

## CAUSES OF CANCER IN THE MODERN WORLD

*Abduvohidov N.Z., Ro'ziyeva G.T*

*The Termiz University of Economics and Service, Termiz city, Farovon massif e-mail:[abduvohidovnemmat70@gmail.com](mailto:abduvohidovnemmat70@gmail.com)*

**Abstract:** The existence of cancer has been known for thousands of years, yet its rates continue to grow despite advances in medicine and human development indexes. In fact, over 35 million new cancer cases are predicted in 2050, a 77% increase from the estimated 20 million cases in 2022. This article will try to highlight key factors in cancer growth and its preventive measures.

**Keywords:** cancer, obesity, alcohol, tobacco, environmental pollution

**Introduction:** The fast-increasing worldwide cancer burden is a result of changes in risk factor exposure, many of which are linked to socioeconomic development as well as population increase and aging. Obesity, alcohol, and tobacco use are the main causes of the rising cancer incidence, while environmental pollution continues to be a major contributor to environmental risk factors.

### HOW CAN OBESITY CAUSE CANCER?

Numerous theories have been put forth to explain how obesity may raise the chance of developing certain types of cancer.

Excess estrogen produced by fat tissue, also known as adipose tissue, has been linked to an increased risk of ovarian, endometrial, breast, and several other cancers.

Blood levels of insulin and insulin-like growth factor-1 (IGF-1) are frequently elevated in obese individuals. Insulin resistance causes high insulin levels, or hyperinsulinemia, which occurs before type 2 diabetes, another proven risk factor for cancer. High insulin and IGF-1 levels may encourage the growth of malignancies of the colon, kidney, prostate, and endometrium.

Chronic inflammatory diseases such as non-alcoholic fatty liver disease and gallstones are common in obese people. These illnesses may result in oxidative stress, which damages DNA and raises the risk of malignancies of the biliary system and other organs.

Adipokines are hormones produced by fat cells that have the ability to either promote or hinder cell proliferation. For instance, as body fat increases, so does the blood's concentration of the adipokine leptin, and elevated leptin levels might encourage



abnormal cell division. Adiponectin, another adipokine, may have antiproliferative properties that prevent the growth of tumors and is less prevalent in obese individuals than in those who are healthy in weight.

Other metabolic and cell growth regulators, such as AMP-activated protein kinase and mammalian target of rapamycin (mTOR), may also be impacted, both directly and indirectly, by fat cells.

Obesity may also influence cancer risk through altered tumor immunology and modifications to the mechanical characteristics of the scaffolding tissue surrounding growing tumors.

Obesity can have biological impacts as well as make screening and management more challenging. For instance, women who are overweight or obese are more likely to get cervical cancer than women who are of a healthy weight. This is probably because cervical cancer screening is less successful in these people.

### **EFFECTS OF ALCOHOL ON CANCER**

Alcohol may raise the risk of cancer in a number of ways, according to research, including

converting ethanol in alcoholic beverages into acetaldehyde, a hazardous chemical and likely human carcinogen, which can harm proteins and DNA (the genetic material that makes up genes).

Acetaldehyde also produces reactive oxygen species, which are chemically reactive molecules that contain oxygen and can harm the body's lipids (fats), proteins, and DNA through a process known as oxidation.

Hindring the body's capacity to absorb and digest a number of nutrients that may be linked to the risk of cancer, such as carotenoids, vitamin A, vitamin C, vitamin D, vitamin E, and nutrients in the vitamin B complex, such as folate.

rising levels of the sex hormone estrogen in the blood, which is associated with an increased risk of breast cancer

A number of carcinogenic pollutants, including nitrosamines, asbestos fibers, phenols, and hydrocarbons, may also be present in alcoholic beverages as a result of fermentation and manufacture.

### **RELATIONSHIPS BETWEEN TOBACCO AND CANCER**

One of the main causes of cancer and cancer-related deaths is tobacco usage. Because tobacco products and secondhand smoke include numerous chemicals that damage DNA,



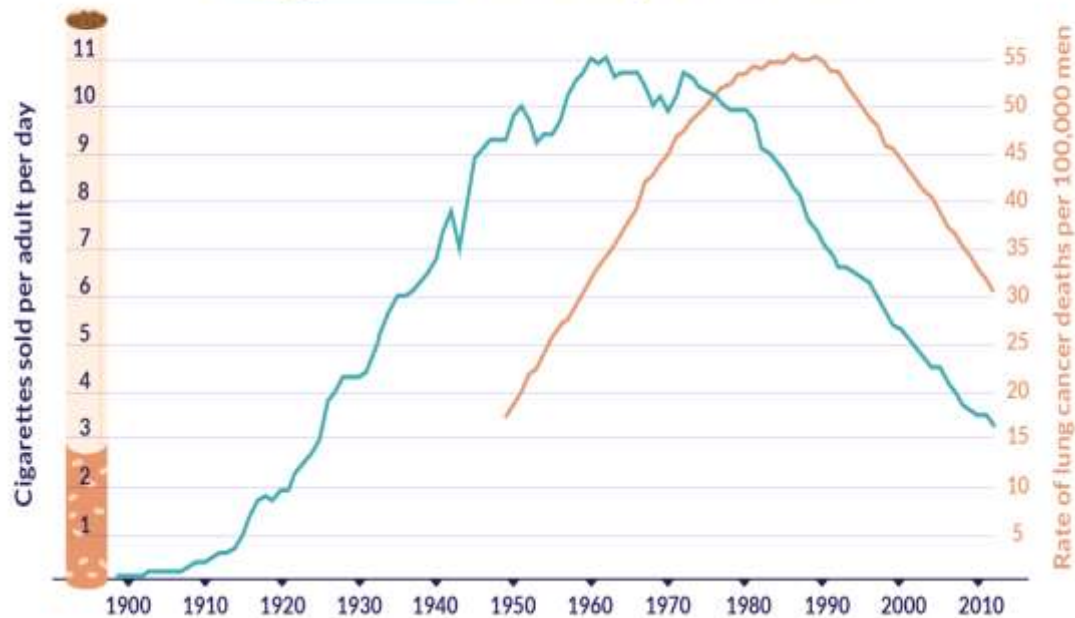


people who use tobacco products or are frequently around environmental tobacco smoke, also known as secondhand smoke, are more likely to develop cancer.

Numerous cancers are brought on by tobacco use, including acute myeloid leukemia and cancers of the lung, larynx (voice box), mouth, esophagus, throat, bladder, kidney, liver, stomach, pancreas, colon, and rectum, as well as the cervix. Individuals who use smokeless tobacco, such as snuff or chewing tobacco, are more likely to develop pancreatic, esophageal, and oral malignancies.

Tobacco use has no safe threshold. It is highly recommended that everyone who uses tobacco products of any kind stop. Regardless of age, quitting smoking significantly increases life expectancy as compared to continuing to smoke. Additionally, the risk of death is decreased when smoking cessation occurs at the time of a cancer diagnosis.

### Decline in cigarette sales and lung cancer mortality over time







## Comparing smoking and air pollution

Smoking causes around nine times more lung cancer cases than outdoor air pollution does



Source: Brown et al, British Journal of Cancer, 2018.

Together we will beat cancer

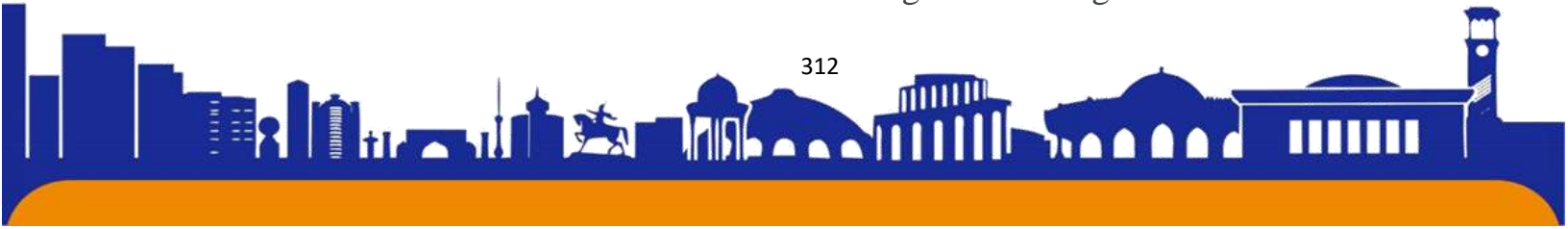


### CANCER CAUSING SUBSTANCES IN THE ENVIRONMENT

Changes to specific genes that affect how our cells work are what create cancer. When DNA replicates during cell division, some of these genetic alterations naturally take place. Others, however, are caused by exposures to the environment that harm DNA. Substances like the compounds in tobacco smoke or radiation like the sun's UV rays can be included in these exposures.

Some cancer-causing exposures, like tobacco smoke and sunlight, can be avoided by people. Some, however, are more difficult to avoid, particularly if they are present in the food we eat, the water we drink, the air we breathe, or the supplies we use for our occupations. Researchers are looking at the exposures that can lead to or cause cancer. People may be able to avoid dangerous exposures if they are aware of which ones exist and where they can be discovered.

The following chemicals have been identified as known human carcinogens by the National Toxicology Program (NTP) in its 15th Report on Carcinogens. However, just because a material has been classified as a carcinogen does not guarantee that it will





cause cancer. The amount and length of exposure, as well as the person's genetic history, are among the many factors that affect a person's likelihood of developing cancer.

Aflatoxins

Aristolochic Acids

Arsenic

Asbestos

Benzene

Benzidine

Beryllium

1,3-Butadiene

Cadmium

Coal Tar and Coal-Tar Pitch

Coke-Oven Emissions

Crystalline Silica (respirable size)

Erionite

Ethylene Oxide

Formaldehyde

Hexavalent Chromium Compounds

Indoor Emissions from the Household Combustion of Coal

Mineral Oils: Untreated and Mildly Treated

Nickel Compounds

Radon

Secondhand Tobacco Smoke (Environmental Tobacco Smoke)

Soot

Strong Inorganic Acid Mists Containing Sulfuric Acid

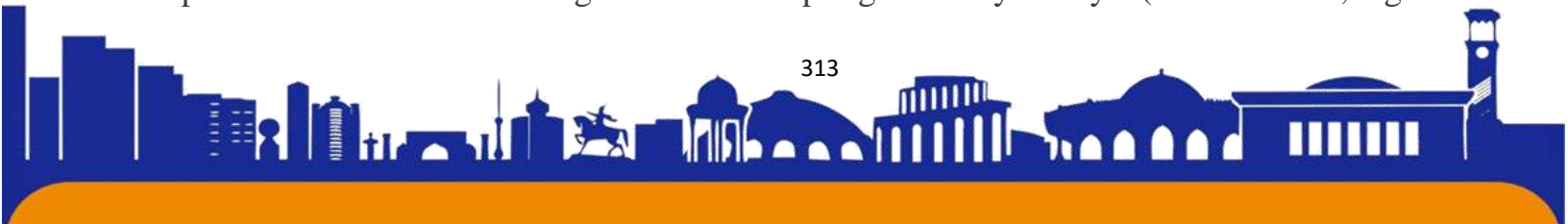
Thorium

Trichloroethylene

Vinyl Chloride

Wood Dust

**Conclusion:** Cancer is a multifactorial disease, with its development influenced by genetic predisposition, lifestyle choices, environmental exposures, and biological processes. Prevention strategies include adopting a healthy lifestyle (balanced diet, regular





ISSN (E): 2181-4570 ResearchBib Impact Factor: 6,4 / 2023 SJIF 2024 = 5.073/Volume-2, Issue-11

exercise, no smoking or excessive drinking), minimizing exposure to carcinogens, and early detection through regular screenings. Awareness and proactive measures can significantly reduce the burden of cancer at individual and population levels.

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