So begins the U.S. clinical practice guideline on smoking cessation. Canadian preventive experts give clinical smoking cessation an “A” recommendation (good evidence for effectiveness) 2. Importantly, smokers place a physician-based approach at the top of their list of methods to stop smoking 3.

What does smoking do to people's health?
Every second smoker dies from smoking. In Canada, smoking causes 16% of ischemic vessel disease, 35% of cancer, and 77% of chronic lung disease 4. Tobacco addiction causes more deaths than AIDS, accidents, and drugs combined, and cigarette smoking alone cost the people of BC $738 million in medical expenditures in 1996.

Why do smokers keep smoking?
Nicotine is a powerful chemical that offers smokers pleasure and reward, focuses attention, suppresses hunger, calms stress, elevates mood, and relieves nicotine withdrawal 5. Nicotine is both a stimulant and a relaxant. In just seven seconds, the nicotine from a cigarette binds to the brain's nicotinic receptors after entering the pulmonary circulation and crossing the blood-brain barrier. The pack-a-day smoker repeats this process (puffs) 200 times per day. Thus, nicotine drives the addiction to tobacco. The evidence for addiction includes6:
- Fewer than 10% of smokers go a day without a cigarette.
- Symptoms of tobacco withdrawal are reliably reversed by nicotine.
- Experienced drug users, given various drugs, find IV nicotine as satisfying as subcutaneous morphine. Specific indicators (number of cigarettes per day, time to first cigarette after awakening, and severity of withdrawal symptoms) reflect the intensity of addiction and predict the (un)likelihood of stopping smoking 7.

How does tobacco addiction work?
Nicotine links to central receptors (cholinergic, adrenergic, dopaminergic and serotonergic) to produce the effects noted above 7. The mode of delivery (whether smoking or nicotine gum or patch) determines peak blood nicotine level and time to peak level. Inhaling tobacco smoke delivers to the brain the highest and sharpest peaks of nicotine and thereby maximizes its psychoactive effects. Nicotine has a half-life averaging two hours. Smokers usually begin their day with low nicotine levels that rise sharply in the morning, plateau in the afternoon when smoking slows, and fall during sleep. Each smoker has a characteristic, 24-hour blood nicotine curve and maintains blood nicotine levels within a specific range for each hour of the day. When blood nicotine falls beneath the smoker’s zone of comfort, withdrawal symptoms may begin: anxiety, restlessness, inability to concentrate, irritability, severe urges to smoke, reduced pulse rate, headaches, and problems with sleeping. If blood nicotine gets too high, toxicity may appear: nausea, excessive salivation, cold sweat, pallor, an increased pulse rate, headaches, and problems with sleeping, particularly vivid dreams.

What do we know about smoking behaviour?
Two thirds of new recruits to smoking are children, between ages 9 to 16. Children, after they make the transition to daily smoking, often move quickly to early addiction.
Adolescents identify physicians as a highly credible source of information about smoking. An individual’s smoking varies with their age, geographic region, ethnic group, and the smoking behaviour of their family, friends, and workmates. The best predictor of smoking is years of education: the more years, the less likely the individual is to smoke. A genetic component of nicotine addiction has been established. Nicotine’s effects on mood are particularly powerful for people with disorders such as schizophrenia, depression, alcoholism, and drug addictions. In BC, ex-smokers outnumber smokers. However, half of present smokers have no plans to quit and only one in seven BC smokers is ready to stop smoking (a third of smokers are thinking about stopping within six months). The vast majority of those who stop smoking do so on their own, without formal help. But few smokers manage to quit on their second or third attempt. Thus, the potential strength of medical care is to sustain and support smokers’ efforts to quit.

What non-drug interventions can the clinician use to help patients quit smoking? Brief interventions (e.g., personalized advice; then asking, “How do you feel about stopping smoking?”, and listening empathetically for just 30-40 seconds) versus no intervention lead to an average absolute increase in cessation at one year of 2.3%. In other words, for every 43 patients who receive brief intervention, one will quit smoking. While this effect may seem small, one must remember that the extra 30-40 seconds required to do this on each visit can markedly diminish a life-threatening risk. The transformation from smoker to ex-smoker usually requires significant neurochemical, behavioural, and attitudinal changes. Treatment tailored to the patient’s stage of readiness to quit smoking accelerates the process. Many years often pass from the first attempt to stop smoking until the smoker goes for a year without a puff. The patient’s struggle with smoking cessation should be regarded as a chronic condition. In this struggle, patients want their doctor to understand their frustrations. Controlled trials demonstrate two measures that independently increase smoking cessation substantially: chart-reminders indicating smoking status on all medical records (sticky label, rubber stamp, or computer prompt) (absolute increase 3%) and involvement of both doctor and office staff (absolute increase 14%). The many smokers who are not ready to stop require no more than brief listening and an empathetic statement. Controlled trials of mail-based tobacco interventions suggest that motivating those smokers who are reluctant to quit produces as many new ex-smokers as treating those who are ready to quit. The few smokers who are ready to quit will require more time for: problem solving, pharmacotherapy, and follow-up care (optimally visits are scheduled within 3 days of the quit date, 10-14 days later, and at 1, 3, 6, and 12 months). Systematic reviews and meta-analyses of the effectiveness of most interventions are now available and updated regularly in the Cochrane Library.

What pharmacological interventions have proven effective? Nicotine replacement enhances the chances of quitting over clinician advice alone. All forms of nicotine replacement are effective. Nicotine patches, 2mg and 4mg nicotine gum are presently available in Canada; the nicotine nasal spray, and the nicotine inhaler, both available in the U.S., may come to Canada soon. Nicotine replacement should be offered to smokers of five or more cigarettes per day who are ready to stop smoking. Nicotine replacement reduces disabling nicotine withdrawal, but it does not provide the positive psychoactive benefits of smoking.

Nicotine gum
In patients who use nicotine gum, the absolute difference in cessation rates at one year is 6%. The likelihood of cessation is greater when motivated, self-referred patients are treated (11% absolute difference) than when the gum is offered to all smoking patients (3% absolute difference). In patients with high degrees of nicotine addiction, the 4mg gum is more effective than the 2mg gum. However, in smokers with low levels of dependence, the 4mg gum has no therapeutic effect. In patients who self-refer and who have high dependence, the 4mg nicotine gum produces an absolute difference in cessation rate of 35% at one year. In British Columbia, 2mg and 4mg nicotine gum do not require a prescription.

Nicotine patch
The absolute difference in cessation rates between treatment and control groups with the nicotine patch is 9%. As with the gum, the benefit is greater in self-referred patients (12% absolute difference) compared with offering the patch to all smoking patients (6% absolute difference). The several patches available have different nicotine delivery attributes, but there is insufficient evidence to identify one patch as being more effective than another. There is also insufficient data to compare the effectiveness of nicotine gum with that of nicotine patches.

continued on page 21b
The patch is much simpler to use than the gum, but is not recommended for patients with sensitive skin nor for those who want to control their nicotine levels. Combining the patch with the gum may be helpful for heavily-addicted smokers who can manage a complex treatment plan. Physicians who prescribe combined patch and gum treatment should obtain the patient's written consent because of the theoretical risk from higher-than-usual levels of therapeutic nicotine.

Can nicotine replacement continue long-term addiction to nicotine?

There is no evidence that the patch perpetuates nicotine addiction. The gum occasionally sustains it (10-15% still using gum after one year). Continued addiction is more likely with the nasal spray (35-40% still using the nasal spray after 12 months). However, being addicted to nicotine alone is a healthier option than continued heavy smoking.

What are the contraindications to nicotine replacement therapy?

The following conditions contravene use of nicotine replacement:

- immediate post-myocardial infarction
- life-threatening cardiac arrhythmias
- severe or worsening angina pectoris
- temporomandibular joint disease (only contravenes use of gum)

In patients with other conditions (e.g., ischemic heart disease, hypertension, or pregnancy) clinical judgment will determine whether to recommend stopping with or without pharmacological treatment.

What other drugs can be used to treat nicotine addiction?

Buproprion, an antidepressant available on an emergency release basis in Canada, at a daily dose of 300 mg, has been shown in 3 trials to produce a 12.5% absolute difference in one-year smoking cessation (22.5% for the drug versus 9% for placebo). Fluxetine and nortriptyline appear to also increase cessation in single clinical trials. A meta-analysis of 5 clinical trials of clonidine demonstrates a 9% absolute difference in smoking cessation; however, it produces unpleasant side effects such as dry mouth, sedation, and dizziness.

What strategies should guide pharmacological therapy?

Begin by assessing the patient’s smoking: number of cigarettes smoked per day; how soon the patient has their first cigarette after arising; longest time without a cigarette in the past year; severity of withdrawal in the past; had a smoke-free year since began smoking; had a smoke-free week in past year. Ask the patient to indicate readiness to stop smoking by choosing a number from 1 (low) to 10 (high) and reserve treatment for motivated smokers (>7). Motivate the others with personalized advice and brief listening. For those who are ambivalent about stopping and for heavy smokers, one to three weeks of monitoring smoking (recording the time and place of each cigarette prior to lighting it) provides useful information, indicates the patient’s commitment to stop smoking, and subtly modifies smoking behaviour. A target date for stopping, set by the patient, is useful. The patient should understand the psychoactive effects of smoking (stimulation, calming, reward, ritual) and how treatment works.

The first line of pharmacological treatment is nicotine replacement. The smoker should end smoking one day and begin the next with enough medication to block withdrawal.
The nicotine medications for which the patient controls dosage, i.e., the gum and the nasal spray, should be taken on a scheduled rather than on an as-needed basis in order to assure sufficient nicotine intake. For example, the patient who smoked hourly should plan on taking a 2mg gum hourly. Smokers should be monitored for symptoms of withdrawal and toxicity and the dose of nicotine adjusted accordingly. Nicotine replacement can be maintained for 8-12 weeks. In clinical trials, 8 weeks of nicotine patch therapy was as effective as longer treatment10. Tapering the dose from the 21mg (22mg) to the 14mg (11mg) patch at four to six weeks may minimize withdrawal symptoms. However, tapering does not produce a net gain in long-term cessation10. If a patient who uses nicotine replacement properly does not stop smoking, other pharmacological agents should be considered when the patient is next ready to try again.

Patients with the following characteristics may require more supervision and/or higher doses of nicotine replacement:

- heavily addicted to tobacco, with many quit attempts
- addicted to other drugs including alcohol
- history of depression or schizophrenia
- severe poverty or psychological stress
- cessation is urgently required for medical reasons

**Conclusion**

The challenge for health care professionals is to:

- organize medical care so that the smoking status of all patients is identified and followed-up
- motivate smokers to stop and youth to avoid the addiction
- offer those smokers who are ready to quit behavioural and pharmacological treatment and follow-up

The benefit is that 8-12% of all your smoking patients will stop smoking annually, rather than the 4-6% who stop with no intervention (absolute increase 6%, number needed to treat to benefit one patient, 17 per year)19. The long-term, cumulative impact of physician based tobacco intervention on smoking prevalence makes it one of the leading options in tobacco control 20.

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**References**


7. Tel.: (604) 822-0700  Fax: (604) 822-0701

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**Programs to help health professionals help their patients to stop smoking:**

- B.C. Doctors Stop Smoking Program
  - Telephone: (604) 736-1226, local 278
  - Fax: (604) 736-3987

- Guide Your Patients to a Smoke Free Future
  - To Request Booklets, Fax: (604) 736-3987

- The Cancer Society, Lung Association, Heart and Stroke Association, and public health units have useful patient education materials.


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