

BEYOND THE BASICS

Tobacco

What are tobacco products?

Tobacco is available in a variety of products that deliver its effects through various routes of administration; however, cigarette smoking is the most common form of use.^{1,2} Leaves from the tobacco plant (*Nicotiana tabacum*) are shredded and cured for the purpose of smoking in cigarettes, cigars or pipes, or in chew form.

Cigarettes emit smoke that contains more than 4,000 chemicals, including cyanide, aluminum, DDT, dieldrin, ammonia, arsenic, formaldehyde, benzene, hydrogen, lead, carbon monoxide, carbon dioxide, tar, chloroform and vinyl chloride.³

Smoking became prevalent in the 1920s when milder tobacco and industrial cigarette rolling machines made cigarettes more palatable to the masses. Its popularity grew over the next 30 years, peaking in the 1950s and then decreasing over the next 30 years. In recent years the rate of decrease in smoking has slowed considerably. It has been suggested, although the concept is controversial, that the current generation of smokers is more difficult to treat despite their understanding of the health risks associated with smoking. This may, in part, be due to a greater level of dependence than in previous generations of smokers.²

Nicotine, the active and highly addictive substance in tobacco, is considered a psychoactive stimulant.¹ The extremely addictive nature of this drug can be inferred from research that states approximately 70% of smokers indicate a desire to quit smoking, while only approximately 2.5% successfully quit annually.² Due to the significant numbers of individuals who relapse after quitting smoking on their own or with the assistance of formal programs, smoking, or tobacco dependence, can be seen as a chronic relapsing disorder that may require intensive and repeated care.²

Although cigarettes are the most common form of tobacco used, there are two types of smokeless tobacco – snuff and chewing tobacco – that also present significant health issues for users. Snuff is a finely ground or shredded tobacco that an individual generally places between the cheek and gum. Chewing tobacco is obtained as loose leaf, plugs or twist forms and is used in much the same manner as snuff. These tobacco products are also addictive due to their nicotine content. The amount of nicotine absorbed by the individual using these products is three to four times that absorbed through smoking a cigarette.⁴

Medical Use

The only medical use for tobacco, or specifically nicotine, is its incorporation in smoking cessation aids, such as nicotine gum or patches to assist smokers who are weaning off cigarettes.¹

Prevalence of Use

Tobacco is one of the most widely abused psychoactive drugs by both young people and adults.¹

In 2007, the Alcohol and Other Drugs study of students in Manitoba asked students about their tobacco use.⁵ Approximately 15% of both males and females reported smoking cigarettes at least occasionally. Daily smoking was reported by 4.8% of males and 6.1% of females. This is consistent

with the Canadian Tobacco Use Monitoring Survey (CTUMS) results in 2008, which reported 10% of youth aged 15 to 17 were current smokers. Approximately 20% of all students in that survey smoked cigarettes in the past year. Just over 40% of smokers had their first cigarette by age 12.⁶

CTUMS reports there is a decline in the overall smoking rate from 25% in 1999 to 18% in 2008, and the results indicate smokers' behaviours have changed in the last 10 years. In 1999, 21% of the population aged 15 years and older smoked daily. In 2008, 13% of that same population smoked daily and generally smoked 2.5 fewer cigarettes than in 1999. Currently, of particular concern are young adults aged 20 to 24 years, who report the highest rate of smoking at 27%.⁶

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According to CTUMS, less than 1% of Canadians aged 15 years and older report using smokeless tobacco products in the last 30 days prior to the survey.⁶

Pharmacokinetics

The cigarette is an efficient drug delivery system and facilitates nicotine reaching peak levels in the bloodstream, and ultimately the brain, generally within ten seconds of inhalation. The average smoker obtains one to two mg of nicotine per cigarette. A typical smoker will take ten puffs on a cigarette over a period of five minutes. If a person smokes one and a half packages daily, they will deliver approximately 300 “hits” of nicotine to the brain each day.⁷

For those who typically do not inhale the smoke – such as cigar and pipe smokers and smokeless tobacco users – nicotine is absorbed through the mucosal membranes and reaches peak blood and brain levels more slowly.⁷

Pharmacodynamics

Nicotine, the primary addictive ingredient in tobacco, stimulates nicotinic receptors throughout the body and brain, activates the reward pathways in the brain and promotes release of dopamine in the limbic system. These actions promote alertness, reduce irritability and relax skeletal smooth muscle.⁸

Recent research reveals that nicotine may not be the only psychoactive ingredient in tobacco. Studies reveal a marked decrease in the levels of monoamine oxidase (MAO) among users of tobacco products. Since MAO is an important enzyme responsible for the breakdown of dopamine, inhibition by substances in tobacco results in prolonged effects of dopamine in the reward pathways. Smokers will continue to smoke to sustain higher dopamine levels, which in turn reinforces the desire for repeated drug use.⁹

In addition, researchers have also recently found that acetaldehyde, another chemical constituent of tobacco smoke, dramatically increases the rewarding properties of nicotine in animals, most significantly in adolescent animals. These findings may suggest one reason why adolescents are more vulnerable to tobacco addiction than adults.⁹

Short-term Effects

Immediate exposure to nicotine will result in stimulation of the adrenal glands and a discharge of epinephrine (adrenaline). This results in an increase in blood pressure, respiration and heart rate.⁷ The effects of nicotine on mental functioning – mainly alertness and focus – are also apparent very quickly after initial exposure.

While difficult to verify through research, smokers claim that smoking results in feeling calm, improved mood and ability to concentrate.¹⁰ These effects may, in fact, result from relieving withdrawal symptoms that emerge between nicotine “doses.”

Long-term Effects

Regular smoking over extended periods of time increases blood pressure, depletes ascorbic acid (vitamin C) levels, causes skin wounds to heal more slowly and reduces immunity to disease. Research indicates that each cigarette cuts five and a half minutes from a smoker’s lifespan.¹

Women who smoke may experience earlier onset of menopause than non-smoking women.¹⁰

Toxic Effects

With any type of regular tobacco use, there is potentially an increased risk for lung, mouth and throat cancer, heart disease, heart attack, stroke, respiratory disease, stomach ulcers, diabetes and reproductive problems.^{1,4}

Regular use of chewing tobacco and snuff increases the risk for cancer of the oral cavity, including cancer of the lip, tongue, cheeks, gums and the floor and roof of the mouth. In addition, individuals using these products may be more susceptible to oral leukoplakia, gum disease and gum recession.⁴

Women are more vulnerable to the effects of tobacco and smoking-related diseases, such as lung cancer, than men.¹ Women who smoke, particularly women over the age of 30, and who also take oral contraceptives are at greater risk of cardiovascular diseases and stroke than if they did not take contraceptives.¹⁰

Tolerance and Dependence

Approximately 20% of individuals who smoke on a daily basis for one month will develop nicotine dependence.³ Tolerance to the peripheral and central actions of nicotine will also develop, meaning that more tobacco exposure will be needed to get the desired effect.⁸

Stronger and more frequent doses lead to greater degrees of tolerance. Animal studies have clearly demonstrated that in terms of chronic tolerance, higher nicotine maintenance doses leads to greater degrees of tolerance.²

Withdrawal

Strong cravings, irritability, restlessness, anxiety, insomnia, fatigue, depression, cognitive and attention deficits, and increased or decreased appetite are all symptoms of nicotine withdrawal.^{3,7,8}

Symptoms may begin within a few hours of the last cigarette and will generally peak within a few days of stopping the use. Usually, these symptoms subside within a few weeks; however, in some individuals, the symptoms can persist for months.^{3,7}

Although withdrawal is related to physical dependence on nicotine, behavioral factors can also affect the withdrawal process. For some individuals, exposure to other smokers, along with the physical rituals of feeling, smelling and seeing cigarettes, are all associated with the perceived pleasure of smoking and can make withdrawal or craving worse.⁷

Legal Issues

Sale and use of tobacco is subject to both federal and provincial legislation. Legislation outlines who may purchase and use tobacco and where it may be consumed with respect to public places. Tobacco products can be purchased and used legally by anyone who is of legal age (18 in Manitoba).¹

Specific regulations require that manufacturers display health warnings, health information and toxic constituent information on packages of all tobacco products. Current standards dictate health warnings occupy half of the packaging and include graphic images of the consequences of tobacco use.¹

Risks & Other Harms

Individuals who choose not to smoke but are exposed passively to second-hand smoke are still at risk of significant health issues, including lung cancer and coronary heart disease.⁹

As is the case in any abuse of licit and illicit drugs, there are potential adverse consequences related to the law, a person's financial situation, family relationships, and generally putting oneself at risk by participating in unsafe behaviours while under the influence of the drug.

Pregnancy & Lactation

Nicotine crosses the placenta and can reach levels in the fetus that significantly exceed maternal levels (generally 15% higher), concentrating in fetal blood and amniotic fluid. In addition, nicotine can be passed to the infant through breast milk.^{3,11}

Smoking during pregnancy, and exposure to second-hand smoke while pregnant, has been associated with increased risk for spontaneous abortion, decreased birth weights and preterm birth. In addition, there appears to be an increased risk for stillbirth and infant mortality. There is a strong association for increased risk of negative effects to the fetus with increased exposure, whether directly from the mother's smoking or exposure to second-hand smoke.¹¹

The risks continue into the postnatal period and can include respiratory illnesses (such as asthma, respiratory infections and bronchitis), ear infections, dental caries and sudden infant death syndrome (SIDS). The risk of SIDS is three times higher for children of mothers who smoke during pregnancy, with the greatest risk associated with smoking ten or more cigarettes a day.^{3,11}

Smoking while breastfeeding can result in lower basal prolactin levels and potentially decrease the milk supply. Nicotine and the thousands of other chemical agents present in cigarette smoke are passed through breast milk. The potential long-term effects of this exposure are not known.³

Infants born to mothers who smoke heavily can experience passive addiction and neonatal nicotine withdrawal syndrome, which can manifest as irritability, tremors and sleep disturbances.³ The risk of the child becoming addicted to tobacco is nearly doubled if the mother smokes in excess of a package a day during pregnancy.¹¹

Smoking during pregnancy may also affect cognition and is linked to behavioural problems. One study of adult men found that the sons of women who smoked while pregnant had twice the risk of committing a violent crime or repeatedly committing crimes even when other biopsychosocial risk factors were considered.^{3,11}

Interventions

Approximately 90% of smokers who quit on their own will return to smoking. For those who participate in smoking-cessation programs, the relapse rate is reduced to 70%.² Assessment of basic demographic information, smoking-related information, determination of motivation to quit, nicotine dependence, nicotine withdrawal and urges/craving to smoke may aid evidence-based treatment planning and follow-up.²

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Replacement therapy for nicotine dependence can consist of transdermal patches that administer diminishing doses of nicotine to reduce tolerance and dependence while minimizing withdrawal symptoms. The time frame will depend on the level smoked prior to attempting cessation. Nicotine gum, lozenges, inhalers or nasal sprays produce plasma nicotine levels that, while not long lasting, do create a “rush” that may alleviate withdrawal symptoms.²

Bupropion is moderately effective for treatment of addiction to nicotine due to its ability to inhibit serotonin and norepinephrine transport into nerve terminals.⁸ This effect may mimic at least some of the effects of nicotine in the central nervous system.

Clinical studies of the efficacy of varenicline (a partial agonist for the nicotinic receptor) to reduce withdrawal and craving, and to promote smoking cessation, have shown positive results.²

Behavioural therapies can help smokers identify environmental and emotional triggers to mitigate urges and craving to smoke.⁷ Most behavioural programs for nicotine dependence consist of multiple group-treatment sessions delivered by trained facilitators. Effective behavioural treatment must focus on as many aspects of a person’s life as possible due to nicotine’s multi-faceted dependence.

Studies show the best results in terms of smoking cessation generally occur with a combination of both nicotine replacement and behavioural

therapy. An important aspect of cessation attempts being initiated and ultimately successful appears to be the persistent attention of a smoker’s health professional.¹⁰

Substance Use & Mental Health

- Substance use and mental health problems can often occur together. This is commonly referred to as a co-occurring disorder.
- Substance use may increase the risk of mental health problems.
- People with mental health problems are at higher risk of developing substance abuse problems:
 - Sometimes they use alcohol and other drugs in an attempt to relieve themselves from mental health symptoms.
 - For most people alcohol and other substance use only covers up the symptoms and may make them worse.

Remember: A person’s experience with any drug can vary. Here are a few of the many things that may affect the experience: the amount and strength of the drug taken, the setting, a person’s mood and expectations before taking the drug, gender, overall health, past experience with that drug and whether more than one drug is being used at the same time. Using alcohol and other drugs at the same time can also be dangerous.

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The Addictions Foundation of Manitoba (AFM) offers a broad range of prevention and treatment services for alcohol, other drugs and gambling. These are designed to meet the needs of all Manitobans and include harm reduction and abstinence-based programs.

For more information, contact your local AFM office or visit our website: www.afm.mb.ca.

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