# SMOKING CESSATION STRATEGIES FOR BUSY CLINICIANS

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***Abstract:***

Cigarette smoking is a preventable cause of morbidity and mortality. Recognizing and treating nicotine dependence is the most important intervention for successful smoking cessation. Available strategies range from behavioral modification and counseling to pharmacologic therapies.

## Introduction

Smoking is a modern day epidemic that poses substantial health burdens and costs. This report will systematically review smoking cessation methods and provide evidence-based recommendations.

## Epidemiology of Cigarette smoking

The World Health Organization (WHO) estimates that there are over 1100 million smokers world wide and that 75% are in developing countries [1].In 2003, Javaid Khan et al[2] reported an overall smoking prevalence of 29% in Pakistan; 41% in men and 7.7% in women. The majority (56%) began smoking between 15 – 24 years. Interestingly in the same study, 91% of respondents knew that smoking was detrimental to health but stated 'relaxation' and 'habit' as reasons for continued cigarette consumption.
Morbidity and mortality attributable to smoking are substantial. WHO predicts that by the year 2025, there will be 10 million tobacco-related deaths annually, which is more than the combined deaths from malaria, maternal and childhood conditions and tuberculosis. Seven million of these deaths will occur in developing countries[1]. Table 1 shows the relative risk of smoking-attributable morbidity and mortality from various conditions.

**Table 1.** Relative Risk of Death: Current Smokers versus Former Smokers (From Reference 3)

**Relative Risk of Death**

| | Male | | Female | |
|---|---|---|---|---|
| *Smoking Habit* | *Current* | *Former* | *Current* | *Former* |
| **Cause of Death** | | | | |
| *Malignant Neoplasms* | | | | |
| Lip, oral cavity, pharynx | 10.9 | 3.40 | 5.0 | 2.3 |
| Esophagus | 6.7 | 4.5 | 7.7 | 2.7 |
| Pancreas | 2.3 | 1.1 | 2.2 | 1.5 |
| Larynx | 14.6 | 6.3 | 13.0 | 5.1 |
| Trachea, lung, bronchus | 23.2 | 8.7 | 12.7 | 4.5 |
| Cervix uteri | 0.0 | 0.0 | 1.5 | 1.1 |
| Urinary bladder | 3.2 | 2.0 | 2.2 | 1.8 |
| Kidney and renal pelvis | 2.7 | 1.7 | 1.2 | 1.0 |
| *Cardiovascular Diseases* | | | | |
| Hypertension | 2.1 | 1.0 | 1.9 | 1.0 |
| Ischemic heart disease | | | | |
| Age 35–64 yr | 2.8 | 1.6 | 3.0 | 1.3 |
| Age > 65 yr | 1.5 | 1.2 | 1.6 | 1.2 |
| Other heart disease | 1.7 | 1.2 | 1.4 | 1.1 |
| Age 35–64 yr | 3.2 | 1.0 | 4.0 | 1.3 |
| Age > 65 yr | 1.6 | 1.0 | 1.4 | 1.0 |
| Atherosclerosis | 2.4 | 1.3 | 1.8 | 1.0 |
| Aortic aneurysm | 6.2 | 3.0 | 7.0 | 2.0 |
| Other arterial disease | 2.0 | 1.0 | 2.1 | 1.1 |
| *Respiratory Diseases* | | | | |
| Pneumonia, influenza | 1.7 | 1.3 | 2.1 | 1.1 |
| Bronchitis, emphysema | 17.1 | 15.6 | 12.0 | 11.7 |
| Chronic airways obstruction | 10.5 | 6.8 | 13.0 | 6.8 |

## Nicotine Addiction

It is now well recognized that nicotine is the drug in tobacco which causes addiction and that the pharmacological and behavioral processes which result in nicotine addiction are similar to those encountered in cocaine and heroin addiction [4].The physiology of nicotine addiction has recently been characterized as biphasic, in that it stimulates the pleasure response to the brain, and when taken for longer periods, also creates a relaxed state. As with cocaine, amphetamines, and

morphine, addiction to nicotine is believed to result from increased release of dopamine in the region of nucleus acumbens[5].
As with all addictions, nicotine withdrawal elicits a number of clinical consequences, avoidance of which promotes smoking. Nicotine withdrawal symptoms are time-limited, can last for several weeks, and include physical symptoms of irritability, anxiety, depression, difficulty concentrating, weight gain, restlessness, and impatience. The intensity of these withdrawal symptoms can be related to the level of nicotine dependence. A common measuring tool is the Fagerstrom Test for Nicotine Dependence, which rates addiction on a 0–10 scale. The test places the most emphasis on the length of time after waking before the first cigarette and the number of cigarettes smoked per day[6].
As evidence of the power of nicotine addiction, estimates suggest that 70% of smokers would like to quit, that approximately 41% try to quit each year, but that only 4.7% are able to maintain long term abstinence[7].

The spectrum of available smoking cessation interventions can be classified into behavioral, pharmacologic, and alternative methods (Table2). Behavioral interventions include physician advice, individual counseling, group counseling, and telephone counseling. Pharmacologic interventions include nicotine replacement therapy, sustained- release bupropion, clonidine, and nortriptyline. Finally, alternative (and less-studied) interventions include hypnosis, acupuncture, aversive therapy, exercise, lobeline, anxiolytics, mecamylamine, opioid agonists, and silver acetate.

**Table 2:** Overview of Smoking Cessation Interventions

| |
|---|
| **Behavioral interventions** |
| Physician advice |
| Individual counseling by nurse or other non-physician |
| Group counseling |
| Telephone counseling |
| Self help |
| |
| **Drug Interventions** |
| First-Line: |
| **Nicotine replacement therapy** (transdermal patch, gum, inhaler, nasal spray) |
| **Bupropion** (Antidepressant) |
| Varenicline |
| Second-Line: Clonidine, Nortriptyline, Mecamylamine, Lobeline, Anxiolytics |
| **Other Interventions** |
| Acupuncture,Hypnosis, Aversive therapy, Exercise |

**Assessment of Tobacco use**

The first step in treating tobacco smoking and dependence is to identify tobacco users. The identification itself increases the rates of clinician intervention. Identification can be made at nursing assessment and recorded with vital signs.

**Vital Signs**

Blood Pressure:----------
Pulse:---------- Weight:--------
Temperature:----------
Respiratory rate:----------
Smoker: Current Former Never
(circle one)

The next step is assessing the smoker's desire to quit. Table 3 describes the 5 "A" s of smoking cessation, namely; ask, advise, assess, assist, and arrange.

**Ask** about tobacco use
**Advise** to quit. Be clear, strong, and personalized
**Assess** willingness to quit
**Assist** in quit attempt

Set a quit date, usually within 2 weeks
Enlist support and understanding of family and friends
Anticipate challenges, especially first few weeks
Remove tobacco products from environment
Provide practical counseling (eg, problem-solving and skills training)
Stress abstinence
Review past quit experience
Anticipate triggers and challenges
Point out that having other smokers in the home will increase the difficulty
Provide treatment and social support
Provide a supportive clinical environment
Help obtain extra treatment social support
Help obtain patient-environment support from family, friends, and coworkers
Recommend pharmacotherapy
Provide supplementary materials:
Sources: organizations that promote smoking cessation, including federal, state, and nonprofit organizations
Type: Are the materials appropriate for the patient, in relation to culture, race, education, and age?
Location: Are the materials readily available?

**Arrange** follow-up Schedule follow-up
Timing: Follow up within the first week of the quit date, and follow up again within the first month

**Actions during follow-up:**
Congratulate
Review, stress relapse prevention interventions Identify potential and current Assess pharmacotherapy problems, Consider increased intervention when necessary
Stress abstinence

**Table 3** (Adapted from Reference 8.)

For smokers unwilling to attempt quitting, a brief intervention designed to increase the motivation to quit is suggested. This involves discussing the 5 "R"s: relevance, risk, rewards, roadblocks, and repetition (Table 4 [8]). Motivational attempts are most likely to be successful when the clinician is empathic, promotes patient autonomy (i.e.; choice among options), avoids arguments and supports the patient's self efficacy (identifies previous successes in behavior change efforts) [16]

| |
|---|
| **Relevance** Why would quitting be personally relevant?<br><br>**Risk** Clinician should ask patient to identify negative consequences of smoking: Highlight those most relevant to patient, emphasize that low-tar, low-nicotine, and other forms of tobacco do not eliminate risk<br>**Rewards** Ask patient to identify potential rewards and highlight those most relevant to the patient (Improved health, taste for food, sense of smell, Save money, Feel better about yourself. Home, clothing, and breath will smell better, Can stop worrying about quitting, Sets a good example for children, Healthier babies and children, Not worry about exposing others to smoke. Feel better physically, Reduced wrinkling and aging of skin<br>**Roadblocks** Ask patient to identify barriers to quitting and address elements of treatment that can assist. Typical barriers: Withdrawal symptoms, Fear of failure, Weight gain, Lack of support , Depression, Enjoyment of tobacco<br>**Repetition** Repeat every time an unmotivated patient visits the clinic setting. Tobacco users who have failed in previous quit attempts should be told that most people make repeated quit attempts before they are successful. |

**Table 4** (Adapted from Reference 8.)

**Behavioral Interventions**

Behavioral interventions range from physician advice, nurse / trained counselor advice to group sessions and self –help material; pamphlets, etc.

Brief, direct physician advice to quit smoking is effective. In the Cochrane Library review of 16 studies, Silagy et al[9] found that brief (ie, 2–5 min) physician advice increased the absolute rate of abstinence by 2.5% over usual care (odds ratio [OR] 1.69, 95% confidence interval [CI] 1.45–1.98). Furthermore, the rate of smoking abstinence increased when the intensity of advice was increased and when follow-up visits were included (OR 1.44, 95% CI 1.23–1.68 and OR 2.66, 95% CI 2.06–3.45[9]). With regard to counseling by nurses, Rice and Stead[10] reported small increases in smoking cessation rate following nurse advice (OR 1.5, CI 1.29–1.73). Pooled results of 16 trials in a Cochrane Collaboration review showed that receipt of nursing advice was associated with a cessation rate of 13.3%, compared with the control group rate of 12.1%[31] .A review of 29 studies by Fiore et al[8] offered 2 conclusions; smoking cessation intervention by non-physicians increases abstinence, compared to control groups, and should be encouraged (OR 1.7, CI 1.3–2.1), and that no specific clinician type demonstrated superiority, so smoking cessation should be encouraged by multiple health care providers.

Self-help information is marginally beneficial for increasing smoking cessation. Examples of self-help materials include booklets, leaflets, brochures, videotapes, compact discs, help lines, and various computer and Internet interventions. Lancaster and Stead[11] confirmed benefit in a review of 12 studies that compared self-help cessation materials to no intervention; self-help materials slightly improved cessation rates (OR 1.24, CI 1.07–1.45).

One lesson from available meta-analyses of behavioral interventions is that adding formats confers incremental effectiveness[8]. Combining up to 3–4 formats (eg, self-help with individual

counseling, or individual counseling and telephone counseling) may increase the absolute cessation rate by 12%.

**Pharmacologic Interventions**

The first –line pharmacologic interventions are nicotine-replacement therapy and Bupropion (an antidepressant). The two second-line drugs are Nortriptyline (tricyclic antidepressant) and Clonidine (antihypertensive). Available guidelines suggest that nicotine-replacement therapy, antidepressants and certain antihypertensives effectively increase smoking cessation rates.

**Nicotine-replacement therapy**

NRT offsets the craving for nicotine. A Cochrane Library review of 96 trials by Silagy et al [12]comparing all forms of NRT to placebo found that abstinence rates were 7% better with NRT (OR 1.74,CI 1.64 -1.86).Nicotine-replacement therapy is supplied in several forms; patches, gum, nasal spray, inhaler.

The nicotine patch is applied transdermally and nicotine is absorbed through the skin. Patches are available in doses of 7 mg, 14 mg and 21 mg (generic or Nicoderm CQ) or 7, 10 and 24mg (Nicotrol).Regarding patch duration, the 16 hour patch confers the same benefit as the 24 hour patch.

Nicotine gum allows for buccal absorption of nicotine and is available in 2 mg and 4 mg doses (generic or Nicorette). Patients who are highly nicotine-dependent (smoke >25 cigarettes /day) or have failed the 2 mg dose, should use the 4 mg dose, but should not use more 24 pieces per day.[8, 12]

In a study of 3,094 patients receiving nicotine gum, Murray et al[13] found no adverse cardiovascular effects from nicotine gum, even among those who smoked and continued to chew gum. Approximately 25% of nicotine gum users experienced one or more adverse effects, including mouth irritation, headache, and indigestion[13].

Other forms of NRT, currently not available in Pakistan, are the nicotine inhaler (Nicotrol inhaler) and nicotine nasal spray (Nicotrol NS). Advantages are rapid delivery of nicotine with hypothetically better success rates. Disadvantages of these methods include higher costs, local irritation and contraindicated use in patients with reactive airways.
In summary, all forms of NRT are effective for smoking cessation. At this time there is insufficient evidence to recommend one form of NRT over another.

**Bupropion**

Bupropion is thought to blunt the impact of nicotine withdrawal by reducing the uptake of norepinephrine and dopamine, thereby reducing cravings. Another benefit is its ability to blunt the weight gain that may accompany smoking cessation.

The Cochrane collaboration[14] analysis of 7 trials found a 10% better cessation rate with use of bupropion when compared to placebo alone (OR 2.54, CI 1.9-3.41).With regards to combination therapy, Jorenby et al[15] reported significantly better rates when bupropion was combined with NRT than with nicotine patch alone. They also found a lower mean weight gain than did nonreciepients of bupropion (2.1 kg v/s 1.1 kg at 7 weeks).

**Varenicline tartrate**

In May 2006, the Food and Drug Administration approved Chantix (varenicline tartrate) tablets to help cigarette smokers ages 18 and older stop smoking.The drug received a priority review because of its significant potential benefit to public health.

Varenicline acts at sites in the brain affected by nicotine and may help those who wish to give up smoking in two ways: by providing some nicotine effects to ease the withdrawal symptoms and by blocking the effects of nicotine from cigarettes if they resume smoking.

The effectiveness of varenicline in smoking cessation was demonstrated in six clinical trials, which included a total of 3,659 chronic cigarette smokers who were treated with varenicline. Five of the six studies were randomized, controlled clinical trials in which varenicline was shown to be superior to placebo in helping people quit smoking. These smokers had previously averaged 21 cigarettes a day for about 25 years.

In two of the five placebo-controlled studies, varenicline -treated patients were also more successful in giving up smoking than patients treated with bupropion. Both studies had very similar results with approximately 44 percent of people taking varenicline having stopped smoking at the end of 12 weeks, compared with 17 percent of people who were taking placebo and 30 percent of people taking bupropion. Researchers followed study participants in both studies for a year and found that approximately 22 percent of people taking varenicline, 16 percent of people taking bupropion, and 10 percent of people taking placebo were still smoke-free at the end of the year.

The approved course of varenicline treatment is 12 weeks; for the first three days, patients take 0.5 milligram (mg) once a day, followed by 0.5 mg twice a day for the next four days, and then 1 mg twice a day for the remainder of the treatment period. Patients who successfully quit smoking during varenicline treatment may continue with an additional 12 weeks of treatment that further increases the likelihood of long-term smoking cessation.

In clinical trials, the most common adverse effects of varenicline were nausea, followed by changes in dreaming, constipation, gas, and vomiting

**Second-line drugs**

Nortryptaline is a tricyclic antidepressant that has been found in 3 trials to achieve a 12% absolute improvement in cessation compared to placebo (OR 1.73, CI 1.74-4.44)[8,14]. The USDHHS Clinical Practice Guideline[8] review of 2 studies found an 18.4% reduction in cessation rates over placebo (OR 3.2, 1.8-2.7). Overall the limited numbers of trials and side effect profile make nortryptaline a second-line intervention.

Clonidine (antihypertensive), anxiolytics, Mecamylamine (nicotine antagonist),Lobeline (partial nicotine agonist) are other agents that have been tried with variable success. Their use as aids for smoking cessation is currently not supported by literature.

**Table 5.** First-Line Medications for Smoking Cessation

| **Drug** | **Dose** | **Instruction** | **Daily Dose and Duration** | **Side Effects** | **Cost*** |
|---|---|---|---|---|---|
| Nicotine gum (polacrilex) | Nicorette 2 mg<br>Nicorette 4 mg<br>Generic 2 mg and 4 mg<br><br>15- 30 pieces per strip | Mucosal absorption.<br>Chew until spicy or minty flavor begins, then "park" between cheek and gum.<br>When taste disappears, repeat chew-and-park process for approximately 30min. | Typical doses: 10 – 15 pieces. No more then 24 pieces/day.<br><br>With patients who smoke > 25 cigarettes/day, use 4-mg type, 1 piece/hour.<br><br>For patients who smoke < 25 cigarettes/d, use 2-mg type, 1 piece/hour or as needed.<br><br>Maximum levels of nicotine achieved within 20–30 min. | Jaw fatigue, nausea, hiccups<br><br>Duration: 12 wk | Cost; Rs.140<br>for 2 mg pack of 15/day |
| Nicotine patch | Nicoderm CQ or generic:<br>21 mg, 14 mg, and 7 mg<br>24-h patches<br>14 patches per package<br><br>Nicotrol:<br>15 mg, 10 mg, and 5 mg<br>16-h patch<br>14 patches per package<br><br>Dose depends on degree of nicotine dependence | Rotate site daily.<br>Hair-free sites offer best absorption.<br>May remove at night for insomnia<br>Continuous delivery.<br><br>Requires 2–3 d to reach peak. | 21 mg or 15 mg during weeks 1–6.<br><br>14 mg or 10 mg during weeks 7–8.<br><br>7 mg during weeks 9–10.<br><br>Patients who smoke > 10 cigarettes/d should start on intermediate dose. | Skin reactions among up to 50% of users.<br><br>Not recommended for patients who have had a recent (within past 2 wk) myocardial infarction. | Supplied in;<br><br>7mg (Rs.154/patch)<br><br>14mg(Rs.165/patch)<br><br>21 mg(Rs.175/patch) |
| | | Hold inhaler | 6–16 cartridges/d | Mouth and throat | |

| | | | | | |
|---|---|---|---|---|---|
| Nicotine inhaler | Nicotrol Inhaler: Each cartridge contains 10 mg of nicotine Delivers 4 mg/puff | between fingers and "puff". Requires rapid puffing: 3–4 puffs/min. 80 inhalations over 20 min.<br><br>Absorbs in mouth and throat. | Duration: 3 mo | irritation, cough, rhinitis. Use with caution in patients who have reactive airway disease. | Not available in Pakistan |
| Bupropion sustained release | Zyban: 150 mg/ pill | Start 1–2 wk before quit date | 150 mg daily for 3 days,<br><br>then 300 mg/day (150 mg 2 times/d)<br><br>Duration: 3 months | Insomnia and dry cough. Contraindicated in those with seizure disorders. | Cost: Rs.155/pill |

*Cost data are from average price from 3–4 local pharmacies (Adapted from Reference 8 and manufacturers' information.)

**Summary**

Tobacco dependence is a chronic condition that often requires repeated intervention. Effective treatments exist that can produce long term or even permanent abstinence. Patients willing to try to quit tobacco use should be provided with effective treatments, unwilling patients should be given a brief intervention designed to increase their motivation to quit. Level A evidence supports the efficacy of counseling by health care providers, nicotine replacement therapy and bupropion. Combination therapy (counseling plus NRT, NRT plus bupropion) confers additional benefits.

Clinicians should know that an ideal smoking cessation program is individualized, accounting for the person's reasons to smoke, the environment in which smoking occurs, available resources to quit, and individual preferences about how to quit.

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