The Health Risks of Tobacco use

Tobacco use remains the leading cause of preventable death in the United States.[1] No tobacco use is safe or without risk. Commercial tobacco product use, in any form, exposes the body to a myriad of dangerous chemicals and potential health risks.

Dangerous Chemicals in Tobacco

Tobacco products contain a mixture of dangerous chemicals, many of which are carcinogenic (i.e., can cause cancer). Some chemicals are naturally found in the tobacco plant, some are added in by manufacturers, and more are emitted when tobacco is burned. Both combustible and smokeless tobacco products pose health risks.[2]

Tobacco plants absorb heavy metals like cadmium, lead, nitrates,[3] and radioactive materials like polonium-210 from fertilizer and soil as they grow.[4] During the curing and aging process, **tobacco leaves develop tobacco-specific nitrosamines (TSNAs). All of these substances are carcinogenic.** In addition to these carcinogens, tobacco products contain nicotine, which is highly addictive. **Nicotine indirectly increases the risk of cancer by creating and sustaining addiction** leading to sustained exposure to known cancer-causing chemicals.

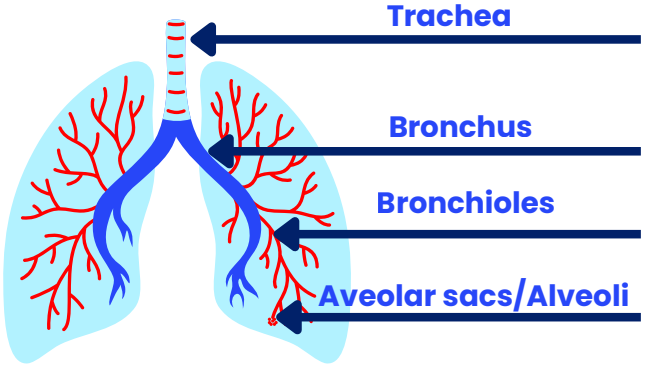
These are just a few examples of the chemicals present in tobacco. **When cigarette or cigar smoke is inhaled, the body is exposed to over 7,000 chemicals[3] 70 of which are carcinogenic.[5]**

Smoking and Pulmonary Health

In the lungs, tobacco smoke flows through the bronchi and bronchioles to the air sacs, called alveoli, exposing them to dangerous chemicals and fine particles. **This leads to long term or irreversible damage**, including:

- Chronic obstructive pulmonary disease (COPD)
- Chronic bronchitis
- Emphysema
- Lung cancer[12]

The lungs have many defenses against toxins inhaled in smoke or air, but continuous exposure to toxins, especially in high concentrations, can impair the effectiveness of these defenses.[8]



Tobacco Smoke and Cancer

- **30% of all cancer deaths annually** in the U.S. are attributed to smoking.[6]
- **13 cancers** have been associated with smoking including cancers of the lungs, mouth, larynx, pharynx, esophagus, kidney, cervix, liver, bladder, pancreas, stomach, colon, and acute myeloid leukemia.[7,8,9]
- **8 in 10 lung cancer deaths** are caused by exposure to tobacco smoke.[10]
- **At least 70 carcinogens** are present in tobacco smoke.[5] Varying levels of many of these carcinogens are present in other tobacco products as well, including e-cigarettes and forms of smokeless tobacco.[11]

Chronic obstructive pulmonary disease (COPD) is characterized by both chronic bronchitis and emphysema. These conditions cause obstruction of airflow through the lungs, resulting in difficulty breathing. **Chronic lower respiratory diseases, including COPD, are the fifth leading cause of death in the United States.[13]**

3 in 4 people with COPD smoke.[14]



Mucus production is one of the lung's defenses. It is meant to protect lung tissue from irritants and toxins, including those present in tobacco smoke. Smoking causes an overproduction of mucus in the lungs **leading to chronic coughing, chronic inflammation of the trachea, bronchus, and bronchioles,** and other harmful effects on the lung cells that impair lung function and breathing, a condition called chronic bronchitis.[8]

Emphysema is a lung condition in which the walls between alveoli are damaged, creating larger, but fewer, air sacs. This makes it **difficult to exhale carbon dioxide and reduces the level of oxygen that reaches the blood.[12]** Both bronchitis and emphysema increase the risk of infections such as pneumonia and tuberculosis.[12]

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The Health Risks of Tobacco use

Smoking and Cardiovascular Health

Smoking damages the heart and blood vessels and causes risk factors associated with heart disease[8,15] such as hypertension, COPD, decreased activity, and lower levels of HDL cholesterol. Smoking increases the risk of many cardiovascular diseases (CVD) including:

- **Coronary Heart Disease (CHD)** - narrowing of the arteries of the heart,[8,12]
- **Heart Attacks and Strokes** - interruption or blockage of blood flow to the heart or brain,[8,12]
- **Atherosclerosis and Peripheral Arterial Disease (PAD)** - plaque build up in the arteries,[8,12,15]
- **Aortic Aneurysm** - a bulging of the aortic artery caused by a weakened aortic wall,[8,12] and
- **Peripheral Vascular Disease (PVD)** - decreased blood flow to the upper and lower extremities.[8,12]

Additional Health Risks of Smoking

Smoking can also increase the risk of cataracts, age-related macular degeneration leading to blindness, infections, periodontitis (gum disease), type-II diabetes, loss of bone density leading to increased risk of hip fractures, rheumatoid arthritis, and a weakened immune system.[16]

The Health Risks of Smokeless Tobacco

Smokeless tobacco comes in many forms. Chewing tobacco, snuff, and snus are all made from tobacco leaves. These forms of tobacco are absorbed through the mouth or gums. Dissolvable tobacco is ingested through the mouth in the form of recreational lozenges, orbs, or pellets. **All of these products contain tobacco.**

Smokeless tobacco products contain at least 28 carcinogens, and increase the risk of head and neck cancers, esophageal cancer, and pancreatic cancer.[17] These products can also increase risk of heart disease and stroke[18] and can cause mouth and tooth problems such as leukoplakia, stained teeth, bad breath, damaged gum tissue, receding gums, and tooth decay, abrasion, and loss.[19]

Nicotine pouches are a newer form of smokeless tobacco. They contain nicotine powder that can be extracted from tobacco or synthetically engineered. **Nicotine pouches can contain trace amounts of heavy metals and other carcinogens.[20]** These contaminants often enter the product during the nicotine extraction or manufacturing process, regardless of the nicotine source. Additionally, most nicotine pouch brands are owned by the same companies that own and manufacture popular cigarette brands, and **nicotine use in any form can have negative effects on health including addiction and increased risk of cardiovascular disease.**

Tobacco Use and Reproductive Health



WOMEN

Smoking can decrease fertility in women.[8] Pregnant women who use tobacco are at an elevated risk for pregnancy complications including premature birth, miscarriage, and birth defects.[8,12,16]



MEN

Tobacco use can cause erectile dysfunction and decreased fertility in men.[12,16,21]

The Dangers of E-cigarette Use

E-cigarettes are battery-operated devices that heat an e-liquid to produce an aerosol that is inhaled. Although some e-cigarettes are branded as "tobacco free," they still contain dangerous chemicals including carcinogens. E-cigarettes have been proven to cause **nicotine addiction and e-cigarette or vaping product use-associated lung injury (EVALI).[11]** They are also linked to **lung problems including worsened asthma symptoms, bronchitis, and lung infections.[6]**

The Dangers of Heated Tobacco Products

Heated tobacco products are a form of inhaled tobacco. These devices heat tobacco without burning it, but this does not mean they are safe. Heated tobacco products **emit over 20 toxic chemicals,**[18] some of which are carcinogenic, including aldehydes, TSNAs, and tar.[22,23] Heated tobacco product use can **cause increased heart rate and blood pressure, arterial stiffness, cardiovascular stress, and lung inflammation.**[22]

Tobacco Use and Teen Health

Tobacco product use poses specific risks for adolescents.

- Adolescence is a critical period of development, making teens especially vulnerable to nicotine addiction.[24]
- Chronic nicotine consumption, especially for adolescents, can alter dopamine sensitivity and cognitive functioning development. This can impact learning, mood regulation, and impulse control.[25]
- Youth or adolescents who smoke are at risk of physical problems including reduced lung growth, reduced lung function, and early cardiovascular damage.[25]
- Early nicotine use may increase the risk of addiction to other substances.[26]

Tobacco use is associated with 4 out of 5 leading causes of death in the United States.[13]

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