

Tobacco is deadly in any form. Smoked tobacco products, including waterpipes, contain over 7000 chemicals, including at least 250 chemicals known to be toxic or to cause cancer. Use of smokeless tobacco products can result in serious – sometimes fatal – health problems. Exposure to second-hand smoke has also been implicated in adverse health outcomes, including death. Newer tobacco products contain similar chemicals to traditional tobacco products and are harmful to health. Lifelong tobacco smokers lose at least 10 years of life on average. Globally, over 22 000 people die from tobacco use or second-hand smoke exposure every day — one person every 4 seconds. Tobacco use affects almost all organs of the human body. Some of the health effects are depicted below – from head to toe.

## DISEASES CAUSED BY ALL FORMS OF TOBACCO

### HEART ATTACK, STROKE, AND OTHER CARDIOVASCULAR DISEASES

One in three deaths worldwide is attributed to cardiovascular disease. Tobacco use and second-hand smoke exposure are major contributors, causing approximately 3 million cardiovascular deaths globally every year. Tobacco smokers have up to twice the risk of stroke and a fourfold increased risk of heart disease.

Tobacco smoke damages the arteries of the heart, causing the build-up of plaque and development of blood clots, thereby restricting blood flow and eventually leading to heart attacks (1) and strokes (2). Restricted blood flow, if left untreated, can lead to gangrene (death of body tissue) (3) and amputation (4) of affected areas. Stroke, like heart disease, has a high risk of death, and survivors of stroke may experience disastrous disabling conditions, such as paralysis or loss of vision or speech.

Smoking is harmful, whatever the frequency of use. Those who smoke just one cigarette per day are already half as likely as those who smoke 20 per day to develop heart disease and stroke.

However, it is not just tobacco smoking and second-hand smoke exposure that increase the risk of cardiovascular disease. Use of smokeless tobacco products also increases the risk of death due to heart attack or stroke.

### ORAL CANCER AND OTHER ORAL DISEASES

Tobacco use (both smoked and smokeless) is responsible for a significant burden of oral disease. Both forms are known to cause mouth cancer (5). In many countries, the chances of surviving more than five years after an oral cancer diagnosis are low. Those who survive oral cancer often experience considerable facial disfigurement and lose the ability to speak, swallow or chew.

Tobacco use also increases the risk of periodontal disease, a chronic inflammatory disease that wears away at the gums and destroys the jawbone, leading to tooth loss (6). Smoking tobacco and the use of smokeless tobacco products interfere with the mouth's chemistry, creating excess plaque and yellowing teeth, and causing bad breath.

### THROAT CANCER

Use of smokeless tobacco products and tobacco smoking increase the risk of head and neck cancers, including cancers of the lips, throat (pharynx and larynx) and oesophagus. Surgical removal of the cancerous larynx can lead to the need for tracheostomy (7), the creation of a hole in the neck and windpipe that allows the patient to breathe. Radiation and chemotherapy for throat cancer have damaging and highly debilitating effects, including loss of taste, decreased saliva production and increased throat mucus, which make it painful and at times impossible to eat.

### OTHER CANCERS

Tobacco use is also known to cause over 10 other types of cancer. With every puff of a cigarette, toxins and carcinogens are delivered to the body. Of the many chemicals in tobacco smoke, at least 70 are known to cause cancer. Smokers are at a significantly higher risk of developing acute myeloid leukaemia; cancer of the nasal and paranasal sinus cavities (8a), colorectal (8b), kidney (8c), liver, pancreatic (8d), stomach (8e) or ovarian cancer; and cancer of the lower urinary tract (including the bladder, ureter and renal pelvis). Recent studies have also demonstrated a link between tobacco smoking and an increased risk of breast cancer (8f), particularly among heavy smokers and women who start smoking before their first pregnancy. Smoking is also known to increase the risk of cervical cancer (8g) in women infected with human papillomavirus. The risk of these cancers typically increases with intensity and duration of smoking, because of the continued exposure to toxins and carcinogens. Smokeless tobacco contains 28 carcinogens that cause cancer of the oral cavity, oesophagus and pancreas.

Continuing to use tobacco following a cancer diagnosis aggravates the disease prognosis, since toxins in tobacco smoke can alter cell biology, which may lead to tumour regrowth; interfere with anticancer drugs; and increase treatment-related complications.

### FETAL DEATH

Tobacco use and exposure to tobacco smoke during pregnancy increase the risk for fetal death. Women who smoke or are exposed to second-hand smoke during pregnancy are at an increased risk of miscarriage. Stillbirths (the delivery of fetuses that have died in the womb) are also more common owing to fetal oxygen deprivation and placental abnormalities induced by carbon monoxide in tobacco smoke and by nicotine in tobacco smoke and smokeless tobacco. Smokers are at higher risk of ectopic pregnancy, a potentially fatal complication for the mother in which the fertilized egg attaches outside the uterus. Therefore, smoking cessation and protection from exposure to second-hand smoke are especially important for women of reproductive age planning to become pregnant and during pregnancy.

### REDUCED FETAL GROWTH, LOW BIRTH WEIGHT AND PRETERM DELIVERY

Any form of tobacco use or exposure during pregnancy can be detrimental to the development of the child. Infants born to women who smoke, use smokeless tobacco, or are exposed to second-hand smoke during pregnancy have a higher risk of preterm birth and low birthweight. Children born preterm and with low birthweight may experience lifelong health complications, including developing chronic diseases in adulthood.

**Smoked tobacco product:** any product made or derived from tobacco through a combustion process. Examples include manufactured cigarettes, roll-your-own tobacco, cigars, shisha (also known as waterpipe), kreteks and bidis.

**Smokeless tobacco:** any product that consists of cut, ground, powdered, or leaf tobacco and that is intended to be placed in the oral or nasal cavity. Examples include snuff, chewing tobacco, gutka, mishri and snus.

**Second-hand smoke (SHS):** the combination of "mainstream" smoke exhaled by the smoker and "sidestream" smoke emitted into the environment from lit cigarettes and other smoked tobacco products. The terms "passive smoking" or "involuntary smoking" are also often used to describe exposure to SHS.

## DISEASES CAUSED BY TOBACCO SMOKE

### LUNG CANCER

Smokers are up to 22 times more likely to develop lung cancer (9) in their lifetime than non-smokers. Tobacco smoking is the primary cause of lung cancer, causing over two thirds of lung cancer deaths globally and claiming roughly 1.2 million lives every year. Non-smokers exposed to second-hand smoke at home or in the workplace are also at risk of developing lung cancer.

### ASTHMA

Smoking is known to exacerbate asthma in adults, restricting their activity, contributing to disability and increasing the risk of severe asthma requiring emergency health care. School-aged children of parents who smoke are exposed to the harmful effects of second-hand smoke and are at risk of the onset and exacerbation of asthma through inflammation of the airways to the lungs.

### CHRONIC OBSTRUCTIVE PULMONARY DISEASE

One in five tobacco smokers will develop chronic obstructive pulmonary disease (COPD) (10) in their lifetime, especially people who start smoking during their childhood and teenage years, since tobacco smoke significantly slows lung growth and development. Smokers are 3–4 times more likely to develop COPD than non-smokers. Tobacco smoking causes a swelling and rupturing of the air sacs in the lungs that reduce the lung's capacity to take in oxygen and expel carbon dioxide. It also causes the build-up of purulent mucus, resulting in a painful cough and agonizing breathing difficulties. Adults who were exposed to second-hand smoke as children, and had frequent lower respiratory infections as a result, are also at risk of developing COPD.

### TUBERCULOSIS

About one quarter of the world's population has latent tuberculosis, placing them at risk of developing the active disease. Tobacco smoking more than doubles the risk of transforming tuberculosis from a latent state to an active state, and is also known to worsen the natural progression of the disease. In addition, second-hand smoke exposure may increase the risk of progression from tuberculosis infection to active disease. Tuberculosis damages the lungs, compounding the reduction in lung function caused by smoking, and increases the risk of substantial disability and death from respiratory failure.

### OTHER RESPIRATORY ILLNESSES AND REDUCED LUNG FUNCTION

Tobacco smoking is known to cause pneumonia and all major respiratory symptoms, including coughing, wheezing and phlegm. Lung growth and function are also more likely to be impaired among tobacco smokers. The children of parents who smoke suffer similar respiratory symptoms and lower levels of lung function throughout childhood. Infants born to mothers who smoke during pregnancy are especially susceptible, having been exposed to chemicals found in tobacco during critical developmental stages in utero.

### TYPE 2 DIABETES

The risk of developing diabetes is higher in smokers, and that risk is compounded as the number of cigarettes smoked per day increases. Second-hand smoke exposure is also associated with type 2 diabetes.

### DEMENTIA

Smoking is a risk factor for dementia, a group of disorders that result in mental decline and for which there is currently no effective treatment or cure. Dementia is mostly progressive, affecting memory, behaviour and other cognitive abilities and interfering with daily activities. Apart from contributing to significant disability in the person living with dementia, the disease can be emotionally demanding on the patient's family and caregivers. Alzheimer's disease is the most common form of dementia, and an estimated 14% of Alzheimer's cases globally can be attributed to smoking.

### REDUCED FERTILITY IN MEN AND WOMEN

Smokers are more likely to experience infertility. Women who smoke are more likely than non-smokers to experience challenges in becoming pregnant, increased time to conception and increased risk of miscarriage. Smoking also diminishes sperm count, motility and morphology (shape of the sperm) in men. Smokers who try to conceive using assisted reproduction technology have much lower success rates, sometimes requiring twice as many cycles of in vitro fertilization to achieve conception.

### ERECTILE DYSFUNCTION

Smoking restricts blood flow to the penis, which can cause impotence (the inability to achieve an erection). Erectile dysfunction is more common in smokers and very likely to persist or become permanent unless the man stops smoking early in life.

### SUDDEN INFANT DEATH SYNDROME

Sudden infant death syndrome (SIDS) is the sudden, unexplained death of a child under 1 year of age. Prenatal smoking is known to increase the risk of SIDS, and the risk is further increased among the offspring of parents who continue to smoke after the birth of the child.

### MENSTRUATION AND MENOPAUSE

Women who smoke are more likely to experience painful menstruation and more severe menopausal symptoms. Menopause occurs 1–4 years earlier in female smokers because smoking reduces the production of eggs in the ovaries, resulting in a loss of reproductive function and subsequent low estrogen levels.

### BIRTH DEFECTS

Smoking can deform sperm and damage its DNA, which may cause birth defects. Some studies have found that men who smoke have an increased risk of fathering a child who contracts cancer. Maternal smoking in early pregnancy increases a baby's chance of being born with a cleft lip and/or palate. It has also been noted that men whose mothers smoked during pregnancy had lower sperm densities than men whose mothers never smoked.

### VISION LOSS

Smoking causes many eye diseases which, left untreated, can lead to permanent vision loss. Smokers are more likely than non-smokers to develop age-related macular degeneration, a condition that results in irreversible vision loss. Age-related macular degeneration affects people's ability to read, drive a car, recognize faces and colours and see objects in fine detail. Smokers also have a higher risk of cataracts, a clouding of the eye's lens that blocks light. Cataracts (11) cause vision impairment, and surgery is the only option to restore vision. New evidence suggests that smoking also causes glaucoma, a condition that increases pressure in the eye and can damage eyesight. Tobacco smoke irritates the eyes and worsens dry eye syndrome in smokers and bystanders exposed to second-hand smoke, particularly among those who wear contact lenses.

### HEARING LOSS

Parental smoking is known to cause middle-ear disease among children under 2 years of age who are exposed to second-hand smoke at home. Chronic otitis media (middle-ear disease) among children is a common cause of acquired hearing loss (12) and deafness. Adult smokers are more likely to suffer hearing loss owing to the effects of long-term smoking on cochlear blood supply. Unaddressed hearing loss and deafness can have significant social, emotional and economic impacts.

### GASTROINTESTINAL DISEASES

Smokers are likely to experience gastrointestinal disorders, such as stomach ulcers, inflammatory bowel disease, such as Crohn's disease, and cancers of the gastrointestinal tract. Inflammatory bowel disease is often associated with abdominal cramps, persistent diarrhoea, fever and rectal bleeding.

### WEAKENED IMMUNE SYSTEM

Components of tobacco smoke weaken the immune system, putting smokers at risk of pulmonary infections. Additionally, smokers with a genetic predisposition to autoimmune disorders are at an increased risk of several diseases, including rheumatoid arthritis, Crohn's disease, bacterial meningitis, postsurgical infection, and cancers. Smoking also puts immune-compromised individuals, such as those living with cystic fibrosis, multiple sclerosis or cancer, at a higher risk of disease-related comorbidities and premature death. The immunosuppressive effects of tobacco put people living with HIV at an increased risk of developing AIDS. Among HIV-positive smokers, the average length of life lost is 12.3 years, more than double the number of years lost by HIV-positive non-smokers.

### WEAK BONES

Carbon monoxide, the main poisonous gas in vehicle exhaust fumes and tobacco smoke, binds to haemoglobin in the blood more easily than oxygen does, reducing the delivery of oxygen to the body's tissues. Smokers are more likely to lose bone density, fracture more easily and experience serious complications, such as delayed healing or failure to heal.

### SKIN DAMAGE

Tobacco smoking increases the risk of developing psoriasis (13), a noncontagious inflammatory skin condition that leaves itchy, oozing red patches all over the body. Smoking prematurely ages the skin by wearing away proteins that give the skin elasticity, depleting it of vitamin A and restricting blood flow. Smokers are more likely to develop dry, leathery and wrinkled skin (14), especially around the lips and eyes.

## BENEFITS OF QUITTING

**It is never too late to quit. The cessation of tobacco use has the potential to reduce the risk of many of these diseases significantly and, in some cases, to reduce risk to that of a person who has never smoked. For more information, please visit: [www.who.int/tobacco/en](http://www.who.int/tobacco/en)**

12 hours

Carbon monoxide level in your blood drops to normal.

1 to 9 months

Your coughing and shortness of breath decrease.

5 years

Your stroke risk is reduced to that of a non-smoker 5-15 years after quitting.

15 years

Your risk of coronary heart disease is back to that of a non-smoker.

20 minutes

Your heart rate drops.

2 weeks to 3 months

Your heart attack risk begins to drop. Your lung function begins to improve.

1 year

Your added risk of coronary heart disease is half that of a smoker.

10 years

Your lung cancer death rate is about half that of a smoker. Your risk of cancers of the mouth, throat, oesophagus, bladder, kidney and pancreas decreases.

Source: WHO Regional Office for the Western Pacific.

Photographs and illustrations: © Australian Government Department of Health; © Convention Secretariat WHO Framework Convention on Tobacco Control; © Georgios Kekos; © Ministry of Public Health, Thailand; © Richard Schneider/Indiana University; © Shutterstock.com

WHO/NMH/PND/19.1

© World Health Organization 2019. Some rights reserved. This work is available under the [CC BY-NC-SA 3.0 IGO](https://creativecommons.org/licenses/by-nc-sa/3.0/) licence.