … Let them give you the treatment clues:
  - "Tell me about your smoking habits? Situations you typically smoke in?"
  - "Do you have any health consequences of smoking? (like cough, voice changes, dyspnea or COPD)"
  - "What do you like most about smoking?"
  - "What do you like least about smoking?"
  - Are you thinking about trying to quit
  - "What would motivate you to quit?"
  - "On a scale of 1-10, how confident are you that you can quit, with 1 being not at all confident and 10 being very confident?"

ADVISING:
- Associate use with current health issue -- a "teachable moment" when attention and motivation may be highest.
- Emphasize impact of SHS on family members, especially with respiratory disease.
- "As your physician, I must tell you that the most important thing you can do to improve your health is to stop smoking."

ASSESSING:
- Help them really understand why they smoke -- write them down in a list
  - Do the "Why do I smoke?" quiz http://familydoctor.org/296.xml
- Assessing interest in quitting:
  - Think in terms of a process of increasing readiness and confidence to try.
  - Ask the patient to rate her confidence in her ability to quit? (on a 1-10 scale)
  - If not ready or confident, focus on the "5 R's"

ASSISTING:
- Changing routines and rituals that involve smoking www.myclearhorizons.com
- Changing how they think about smoking - every cigarette, why?
- Importance of coping or problem-solving skills
- Medication to break the addiction http://cancercontrol.cancer.gov/tcrb/Clearing_the_Air/symptoms.html
- Value of support -- friend who has quit, others who want you to succeed, community groups, quit lines 24 hrs a day, etc http://www.smokefree.gov/qq-preparing-tell.aspx
- Referrals, especially for high risk; learn about local resources, groups with similar characteristics, or counselors that specialize.

FOLLOW-UP:
- Anticipate relapses and treat positively, "we can use this to sharpen our plan for our next attempt; we're getting closer."

Dealing with resistance if not willing to quit at this time:
Many excuses -- not ready, too hard, nothing works, too much else going on, etc.

Focus on the "5 R's": http://www.ahrq.gov/clinic/tobacco/tobaqrg2.htm#Unwilling
- RELEVANCE -- importance of quitting, personal health issues, finding that "teachable moment".
- RISKS -- consequences of not quitting.
- REWARDS -- benefits of quitting. www.nhlbi.nih.gov/hbp/prevent/g_smoke/top_ten.htm
• ROADBLOCKS – identify and manage barriers, e.g., weight gain
• REPETITION -- repeat every visit until ready to try.

Dealing with higher risk patients -- Be prepared for resistance
• The Reluctant Tobacco User -- has tried, but thinks it's too hard, will let you know when ready
• The Refractory Tobacco User -- tried everything, nothing works; other issues to deal with before can focus on smoking

Risk of relapse must be understood
Highest risk: most addicted (> 25 cig/day, first one first thing in the morning),
  current psych problems,
  never quit > 7 days,
  no confidence in ability to quit
Moderate Risk: 15-25 cig/day,
  past psych history,
  < 3 mo quit attempt,
  external pressure to quit
Low Risk: < 15 cig/day, no psych history, >3 mo quit attempt, personal motivation

MORE ON COUNSELING STRATEGIES:
• If willing to try: http://www.ahrq.gov/clinic/tobacco/tobaqrg.htm#Willing
• If not willing to try: http://www.ahrq.gov/clinic/tobacco/tobaqrg2.htm#Unwilling
14. OFFICE SYSTEMS

A number of studies have documented that physician-delivered counseling interventions for smoking cessation can be effective. These studies show that two factors are especially important: skill-building training in counseling methods, and an office system that facilitates delivery of such counseling and enhances its effect must be in place. [148-150]

- One of the keys to success is involving other staff in providing much of the support, education and counseling. It must be a practice program, physician-directed but practice implemented. [146a,150a]

When dealing with a preventive intervention such as smoking in a busy practice setting, a properly configured office support system can effectively cue the physician to carry out the appropriate intervention. Of major importance are the use of reminders, provision of counseling and treatment algorithms, and staff support for necessary follow-up, education, behavioral change, and monitoring. [151,152]

A Systematic Tobacco Dependence protocol that is very useful:
http://www.cdc.gov/tobacco/quit_smoking/cessation/practical_guide/pdfs/practical_guide.pdf

The smoking status of all patients should be assessed and appropriate intervention offered to those who smoke. Physicians should be trained in counseling techniques and the use of nicotine replacement therapy. The importance of delivering smoking cessation counseling was recognized when smoking counseling assessments were incorporated into version 3 of HEDIS, the Health Plan Employer Data Information Set of the National Committee for Quality Assurance. [153] Equally important components of appropriate medical care are development of supportive office systems and multi-component intervention programs and links with smoking cessation specialists and community resources.

<table>
<thead>
<tr>
<th>Frequency of Available Resources:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational poster / pamphlets in waiting room 50%</td>
</tr>
<tr>
<td>Group programs available by referral 46%</td>
</tr>
<tr>
<td>Individual counseling available by referral 41%</td>
</tr>
<tr>
<td>Tobacco user identification system 33%</td>
</tr>
<tr>
<td>Individual counseling available on-site 27%</td>
</tr>
<tr>
<td>Web-based smoking cessation programs available 26%</td>
</tr>
<tr>
<td>Multilingual resources available 18%</td>
</tr>
<tr>
<td>Staff dedicated to providing tobacco dependence treatment 13%</td>
</tr>
<tr>
<td>Group programs available on-site 10%</td>
</tr>
<tr>
<td>None 13%</td>
</tr>
</tbody>
</table>

From: A comprehensive, national survey commissioned by the American Legacy Foundation

Reimbursement
When clinicians provide treatment to patients dependent upon tobacco, the following diagnostic codes, under the section on Mental Disorders (290-319), can be used:

- 305.1 Tobacco Use Disorder
  - Tobacco used to the detriment of health or social functioning or in which there is tobacco dependence.
- V15.82 History of Tobacco Use

These diagnostic codes can be preprinted on the billing and diagnostic coding sheets and checked off rather than manually documenting the treatment.

- Counseling by itself is a reimbursable activity and can be billed, based on time spent.
More:
Reimbursement issues:  http://www.ahrq.gov/clinic/tobacco/reimburs.htm
Billing Codes:  http://www.ahrq.gov/clinic/tobacco/codes.htm
15. RESOURCES

CLINICAL PRACTICE GUIDELINE:

Treating Tobacco Use and Dependence: 2008 Update


Helping smokers quit – A guide for clinicians:
http://www.ahrq.gov/clinic/tobacco/clinhlpsmksqt.htm

Tear sheet for patients: You Can Quit Smoking – Support and Advice from Your Clinician

Slide presentation from the clinical practice guidelines:
http://www.ahrq.gov/clinic/tobacco/slides/tobaccoslides.htm

How-To Guide For Implementing the Clinical Practice Guideline
http://www.ahrq.gov/clinic/tobacco/

ASSESSMENT:

"Why I Smoke" quiz:

Screening Test for Nicotine Dependence:
Fagerstrom Test for Nicotine Dependence and CAGE questions & review of Stages of Change
http://www.aafp.org/afp/20000801/579.html

SMOKING – GENERAL INFORMATION:

The Society for Research on Nicotine and Tobacco: Independent authoritative information about tobacco use
http://www.treatobacco.net

American Lung Association:
http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=36383#tobacco

Surgeon General:
Guideline materials: http://www.surgeongeneral.gov/tobacco/

Treatment Effectiveness:
AHRQ Evidence report: Tobacco Use: Prevention, Cessation, and Control
http://www.ahrq.gov/clinic/tp/tobusetp.htm

Resources for Health Professionals for Helping Patients with Smoking Cessation:

The Partnership for Prevention: Tobacco related information
http://www.prevent.org/content/view/28/38/
OTHER RECOMMENDATIONS:

American Academy of Family Physicians on tobacco use prevention and cessation:
http://www.askandact.org

American College of Preventive Medicine Clinical recommendations for tobacco cessation counseling:
http://www.acpm.org/pol_practice.htm

Smoking Cessation Leadership Center -- a project funded by RWJF, excellent resource materials/links:
http://smokingcessationleadership.ucsf.edu

MEDICATIONS FOR SMOKING CESSATION:

Clinical guidelines for prescribing:
http://www.ahrq.gov/clinic/tobacco/prescrib.htm

Suggestions for the clinical use of pharmacotherapies for smoking cessation:
http://www.ahrq.gov/clinic/tobacco/clinicaluse.htm

OFFICE SYSTEMS:

Chronic Care Model: http://www.ihi.org/IHI/Topics/ChronicConditions/AllConditions/Changes/

Coding: http://www.ahrq.gov/clinic/tobacco/codes.htm

Reimbursement strategies: http://www.ahrq.gov/clinic/tobacco/reimburs.htm

PATIENTS:

Tools and Information from the American Heart Association:
http://www.hearthub.org/

Help Quitting Smoking:
Resources to help smokers quit are available at: www.smokefree.gov.

American Heart Association - Resources and Tools for Quitting:
http://www.americanheart.org/presenter.jhtml?identifier=3038010

QUITLINES:

US Dept of Health and Human Services -- 1-800-784-8669 (1-800-QUITNOW) (24 hrs/day)
  • Calls routed to state quitlines - if no state line, goes to NCI national quitline

American Cancer Society National Quitline -- 1-877-937-8748 (24 hrs/day)
  • Order resources and get info on local quitlines

National Cancer Institute National Quitline -- 1-877-448-7848 (Mon-Fri)
  • Information in English and Spanish on quitting
National Cancer Institute National TTY Quitline -- 1-800-332-8615 (Mon-Fri)
  • National quitline with telecommunications device for hearing impaired

The Great Start Quitline - 1-866-667-8278 (24 hrs/day)
  • Free help for pregnant smokers from ACS and American Legacy Foundation
Using a telephone quit line:  http://www.smokefree.gov/expert.aspx

**Free web-based programs:**
- Freedom from Smoking Online -- the American Lung Association's web-based smoking cessation support program  
  - www.lungusa.org (scroll down to "Freedom from Smoking")
- QuitNet -- Operated in association with Boston Univ School of Public Health  
  - www.quitnet.com
- Quit Wizard -- Massachusetts Dept of Health site with personalized planning and tracking of progress  
  - www.trytostop.org/quitwizardV2

**PATIENT EDUCATION:**

You can quit!  A booklet on how and why to quit  

You can quit smoking - A Consumer Guide  
http://www.ahrq.gov/consumer/tobacco/quits.htm

You can quit smoking - A 5-day countdown  
http://www.ahrq.gov/consumer/tobacco/5daybook.htm

Questions to think about and to ask your doctor:  
http://www.surgeongeneral.gov/tobacco/faq.htm  
http://www.smokefree.gov/qg-preparing-talk.aspx

American Cancer Society - Kick the Habit  

**SECOND HAND SMOKE:**


Second Hand Smoking – Fact Sheet  
http://www.lungusa.org/site/pp.asp?c=dvLUK9O0E&b=35422

Second Hand Smoke and the Health of Your Family  
http://www.epa.gov/iaq/ets/pdfs/trifold_brochure.pdf

**CARDIOVASCULAR DISEASE:**

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