Fast Facts

Fast Facts: Smoking Cessation

Robert West and Saul Shiffman

Second edition

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Declaration of Independence
This book is as balanced and as practical as we can make it.
Ideas for improvement are always welcome: feedback@fastfacts.com

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Glossary

Acetylcholine (ACh): a neurotransmitter; nicotine resembles ACh sufficiently to act at nicotinic ACh receptors located throughout the central and peripheral nervous systems

Addiction: often used synonymously with 'dependence' to mean a condition in which someone has impaired control over a reward-seeking activity; for reasons explained in Chapter 5, a slightly modified definition is preferred, in which 'addiction' is a condition in which an unhealthy priority is attached to an activity because of a disordered motivational system; 'dependence' refers to the nature of that disorder

Alpha4-beta2 nicotinic acetylcholine receptor: the most common type of receptor in the brain to which nicotine binds, believed to be important in some of the addictive properties of nicotine

Amfebutamone: recommended international non-proprietary name for bupropion

Behavioral support: a structured program of counseling and behavioral techniques aimed at helping smokers to give up smoking

Bupropion: a medication licensed as an aid to smoking cessation (international non-proprietary name: amfebutamone; brand name Zyban)

Continuous abstinence: a measure of the success of an attempt to stop smoking, in which abstinence for a specified period of time is recorded

Cotinine: a metabolite of nicotine with a half-life in blood of 14–20 hours, which makes it a useful surrogate measure of the amount of nicotine taken in over the past few days

Counseling: in this context, targeted advice and support focused on maintaining or enhancing motivation to achieve and sustain abstinence, and on strategies for avoiding or coping with urges to smoke and withdrawal symptoms

Dependence: often used synonymously with 'addiction', but in this book 'dependence' refers to the disorder of the motivational system that gives rise to addiction, as in 'nicotine dependence gives rise to addiction to cigarettes'

Expired-air carbon monoxide: concentration of carbon monoxide (CO) in exhaled air, a value that gives an accurate index of CO in the blood and is used to measure the amount of cigarette smoke inhaled while smoking and to verify claims of abstinence (in which case the value should be less than 10 parts per million)

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Half-life: time taken for the plasma concentration of an absorbed drug such as nicotine to decrease by 50% through elimination and metabolism

Nicotine: an alkaloid made by species of the tobacco plant; nicotine has psychological and physiological effects and typically causes dependence if ingested in a form that delivers it rapidly to the brain

Nicotine-replacement therapy (NRT): a medication that delivers pure nicotine into the bloodstream and thus helps smokers to stop smoking; the aim is to provide at least partial replacement, normally temporary, for the nicotine previously provided by cigarettes, with a view to easing cravings and symptoms of withdrawal and aiding smoking cessation

Opportunistic advice: advice delivered by a health professional to a patient on the clinician's initiative

Point prevalence abstinence: a measure of the success of an attempt to stop smoking in which abstinence at the time of assessment (or for some brief, defined period beforehand) is recorded (contrast with 'continuous abstinence')

Rimonabant: a cannabinoid (CB1) receptor antagonist that is used to help patients lose weight, and which may help some smokers to stop smoking

Varenicline: a partial agonist at the alpha4-beta2 nicotinic receptor (see above); licensed as an aid to smoking cessation (brand names Chantix, Champix)

Withdrawal syndrome: a constellation of signs and symptoms caused by abstinence from a drug to which the body has become adapted

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Introduction

Cigarette smoking is one of the most significant preventable causes of death and illness in the world. It accounts for some 400 000 deaths per year in the USA, approximately 100 000 in the UK and 4.9 million worldwide. In industrialized countries cigarette smoking accounts for 12–13% of life-years lost avoidably. A quarter of smokers who fail to stop die an average of 20 years earlier than comparable non-smokers; the average 20-cigarettes-per-day smoker dies 10 years earlier and spends more of his or her life with disability than the average non-smoker.

Some people view smoking as a lifestyle choice, alongside lack of exercise and unhealthy eating. However, there has been a strong consensus for some time that most smokers are addicted to cigarettes and that nicotine dependence lies at the heart of this addiction. This realization has led health agencies and professional bodies to focus attention on the role of clinical services in encouraging smokers to overcome their addiction and stop smoking, and to provide treatment to help smokers to quit. Although these interventions help only a minority of smokers, they are inexpensive compared with other medical treatments, and the health benefits of stopping smoking are considerable. These interventions are therefore among the most cost-effective elements of any healthcare service. Most estimates of the cost per life-year saved by established smoking cessation treatments are under £1000 or US$2000. This compares with an average cost per life-year for other treatments (e.g. kidney dialysis, blood-pressure medication, cholesterol-lowering drugs) of more than £17 000 or US$34 000; coronary artery bypass surgery, for example, is estimated to cost some $60 000 per life-year saved.

Smoking has wide-ranging effects on many disease processes. It is therefore essential that all health professionals understand:

- the short- and long-term effects of smoking on the body
- the short-term and permanent benefits of smoking cessation
- the treatments available to help smokers overcome their addiction
- the many myths about smoking and about quitting.

This book aims to meet these needs.

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1 Cigarettes as a nicotine delivery system

The cigarette

There are many different varieties of tobacco, each with its own flavor and characteristics, and tobacco can be prepared in different ways that affect its taste, smell and pharmacological properties. Along with tobacco, additives are included in cigarettes by the manufacturers to engineer an attractive and efficient nicotine delivery system. Table 1.1 lists some of the many thousands of chemicals in tobacco smoke.

One thing that all cigarettes have in common is that they deliver nicotine to the lungs. A puff on a cigarette results in rapid absorption of nicotine into the bloodstream and rapid delivery of a high-concentration 'bolus' of nicotine to the brain by the arterial circulation (Figure 1.1); this process is repeated with every puff. Smokers in the UK and the USA absorb an average of just over 1 mg of nicotine from each cigarette. This is only about one-sixth of what they could obtain if they puffed more frequently and inhaled the smoke more deeply. In societies in which

TABLE 1.1

Some of the substances a cigarette delivers into the body

- **Nicotine:** addictive, not carcinogenic, limited or no cardiovascular risk at doses typically obtained by smokers
- **Carbon monoxide:** probably increases cardiovascular risk
- **Benzo(a)pyrene:** carcinogenic
- **Aromatic hydrocarbons:** carcinogenic
- **Nitrosamines:** carcinogenic
- **Additives:** enhance 'flavor' and nicotine effects
- **Particulates:** may carry acute risk of coronary thrombosis
- **Free radicals:** ionized particles that may cause atherogenesis
- **Polonium:** radioactive element that may cause cancer

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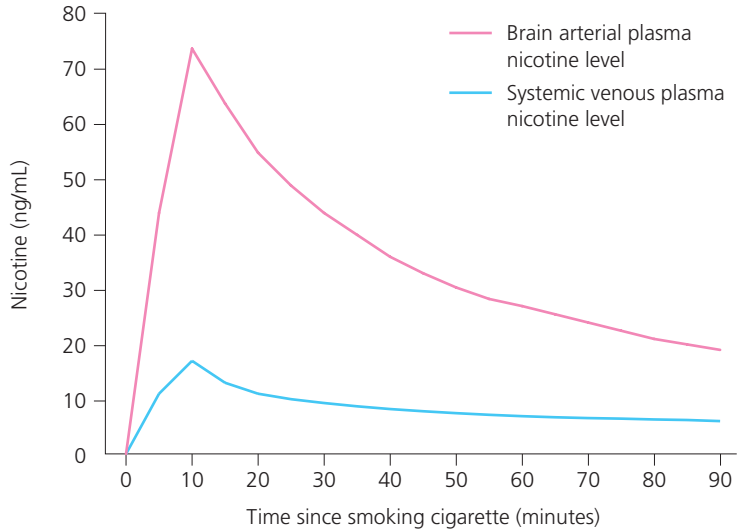

Figure 1.1 Plasma concentrations of nicotine in brain arterial blood and systemic venous blood in a typical smoker following a single cigarette. (The figure does not show the spike in arterial nicotine levels with each puff.)

cigarettes are more expensive relative to earnings or in situations where cigarettes are otherwise not freely available, smokers take more nicotine from each cigarette.

As a drug delivery system, cigarettes are very flexible, because the smoker can control the intensity and frequency of puffing. This means that he or she has 'fingertip control' of the dose of nicotine.

Many smokers, particularly older smokers and women, choose so-called 'light' or 'low-tar' brands, believing the common misconception that these are relatively safe because, according to the labels, they deliver as little as one-tenth of the tar and carbon monoxide of other brands. Unfortunately, in fact the labeling is misleading: the data are based on artificial measurements by smoking machines, and do not mirror the actual delivery to a smoker. It is possible to extract as much tar and nicotine from these cigarettes as from higher tar brands by more intensive puffing and by blocking the ventilation holes in the filter, which would otherwise dilute the smoke – and that is exactly what

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3 Social, psychological and economic influences on smoking

Social norms

Cigarette smoking is markedly influenced by social norms and other environmental influences. In cultures in which smoking is taboo for women, few women smoke. Smoking prevalence has declined as smoking has become more marginalized in sections of Western society. The influence of social norms is also manifest in regional variations in smoking prevalence within countries. In the UK, for example, smoking prevalence increases with 'northerliness', even controlling for social class.

Psychiatric disorders

There is a strong link between smoking and a range of psychiatric disorders, including mood disorders, schizophrenia and substance abuse. Smoking is also prevalent among homeless people, many of whom suffer from mental health disorders. It has yet to be established why this link exists: whether smoking causes or exacerbates these conditions; whether nicotine intake ameliorates some symptoms; whether a disorder makes it more likely that a patient will smoke and be unable to stop; or whether there is a common underlying cause.

It is widely thought that smoking is particularly closely linked to schizophrenia, but in fact the dominant factors are the severity of the psychiatric disorder and whether the patient is institutionalized (Figure 3.1). Thus, discussion about whether specific links exist between smoking behavior and the mechanisms that underlie schizophrenia or its treatment are somewhat premature. For example, it has been speculated that the effects of nicotine on brain dopamine pathways may ease symptoms of schizophrenia or side effects of antipsychotic medication.

Alcohol intake and other drug-related disorders

Smokers are particularly likely to experience problems with drugs and alcohol. The link with alcohol abuse and alcoholism is particularly strong, leading some to suggest that heavy smokers should be screened

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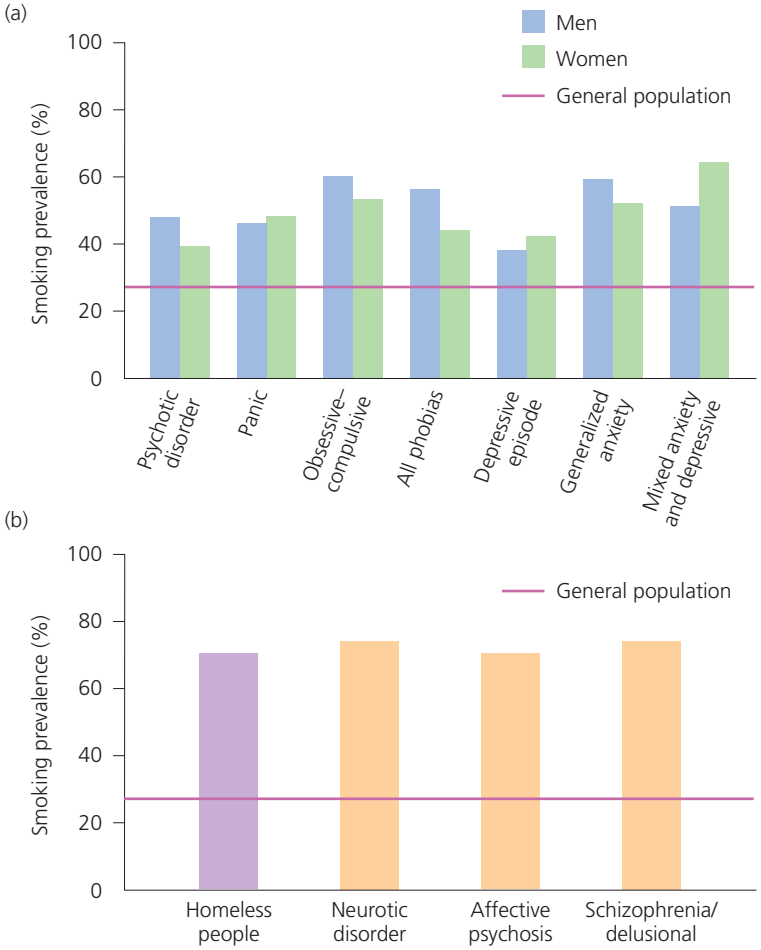

Figure 3.1 Prevalence of smoking in the UK in individuals with psychiatric disorders (the horizontal line represents smoking prevalence in the general adult population): (a) non-institutionalized patients; (b) institutionalized patients (and homeless persons for comparison). Data: Meltzer 1995 (Crown copyright material is reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland).

for alcoholism. Similarly, although drug abuse is rare in an absolute sense, smokers, especially heavy smokers, are far more likely than non-smokers to engage in drug abuse.

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