

## SMOKING CESSATION – A PRACTICAL PARADIGM FOR DOCTORS

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### ABSTRACT

**Helping people to stop smoking is a highly cost-effective and important means of preventing cardiovascular disease such as ischemic heart disease and stroke. A doctor who fails to provide smoking cessation counselling to a patient who smokes is no better than a doctor who neglects to prescribe a cholesterol-lowering drug. Many smokers want to stop smoking, and others may be receptive to encouragement to stop. As doctors, we are in a unique position to help our patients stop smoking as our advice on health matters is trusted more than anyone else's (or so we should hope to think). This article was first published in the Singapore Family Physician in 2008 and focuses on what a doctor should do with a patient who smokes. An additional update on alternatives to cigarettes has been added.**

**Keywords:** tobacco dependence, nicotine, cost-effective, withdrawal symptoms, varenicline, behavioural support

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### INTRODUCTION

Smoking kills! Approximately 5 million deaths worldwide per year can be attributed to smoking-related illnesses. This is roughly equivalent to one person dying every 10 seconds from the effects of smoking and is not inclusive of the effects of second-hand or passive smoking, or the effects that smoking in pregnant women has on unborn children. As smoking contributes significantly to mortality and morbidity worldwide, it is also the largest single preventable cause of death.<sup>1</sup>

Smoking prevention is probably the most important method of reducing the numbers of smokers in the population, but this is an area for government and legislation. The responsibility of health professionals like us is to help patients to stop smoking and this is an important aspect of the treatment of many diseases, especially those related to smoking. Any intervention to assist smokers to quit

smoking is likely to have a major impact on reducing the burden of disease, not only for the individual patient but also for society as a whole. In fact, smoking cessation is considered the most cost-effective medical intervention for any healthcare service. No other preventive intervention is more cost-effective than smoking cessation. While successful smoking cessation costs between \$2,000-\$6,000 for each life-year saved, hypertension treatment may cost as much as \$26,000 per life-year saved and hyperlipidaemia treatment may require the expenditure of \$196,000 for each life-year saved.<sup>3</sup> As doctors, we are in a unique position to help our patients stop smoking as our advice on health matters is trusted most.

### Tobacco Dependence as a Chronic Disease

Some people view smoking as a lifestyle choice or a “habit”. As such, smokers and even some healthcare providers think that willpower is all that smokers need to quit smoking and that they do not need any help doing so. Unfortunately, the scientific evidence does not support this point of view. Scientific data shows that within three to six weeks of a child's beginning regular daily cigarette smoking, even as few as one to two cigarettes per day, the brain structure changes. The number of nicotine receptors within the cell membrane of brain neurons increases twofold or threefold. Thus, nicotine in tobacco smoke permanently alters the structure and function of the brain and tobacco dependence is a serious chronic relapsing life-threatening illness that requires long-term medical management.

Nicotine affects how a person feels, thinks, and functions at a cellular level. Nicotine in tobacco smoke reaches the human brain seven seconds after the smoker makes one inhalation. The nicotine is ultraconcentrated, which is one of the reasons it can alter brain neuronal structure and function. Moreover, nicotine is one of the most potent central nervous system (CNS)-active drugs: milligram for milligram, it is ten times more potent a euphoriant than heroin, cocaine, or d-amphetamine. Consequently, in many smokers, it is not so much a case of “won't quit smoking” but more a case of “can't quit smoking” without additional help.

CNS sensitivity and responsiveness to nicotine is genetically determined. Without the appropriate genetic make-up, a smoker cannot become nicotine-dependent. About 10 percent of cigarette smokers lack the requisite genes and have no physiological nicotine dependence. These individuals do not experience any of the nicotine withdrawal symptoms shown in Table 1. Rather, they can smoke cigarettes every now and then, or heavily on one occasion and then nothing for days or longer, and not even think about cigarettes. These individuals are truly social smokers and do have complete volitional control over when they will smoke tobacco. These

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people never seek assistance for smoking cessation because they have no difficulty stopping.

**Table 1. Common physiologically induced nicotine withdrawal symptoms**

Symptom	Frequency of occurrence (%)
Anxiety	87
Irritability, frustration, or anger	80
Depression*/depressed mood*	75/31
Difficulty concentrating	73
Restlessness	71
Craving for cigarettes	62
Nocturnal awakenings	24
Headache	NA
Constipation	NA

*\*Frequency of occurrence when cigarette smokers without a history of depression stopped smoking*

Unfortunately, about 90 percent of cigarette smokers are physiologically nicotine addicted. For this 90 percent, stopping smoking is not a matter of choice or free will. It is a medical and physiological problem that requires accurate diagnosis and appropriate medical treatment. They fall into a spectrum ranging from minimally addicted to severely addicted to nicotine. As a general rule, the more severe an individual's nicotine addiction, the more severe that person's nicotine withdrawal symptoms will be. Accordingly, the more severe a patient's nicotine addiction, the more intensive the medical treatment plan needs to be. We can assess a person's level of nicotine dependence by using the modified Fagerstrom Tolerance Questionnaire<sup>3</sup> (Table 2).

**Table 2. Karl Fagerstrom Nicotine Tolerance Questionnaire**

	Point(s)
1. How many cigarettes do you smoke per day?	
a) 10 or less	0
b) 11-20	1
c) 21-30	2
d) 31 or more	3
2. How soon after you wake up do you smoke your first cigarette?	
a) After 60 min	0
b) 31-60 min	1
c) 6-30 min	2
d) Within 5 min	3

3. Do you find it difficult to refrain from smoking in places where smoking is not allowed (e.g., hospitals, government offices, cinemas, libraries etc.)?	
a) Yes	1
b) No	0
4. Do you smoke more during the first hours after waking than during the rest of the day?	
a) Yes	1
b) No	0
5. Which cigarette would you be the most unwilling to give up?	
a) First in the morning	1
b) Any of the others	0
6. Do you smoke even when you are very ill?	
a) Yes	1
b) No	0

Total Point(s): \_\_\_\_\_

TOTAL SCORE LEVEL OF DEPENDENCE
0-3 points = Low
4-6 points = Medium
7-10 points = High

## A PRACTICAL APPROACH TO SMOKING CESSATION

It is recommended that all clinicians having contact with smokers routinely adopt the following for their practice: Ask, Assess, Advise, Assist, Arrange (the 5As).

### Ask

Clinicians should routinely ask about the smoking history of their patients or have a system in their practice whereby the smoking status of each and every patient is determined upon registration at every clinic visit. Having patients appreciate the health benefits of quitting smoking is critical. In a recent survey on smoking attitudes commissioned and funded by Pfizer,<sup>4</sup> it was found that most smokers (75 percent) are concerned about the health risks of smoking and that the majority (81 percent) agree that quitting smoking is the best way to improve their health.

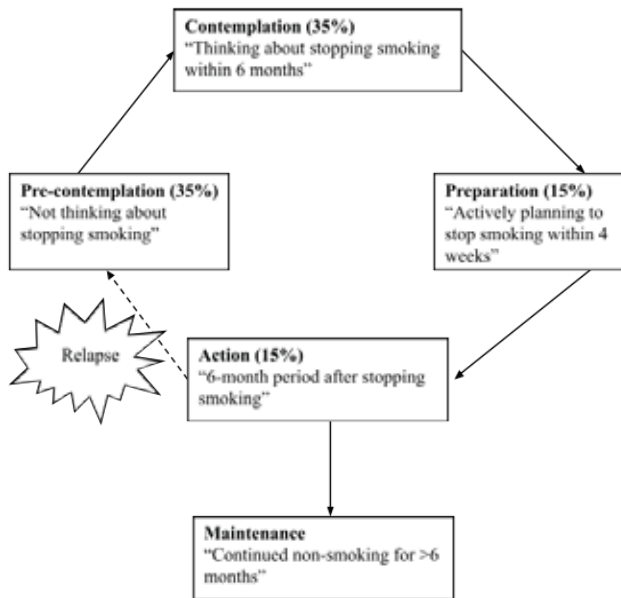
### Assess and Advise

The advice given by health professionals can be a major factor in whether or not a person tries and succeeds in quitting smoking. Physician advice does increase both immediate and more distant attempts to quit. Mere advice from the physician to not smoke increases the likelihood of successful quitting rate in the patient by 10 percent. In the same survey mentioned above, it was found that although 66 percent of doctors said they talked to their patients about quitting smoking, only half of these smokers said they received the advice from their doctors. This discrepancy

stresses the importance of getting the message across when it comes to advice on smoking cessation.

Although most smokers want to stop smoking, only about 15 percent are ready to stop smoking at any given time (Preparation Phase).<sup>5</sup> Of the remaining 85 percent of smokers, 15 percent are in the process of stopping smoking (Action Phase), and 70 percent of smokers are not actively thinking about stopping smoking (Precontemplation and Contemplation Phases – see Figure 1).

**Figure 1. Stages of change in smoking cessation**



For the 70 percent of smokers not thinking about stopping smoking, the healthcare provider need not spend much time, but the time spent is critically important. The patient should clearly and unambiguously hear from the healthcare provider that stopping smoking is the single most important thing the patient can do to improve health. Here, the doctor should take the opportunity of including the advice of smoking cessation in the treatment plan of the patient who has any illness caused by or associated with smoking. Familiarising oneself with the harmful effects of smoking as well as the benefits of quitting is elemental in providing advice for smoking cessation.

#### *Assist*

This and the following sections focus on interventions for patients in the Preparation and Action Phases. Most smokers have developed both Psychological or Physical dependence on smoking and both of these aspects need to be reduced to optimise the success of smoking cessation.

Psychological dependence refers to those settings and situations that serve as triggers for lighting up a cigarette. For most smokers, these triggers fall into four types: habitual; pleasurable; distressing; and boring, monotonous situations. In the treatment of psychological dependence, there are several steps that we should help the patient to take.

First, we need to help patients develop their own unique “Action Plan”. During counselling before the target quit date, we should try to help patients identify and list each trigger setting (e.g., making a phone call, having a glass of wine, or attending a stressful meeting). Literally, patients need to note what they are doing each time they feel an urge to have a cigarette and whenever they actually light one up. They should rate the strength of each trigger (e.g., use a scale of 0-4: 0 = not a trigger and 4 = extremely strong trigger). We should help the patient to decide how to neutralise each trigger setting, i.e., develop new coping skills. To do this, patients need to think through what has and has not worked in the past in those trigger settings previously. They also need to obtain new ideas from supportive friends and family members, whether ex-smokers, current smokers, or non-smokers. Patients also need to obtain new ideas from self-help materials: books,<sup>6</sup> audiotapes, videos, the internet (e.g. [www.stop-smoking-tips.com](http://www.stop-smoking-tips.com)), and other resources. It is important to allow patients to figure out their own solutions to handle external triggers for lighting up and smoking, rather than giving them a set of instructions to follow, as patients know themselves best.

Second, before the target quit date, patients should determine whether they want any external support other than from their physician. If so, they should make arrangements to obtain the potential outside sources of support, such as family, friends, support groups, etc. Treatment for psychological dependence is usually fairly straightforward, but many patients try to ignore what they need to do. Table 3 reviews the basic steps for effectively treating psychological dependence. In most cases, a competent general healthcare provider can provide the guidance the patient needs for this part of the treatment. A psychiatrist, clinical psychologist, or clinical social worker is not usually necessary. There are exceptions, of course. Most patients who have an underlying depressive or anxiety disorder will benefit from concomitant care by a psychiatrist.

**Table 3. Treatment plan in a typical smoker’s clinic**

Quit date minus 1-2 weeks	Quit date	Weekly post-quit sessions
Confirm motivation to quit	Enhance commitment	Reinforce commitment
Assess dependence		
Develop Action Plan (see text)	Implement Action Plan	Modify Action Plan, as necessary
Determine if potential outside sources of support are needed	Use outside sources of support	Add new outside sources of support, as desired

Know and recognise nicotine withdrawal symptoms (even while still smoking)	Help develop coping skills	Help develop coping new coping skills if necessary
Assess suitability for medication	Check on medication	Check on medication

When smokers go “cold turkey”, most experience one or more nicotine withdrawal symptoms (refer to Table 1). These withdrawal symptoms are not “psychological”; they are physical and physiological. Nicotine withdrawal symptoms occur and are caused by sudden removal of nicotine from the increased number of nicotine receptor sites present in the smoker’s brain. Patients should know the basic nicotine withdrawal symptoms (Table 1) and recognise when they experience them while they are still smoking. Present guidelines recommend that essentially *all* patients who smoke, and want to quit, should be prescribed at least one medication to treat nicotine dependence. In the counselling before the target quit date, smokers should be well-informed of any medication(s) that will be used to assist their quit attempt, and identify any side effects that may occur. The goal of effective pharmacotherapy is to completely suppress all of the physiologically caused nicotine withdrawal symptoms (Table 1), from the morning of the target quit date onwards. Failure to do so results in high relapse rates in tobacco-dependence: more than 40 percent relapse within seven days of a cold turkey quit attempt.

Three forms of medication are available to assist smokers in attempts to quit: nicotine-replacement therapy (NRT), bupropion, and varenicline.

### Nicotine-Replacement Therapy (NRT)

Nicotine-Replacement Therapy (NRT) is available in various forms and all forms have been shown to reduce craving and withdrawal symptoms. The patch is slowest to reach the brain and the nasal spray the fastest. Nonetheless, compared to the speed at which the cigarette delivers nicotine to the brain, even the nasal spray is extremely slow. In addition, the nicotine dose delivered to the CNS by any form of NRT is far below what the cigarette, puff by puff, delivers. Dosing typically begins on the quit date and continues for eight to twelve weeks, depending on the product. Given that NRT simply replaces some of the nicotine that smokers have been getting from cigarettes, there are few contraindications, and the products have been found safe for use by patients with a range of medical conditions, including heart disease. The use of NRT during pregnancy is more controversial as nicotine might have some damaging effects on the foetus.

### Bupropion

Bupropion reduces the severity of withdrawal symptoms and the urge to smoke. Its potential as an aid to smoking cessation was discovered by chance when the drug was being

used as an antidepressant. However, its effects on smoking cessation do not rely on its antidepressant actions and its use is not confined to smokers who are depressed. The usual dose is a single 150 mg tablet per day for the first week, increasing to two 150 mg tablets per day by the quit date. The medication is normally continued for a further seven to eleven weeks. There is a risk of seizure of 1 in 1,000 and bupropion is contraindicated in pregnancy, and those with a predisposition and history of disposition to seizures.

### Varenicline

Varenicline was specifically designed to aid smoking cessation. It is a partial agonist at the nicotinic acetylcholine receptor believed to contribute to nicotine dependence. As a partial agonist, it increases activation of the receptors, and this is likely to be sufficient to reduce the urge to smoke and the withdrawal symptoms but not sufficient enough to be rewarding or to induce dependence itself. By binding to the receptors, varenicline prevents nicotine from attaching to it, thereby reducing the rewarding effect of smoking. In head-to-head trials, varenicline has been found to be more effective than bupropion. Its main contraindication is pregnancy and the main side effect is nausea.

### Arrange

Follow-up office visits are critical to successful long-term medical management of any chronic disease. Tobacco dependence is no exception. The more severe a patient’s nicotine addiction, the more frequent the follow-up visits ought to be. Most structured behavioural support programmes follow a pattern of one to two pre-quit sessions, followed by regular (at least weekly) sessions in the four to six weeks following the quit date (Table 3). Further sessions (given face-to-face or by scheduled telephone contacts) are sometimes arranged at less frequent intervals, in an attempt to prevent relapse.

### Smoking Reduction

Smoking reduction can be defined as a sustained decrease in cigarette consumption in smokers unable or not ready to abruptly quit, with the objective of either reducing tobacco-related harm or promoting smoking cessation. As discussed above, only a small fraction of the smoking population are preparing to quit at any given time. Smokers who cut down are more likely to go on to quit, as clinical studies indicate that smoking reduction stimulates interest in cessation, promotes quit attempts, and increases quit rates. The dose-response relationship between smoking and disease offers potential for reduced smoking to decrease the associated risks. Clinical trials have shown that long-term reductions in smoking can be achieved and maintained by using NRT. In addition, concomitant use of NRT and cigarettes does not increase the risk of cardiovascular events, and the direct health benefits of smoking reduction include improvements in various cardiovascular risk markers.<sup>7</sup> Hence, using NRT for smoking reduction offers an additional tool to reduce tobacco-related harm and to completely stop smoking. In this respect, NRT plays multiple roles: facilitating reduction



of smoking, helping smoker's transition to abstinence, and helping to sustain abstinence after the quit date.

### Alternatives to Cigarettes

This section may be irrelevant for discussion here as they are not legalised for use and therefore currently unavailable in Singapore. Nevertheless, much of current research and published literature involves these alternatives to traditional cigarettes. It may still be appropriate to discuss the options in this article as they are widely available in many countries, including our neighbouring ones.

Most young people are unaware of the harm of cigarette alternatives such as shisha, chewable tobacco, and electronic nicotine delivery systems (ENDS). For instance, a shisha session typically lasts about two hours, whereas a cigarette hardly lasts more than five minutes. It is evident that shisha smokers inhale more tobacco smoke than cigarette smokers in one session. The water in a shisha does not do what it is purported to do, which is filter out the toxic ingredients in the tobacco smoke. Instead, the water cools down the smoke and makes it less irritating, allowing the smoker to carry on inhaling for hours – much longer than they would with cigarettes. A person smoking shisha for about an hour consumes about 70 percent more nicotine than he would by smoking cigarettes. In addition, the mouthpiece of the shisha pipe is shared among many, which can lead to infectious diseases being spread, such as pneumonia, tuberculosis, and even herpes (cold sores on the mouth).

The debate on the harms and benefits of ENDS are endless. Most experts will accept that electronic cigarettes (E-cigarettes) are generally less harmful than conventional ones. However, less harmful certainly does not mean they are harmless.<sup>8</sup> Toxic substances found in E-cigarettes have been linked with lung disorders as well as a higher chance of cardiovascular morbidity. Countries where E-cigarettes are unrestricted face the possibility of rampant use of E-cigarettes among the young. There is also the possibility of rising E-cigarette use serving as a gateway to tobacco use in such individuals later on. Opponents of E-cigarettes also raise concern that compounds in E-cigarettes such as flavourings can still be harmful and may promote teen vaping.

Some experts consider E-cigarettes to be beneficial as a quit-aid in smoking cessation, although others caution that this opinion is not supported by scientific evidence. A recent study found that E-cigarettes are more effective than NRT for smoking cessation when both are combined with behavioural therapy.<sup>9</sup> This is the first study of its kind directly comparing E-cigarettes versus NRT use in smoking cessation and concluded that E-cigarette use achieved quit rates double those of NRT. However, 80 percent of the successful quitters in the E-cigarettes group were still using E-cigarettes at end of one year compared with nine percent in the NRT group still using NRT at the end of a year. Hence, it remains debatable how effective E-cigarettes are in achieving total abstinence.

### CONCLUSION

Tobacco dependence is a serious and life-threatening chronic disease. Smoking is not just a habit that most smokers can simply give up. Tobacco dependence has distinct and well-defined neuropathological bases. What is required in smoking cessation is adequate pharmacotherapy to suppress physiologically caused nicotine withdrawal symptoms as well as providing assistance, resources, and referral, if necessary, so that patients can adequately attend to the psychological dependence side of tobacco dependence.

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### LEARNING POINTS

- **Smoking is the largest single preventable cause of death.**
  - **Smoking cessation is considered the most cost-effective medical intervention.**
  - **A combination of behavioural support and medication increases the chances of a successful quit attempt.**
  - **NRT, bupropion, and varenicline are among the safest medicines available, although bupropion carries a small risk of seizure and allergic reactions.**
  - **NRT can help smokers successfully reduce smoking as an additional tool to smoking cessation.**
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