

## Cancers associated with ethylene oxide (EtO) exposure

### What is ethylene oxide (EtO)?

Ethylene oxide (EtO) is a colorless and odorless flammable gas. It is commonly used to make ethylene glycol (a chemical used to make antifreeze and polyester). It is also used to sterilize medical equipment and supplies, drugs, food products, and as an insecticide to control insects in some stored agricultural products (for example, spices and herbs).

Ethylene oxide is considered a carcinogen and can increase the risk of developing breast cancer and certain blood cancers. There are many other factors that can lead to cancer, including family history of cancer and lifestyle choices.

In the United States, approximately 1 in 2 men and 1 in 3 women will develop cancer in their lifetimes. Cancer is the 2<sup>nd</sup> leading cause of death in Utah and the United States, trailing only heart disease. There are steps people can take to lower their overall cancer risk.

### Does ethylene oxide cause cancer?

Breathing in ethylene oxide at elevated levels over decades may cause an increased risk of certain types of cancers and other health problems.

**The Utah Department of Health and Human Services (DHHS) recommends individuals get annual wellness checks and watch for signs and symptoms of cancer.**

### Breast cancer

Breast cancer is a type of cancer that starts in the breast. It can start in 1 or both breasts and is the 2<sup>nd</sup> most common cancer in women. Most breast lumps are benign and not cancer, but some types can increase a person's risk of getting breast cancer.

### Signs and symptoms of breast cancer

- New lump in the breast or underarm (armpit)
- Thickening or swelling of part of the breast
- Irritation or dimpling of breast skin
- Pulling in of the nipple
- Nipple discharge other than breast milk, including blood
- Any change in the size or shape of the breast
- Pain in the breast

# Ethylene oxide

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### Breast cancer screening

A mammogram machine is used to screen for breast cancer. Women aged 40-49 should talk to their doctor about when to start having mammograms and how often they need to have them. Women aged 50-74 should have a mammogram every 2 years. Some women may need to have mammograms at an earlier age or more often depending on their family history of cancer and medical history.

Being familiar with how your breasts look and feel can help you notice symptoms that may be of concern. These could include changes found during a breast self-exam. Tell your doctor or health care provider about concerns you have. The best time to do a breast self-exam is about 3 to 5 days after your period starts.

### How to conduct a breast self-exam



Image from Evangia.B/Shutterstock.com

### Acute lymphocytic leukemia (ALL)

Acute lymphocytic leukemia (ALL) starts in the bone marrow. This is a spongy tissue in the bones where blood cells are made. ALL specifically develops from a type of white blood cell called a lymphocyte. This type of cancer is more common in children than adults and can progress fast.

### Signs and symptoms of ALL

- Low blood cell count
- Weight loss
- Fever
- Night sweats
- Loss of appetite
- Swollen abdomen (belly)
- Enlarged lymph nodes
- Bone/joint pain
- Petechiae or small red spots under the skin (see image below)



Image from Rocky Mountain Cancer Centers

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### Chronic lymphocytic leukemia (CLL)

Chronic lymphocytic leukemia (CLL) starts in the bone marrow. This is a spongy tissue in the bones where blood cells are made. CLL specifically develops from a type of white blood cell called a lymphocyte. In CLL, the leukemia cells often build up slowly. Many people don't have any symptoms for at least a few years. CLL mainly affects older adults and accounts for about one-third of all leukemias.

### Signs and symptoms of CLL

- Weakness
- Feeling tired
- Weight loss
- Chills
- Fever
- Night sweats
- Swollen lymph nodes
- Pain or a sense of "fullness in the belly (this can make someone feel full after only a small meal), which is caused by an enlarged spleen and/or liver

### Non-Hodgkin lymphoma

Lymphoma is a cancer that starts in the lymphocytes, which are cells that are part of the body's immune system.

### Screening for ALL and CLL

There are different types of medical tests that can detect blood cancers like ALL or CLL. These tests include:

- Blood tests
- Bone marrow test
- Chromosome tests
- Lumbar puncture
- Lymph node biopsy
- Imaging test
- Lab tests

### Signs and symptoms of non-Hodgkin lymphoma

- Enlarged lymph nodes
- Chills
- Weight loss
- Fatigue (feeling very tired)
- Swollen abdomen (belly)
- Feeling full after only a small amount of food
- Chest pain or pressure
- Shortness of breath
- Cough
- Severe or frequent infections
- Easily bruising
- Easily bleeding



**Talk with your doctor if symptoms don't improve within 2 weeks or continue to come back.**

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### Multiple myeloma

Multiple myeloma is a cancer of plasma cells. In general, when plasma cells become cancerous and grow out of control, this is called multiple myeloma.

### Signs and symptoms of multiple myeloma

- Bone pain, weakness, or fractures
- Low blood counts
- High blood levels of calcium
- Nerve damage
- Hyper viscosity (thickened blood)
- Kidney problems
- Infections

### Screening for multiple myeloma

There are a variety of lab tests (complete blood count, blood chemistry), biopsies (bone marrow, fine needle aspirations), and imaging tests (x-ray, MRI) that can be performed to screen for multiple myeloma.

### Reduce your cancer risk

- Talk to your healthcare provider if you are experiencing health issues.
- Get screened regularly for early detection.
- Maintain a healthy weight and exercise regularly.
- Avoid smoking and limit alcoholic beverages.

## Resources

### American Cancer Society

[www.cancer.org](http://www.cancer.org)

Call: 1-800-227-2345

### University of Utah – Huntsman Cancer Learning Center

[Cancer Learning Center](http://Cancer.Learning.Center)

Call: 1-888-424-2100 toll free

Text: 801-528-1112

### Utah Department of Health and Human Services (DHHS) Breast and Cervical Cancer Screening Program

[cancerutah.org](http://cancerutah.org)

Call: 1-800-717-1811

## Contact us

### Environmental Epidemiology Program

Email: [EEP@utah.gov](mailto:EEP@utah.gov)

Website: [appletree.utah.gov](http://appletree.utah.gov)

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