

CANCER & THE ENVIRONMENT

Does the environment contribute to causing cancer?

Exposures to some chemicals in the environment may contribute to an individual's risk of developing cancer. Benzene, asbestos, vinyl chloride and arsenic are examples of toxic substances that have been classified by the EPA as *known human carcinogens*. This means that studies have shown that humans have an increased risk of developing cancer when exposed to higher than acceptable doses of these chemicals.

In addition to known carcinogens, many non-carcinogenic chemicals may have a role in the promotion of cancerous growth.

What is cancer?

Cancer is not a single disease, but is made up of over 100 various types. It is characterized by the uncontrolled growth and spread of abnormal cells. It starts in one organ or tissue in the body called the primary site. If the disease remains undetected or cannot be controlled through treatment, it can spread (metastasize) to other organs throughout the body.

Who gets cancer?

Anyone can develop cancer. When categorized as a single disease, cancer is the second leading cause of death in the United States. Since the incidence of cancer increases with age, most cases involve adults middle-aged or older. The perception that cancer is more prevalent today than it was one or two decades ago is partly because our population is aging, and also because cancer survival rates have improved.

What are the known causes of cancer?

Since cancer is many different diseases, there are also many different causes. For very few cancers, such as mesothelioma, there is a single identifiable cause (asbestos). For some others, such as lung cancer, there are readily identifiable primary causes (cigarette smoking). For most cancers however, complex combinations of risk factors may have a role in development of the disease.

What are the risk factors for cancer?

Research has identified a number of factors that are linked to increased risk of developing cancer. These include: tobacco use, family history of cancer, gender; race, particular viruses, nutrition, and exposure to radiation, excessive sunlight, or certain chemicals.

Cancer development

Cancerous cells develop from healthy cells in a complex process called *transformation*. The first step in the process is *initiation*, in which a change in the cell's genetic material (in the DNA and sometimes in the chromosome structure) primes the cell to become cancerous. The change in the cell's genetic material may occur spontaneously or be brought on by an agent that causes cancer (a carcinogen).

The next step in the development of cancer is called *promotion*. Agents that cause promotion are called promoters. Promoters may be substances in the environment or even some drugs. Unlike carcinogens, promoters do not cause cancer by themselves. Instead, promoters allow a cell that has undergone initiation to become cancerous. Promotion has no effect on non-initiated cells. Thus, both initiation and promotion are needed to cause cancer.

What is the latency period for cancer?

Cancer does not develop immediately following an exposure to a risk factor. Cancer latency is the length of time between exposure to a cancer-causing agent and detection of the disease. For the majority of cancers the latency period can be as long as 15 to 30 years.

What about cancer in children?

The most common cancers in children are leukemia, brain tumors, and lymphomas. One of the differences between childhood and adult cancers is that childhood cancers typically have a shorter latency period. Although research has not definitively identified risk factors for childhood cancers it suggests that they are associated with specific genetic conditions, infectious diseases, and possibly some types of environmental pollutants.

Concluding information regarding the environment and cancer

Environmental factors are often perceived as accounting for a much higher proportion of cancer cases than they actually do. The most commonly cited review of cancer research attributes about 75 percent of cancer mortality to behavioral risk factors such as smoking, drinking, and diet. A much smaller proportion of cancer mortality has been linked to environmental factors and pollution. Current scientific research is just beginning to identify the many ways in which heredity, lifestyle and the environment can interact to cause cancer.

What are cancer clusters?

This term refers to an excess of cancer cases in a community during a specified time period. Requirements of a suspected cancer cluster to be determined as a real cluster include a definite carcinogenic exposure; a grouping of cancer cases that are all the same type of cancer; a rare type of cancer rather than more common types; or a number of a certain type of cancer in age groups not usually affected by that type of cancer. If these findings are satisfied, further investigation can determine if there is statistical significance of higher than expected cases in the community. There are three categories of cancer clusters.

Suspected clusters

When someone is diagnosed with cancer, family and friends in the community reach out to provide comfort and support and people learn of other cases of cancer in their community. This apparent clustering of cancer then becomes a concern and may be reported to health authorities. However, closer investigation usually reveals that the suspected cluster involves several different types of cancer among people of different ages, sexes, and occupations. These cancers often have little in common and are not really clusters at all.

Random clusters

When several cancers occur within a short time period, this may represent a real cluster, but the cluster may not be the result of an increased risk of cancer in a particular community. A community may experience a greater than expected number of cancers in a given year simply due to the possibility of chance. In other years, the expected cases for that particular community may be lower than expected. A time trend analysis of cancer data helps to identify these situations.

Clusters of public health significance

These clusters are the ones that represent a group of people at an unusually high risk of developing cancer. This high risk is due to some factor that the cases have in common or some exposure they have all experienced that has increased their risk of developing cancer. The cancer cases in these clusters are all the same type of cancer which when compared with expected rates for the area are significantly increased. These clusters are the most important to public health officials and may need further investigation.

For More Information

For more information regarding the environment and how it relates to your health or any other topics presented here, please call the N.H. Department of Environmental Services Environmental Health Program at (603) 271-4664

www.des.nh.gov/ard/ehp/



You can also contact the American Cancer Society at 800-ACS-2345, or the National Cancer Institute's Cancernet at: <http://cancernet.nci.nih.gov/>

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