# CANCER
## *and the Environment*

The risk for developing cancer can be increased both by genetic and environmental factors. This fact sheet will explain what cancer is as a disease, and the risk factors for developing cancer. It will also explain the process for investigating potential unusual patterns of cancer, sometimes called cancer clusters.

Cancer is a diverse set of diseases in which some of the body's cells grow uncontrollably and spread to other parts of the body. This abnormality in uncontrolled cell growth can be due to multiple different factors, described below.[1]

### Cancer Statistics

**40.5%**

Approximately **40.5% of men and women** in the United States will be diagnosed with cancer at some point during their lifetimes (based on 2017–2019 data).[2]

**2 million** new cases

In 2024 in the United States, an estimated **2 million new cases** of cancer were diagnosed and an estimated **600,000 people died** from the disease.[2]

**prostate, lung, & colorectal**

**breast, lung, & colorectal**

In 2024, the most common newly diagnosed cancers in men were **prostate, lung, and colorectal** and in women were **breast, lung, and colorectal.**[2]

cancer mortality **is higher in men than in women**

Mortality from cancer is **higher in men than in women**. Cancer mortality is also higher in non-Hispanic black men and lowest in non-Hispanic Asian/Pacific Islander women.[2]

cancer mortality **is higher in non-Hispanic black men**

### How Cancer Develops

Cancer is caused by changes to genes that control our cells' function.[1] These genetic changes that cause cancer can happen because of:

- inherited genetic changes from parents
- errors that occur as cells divide.
- damage to DNA caused by harmful substances in the environment (e.g., cigarette smoke, carcinogenic chemicals, diet, etc.).[1]

## GENETIC AND ENVIRONMENTAL RISK FACTORS FOR CANCER

**Genetic risk factors** are inherited through genes.

- Cancer itself can't be passed down from parents to children. However, genetic traits that increase the risk of developing certain cancers can be passed down from parents to children.[3]
- Inheriting a cancer-related genetic change doesn't mean you will definitely get cancer. It means that your risk of getting cancer is increased.[3]

**Environmental risk factors** are non-genetic factors that increase the risk of cancer. Environmental risk factors vary depending on the specific type of cancer but can include:

- Alcohol consumption
- Exposure to cancer-causing substances, also called carcinogens
- Chronic inflammation
- Diet
- Hormones
- Immunosuppression
- Infectious agents
- Obesity
- Radiation
- Sunlight
- Tobacco use.[4]

**Advancing age** is the most important risk factor for cancer overall. However cancer can be diagnosed at any age.[5] For this reason, cancer data are often presented as "age adjusted" because we need to account for the fact that cancer is more common in older individuals.

**Tobacco use** is strongly linked to an increased risk for many kinds of cancer, including lung and esophageal cancers. Not smoking or quitting smoking lowers the risk of getting cancer and dying from cancer. Scientists believe that cigarette smoking causes about 30% of all cancer deaths in the United States.[6]

**Certain viruses and bacteria** are able to cause cancer.[6] One example is human papilloma virus being associated with cervical cancer. Some vaccines have been approved by the FDA to prevent infection by some cancer causing infectious agents.[6]

**Radiation exposure** is a known cause of cancer. There are two main types of radiation linked with an increased risk of cancer:

- Ultraviolet radiation from sunlight: This is the main cause of nonmelanoma skin cancers.
- Ionizing radiation has been associated with lung and thyroid cancer. Sources include:
  i. Medical radiation from tests such as X rays, CT scans, fluoroscopy, and nuclear medicine scans.
  ii. Radon gas in our homes.[6]

**Drinking alcohol** is linked to an increased risk of some types of cancers, such as oral and liver cancer.[6]

**Obesity** is linked to a higher risk of some types of cancer, including breast cancer (in women who have gone through menopause) and uterus cancer. People who lose weight decrease their risk of these cancers.[6]

**Exposure to cancer-causing chemicals** and other substances, also called carcinogens, has been linked to some cancers, such as lung and skin cancer.[6]

**Job related, or occupational, factors** can also increase cancer risk. An estimated 28% of all cancers worldwide are caused by exposures to carcinogens in the workplace.[10] Some specific occupations that have been linked to increased cancer risk include: firefighting, rubber manufacturing, paving, roofing, painting, and chimney sweeping.[10]

## EXAMINING UNUSUAL PATTERNS OF CANCER AND ENVIRONMENTAL CONCERNS

An investigation can be done if an unusual pattern of cancer cases, sometimes called a "cancer cluster," is perceived. A cancer cluster is defined by the Centers for Disease Control and Prevention (CDC) as "a greater than expected number of the same or etiologically related cancer cases that occurs within a group of people in a geographic area over a defined period of time."

It is possible that not every unusual pattern will meet the definition of a cluster as described above. However, unusual patterns that meet some of the criteria and also have plausible environmental concerns still warrant further investigation.

In North Carolina, NCDHHS may investigate cancer concerns around specific geographic areas. The Central Cancer Registry (CCR) is the sole repository of complete cancer incidence data for the state.[8] CCR collects data from hospitals, doctors, laboratories, and death certificates and performs analyses on the major cancer types. CCR collaborates with the NCDHHS Epidemiology Section to conduct these investigations when needed.

When there are cancer concerns in workplaces, NCDHHS, employers, or employees may request investigations called Health Hazard Evaluations (HHEs) conducted by the National Institute of Occupational Safety and Health (NIOSH) at the CDC. NIOSH investigates potentially hazardous working conditions, including suspected cancer clusters in workplaces.[9]

Investigation of cancer clusters might not result in identifying any specific cause of the cancer. This is because:

It can take months or years for cancer to develop or be diagnosed after a given environmental exposure, making it difficult to draw a link between the two.

Cancer as a group of diseases is common, so cases can be frequently observed and might appear to occur atypically within a community.

While cancers are common in general, the number of people diagnosed with a specific type of cancer may be small, making it challenging to do statistical comparisons of cancer rates.

As the U.S. population ages, and as cancer survival rates continue to improve, in any given community, many residents will have had some type of cancer, thus adding to the perception of excess cancer cases in a community.

Multiple factors affect the likelihood of developing cancer, including age, genetic factors, and lifestyle behaviors, like smoking and alcohol consumption.

An excess of observed cancer cases within a given population may occur as a result of natural fluctuation and random chance and may also occur without a specific cause.[8]

## References


1. National Cancer Institute website: www.cancer.gov/about-cancer/understanding/what-is-cancer
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3. National Cancer Institute website: www.cancer.gov/about-cancer/causes-prevention/genetics
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