HEALTH BASICS

Nicotine and tobacco

Nicotine is an addictive chemical found in tobacco and many vaping products.

WHAT IT IS
An addictive chemical and the products that deliver it

WHERE IT COMES UP
Smoking, vaping, smokeless tobacco, secondhand exposure, and quitting

WHY IT MATTERS
Product type changes addiction, poisoning, and long-term health risks

WHAT IT IS NOT
Not a disease or diagnosis

WHO TO ASK
A clinician, pharmacist, or tobacco treatment service

HOW IT IS CHECKED
Use history; cotinine or carbon monoxide tests when needed

Overview

Nicotine is a chemical found naturally in the tobacco plant. It is the main substance that makes tobacco products addictive. Many electronic cigarettes, or vapes, also contain nicotine.

Tobacco products include cigarettes, cigars, pipes, hookah, chewing tobacco, snuff, and products that heat tobacco without burning it. Nicotine may also be sold in pouches that do not contain tobacco.

Nicotine and tobacco are not the same thing. Nicotine drives dependence, but most of the cancer and lung damage from cigarettes comes from other chemicals produced when tobacco burns. Cigarette smoke contains toxic substances, including carbon monoxide and chemicals that damage cells.

Nicotine replacement medicines, such as patches, gum, and lozenges, also contain nicotine. They deliver it without tobacco smoke and are used to help people stop smoking. Their risks are not the same as those of cigarettes.

How it works

Nicotine reaches the brain and attaches to proteins called nicotine receptors. This causes the release of chemical messengers, including dopamine. Dopamine is involved in reward, attention, and learning.

The speed of delivery matters. Inhaled nicotine can reach the brain quickly, which strengthens the link between using a product and feeling its effects. Product design, nicotine concentration, and how a person uses the product all affect the amount absorbed.

With repeated exposure, the brain adjusts. A person may need nicotine more often or in larger amounts to get the same effect. This is called tolerance.

When nicotine levels fall, someone who is dependent may experience withdrawal. This can include cravings, irritability, anxiety, low mood, poor concentration, restlessness, increased appetite, or sleep problems. Withdrawal is usually uncomfortable rather than dangerous, but it can make stopping difficult.

Nicotine patches deliver nicotine slowly through the skin. Gum, lozenges, sprays, and inhaler-type products generally act more quickly. These medicines aim to reduce withdrawal while avoiding exposure to tobacco smoke.

Why it matters for your health

The health effects depend greatly on the product and how it is used.

Burning tobacco creates smoke containing thousands of chemicals. Cigarette smoking is linked to cancers, heart and blood vessel disease, stroke, chronic obstructive pulmonary disease (COPD), and many other conditions. COPD is long-term lung damage that limits airflow.

Cigars, pipes, and hookah also produce harmful smoke. Water in a hookah does not remove all toxic chemicals. Even if smoke is not inhaled deeply, the mouth and throat are still exposed.

Smokeless tobacco does not expose the lungs to smoke, but it can cause nicotine dependence. Some forms are linked to cancers of the mouth, oesophagus, and pancreas, as well as gum and dental problems. Risks differ among products because their contents and manufacturing methods differ.

Vapes heat a liquid to make an aerosol that is breathed in. This is not harmless water vapour. The aerosol may contain nicotine, fine particles, flavouring chemicals, and metals. For an adult who smokes, switching completely from cigarettes to a regulated vaping product can reduce exposure to many chemicals created by burning tobacco. Continuing to smoke while also vaping may preserve much of the smoking-related risk.

Nicotine can affect heart rate and blood pressure. It is also a concern during pregnancy

because it can affect fetal development. Young people are especially vulnerable to dependence because the brain continues developing into early adulthood.

Secondhand tobacco smoke can harm people nearby. Vape aerosol usually contains fewer combustion chemicals than cigarette smoke, but others may still be exposed to nicotine and additional substances.

What can go wrong

Nicotine and tobacco use relate to several distinct health situations:

Nicotine liquids can be particularly dangerous if swallowed by a child. Exposure may cause vomiting, confusion, weakness, abnormal heart rate, seizures, or breathing problems. These signs belong to possible poisoning, not to nicotine use in general.

A damaged vaping battery can overheat, catch fire, or explode. Burns and other injuries require assessment based on their severity.

- Nicotine dependence and withdrawal: repeated use can lead to cravings, tolerance, and difficulty stopping
- Smoking-related disease: cigarette smoke contributes to cancer, COPD, heart disease, stroke, and poor circulation
- Oral disease: smokeless and smoked tobacco can damage gums, teeth, and tissues in the mouth
- Pregnancy exposure: nicotine and tobacco smoke can affect pregnancy and fetal development
- Nicotine poisoning: swallowing nicotine liquid or absorbing a large amount through skin can cause serious poisoning
- Ongoing smoke exposure: using cigarettes alongside another nicotine product does not remove smoking-related harm

What you can do

If you use nicotine or tobacco, keep a simple record of the products you use, how often you use them, and when cravings are strongest. Include cigarettes, vapes, pouches, smokeless tobacco, and nicotine medicines. This can help you and a clinician understand your total use.

If you want to stop smoking, ask a primary care clinician, pharmacist, or tobacco treatment service about counselling and stop-smoking medicines. Options may include nicotine

replacement, varenicline, or bupropion. The best choice depends on your health, other medicines, pregnancy status, and what products you use.

Using more than one form of nicotine replacement may be appropriate in some treatment plans, but ask a clinician or pharmacist how to use the products correctly. Do not guess at doses or combine products without checking their instructions.

Most people do not need a laboratory test for nicotine use. A cotinine test can show recent exposure to nicotine. Cotinine is a substance made when the body breaks nicotine down. It usually cannot show whether the nicotine came from cigarettes, vaping, secondhand exposure, or nicotine medicine.

A breath carbon monoxide test can show recent exposure to smoke. It does not measure nicotine and may not detect vaping or smokeless tobacco use.

Arrange routine follow-up if you have concerns about dependence, withdrawal, pregnancy exposure, persistent cough, mouth changes, or difficulty stopping. A clinician can assess the specific concern rather than assuming it is caused by nicotine or tobacco.

If nicotine liquid is swallowed or gets on a child's skin, contact a local poison information service promptly. Remove contaminated clothing and rinse exposed skin while getting advice. Call emergency services for collapse, a seizure, severe breathing difficulty, or inability to wake. New severe chest pain also needs emergency assessment.

If you do not use nicotine or tobacco and have no known exposure, there is usually nothing you need to test or record.

Common questions

Is nicotine the main cause of smoking-related cancer?

No. Nicotine causes dependence, but most smoking-related cancer risk comes from chemicals in tobacco smoke. This does not make nicotine harmless.

Are nicotine-free vapes harmless?

No. A nicotine-free label does not mean the aerosol is risk-free. It may still contain fine particles, flavouring chemicals, or metals. Product labels may also be inaccurate.

Is vaping safer than smoking?

Vaping generally exposes a person to fewer toxic combustion chemicals than smoking cigarettes. It is not risk-free. Any reduction in exposure is greatest when an adult who smokes switches completely rather than using both products.

Is nicotine replacement the same as smoking?

No. Nicotine replacement provides controlled nicotine without burning tobacco. It is intended to reduce cravings and withdrawal and does not carry the same risks as cigarette smoke.

Can a test prove that someone smokes?

Not by itself. Cotinine shows recent nicotine exposure but not necessarily its source. Carbon monoxide testing can support evidence of recent smoke exposure, but results must be interpreted in context.

Does occasional tobacco use matter?

There is no harmless level of exposure to tobacco smoke. How much risk changes with the product, amount, and duration of use, but occasional use can still lead to toxic exposure and dependence.

Sources

- US Food and Drug Administration. Nicotine Is Why Tobacco Products Are Addictive
- Centers for Disease Control and Prevention. About Electronic Cigarettes (E-Cigarettes)
- World Health Organization. Tobacco
- National Academies of Sciences, Engineering, and Medicine. Public Health Consequences of E-Cigarettes . 2018
- National Institute for Health and Care Excellence. Tobacco: preventing uptake, promoting quitting and treating dependence (NG209)
- Cochrane. Electronic cigarettes for smoking cessation