Ethylene Oxide Fact Sheet

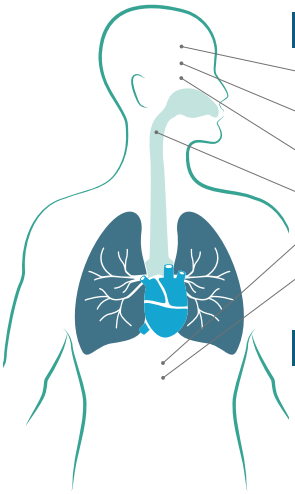
May 2026

Ethylene oxide (EtO) is a colorless gas used to sterilize medical equipment and some food products, as well as make other chemicals. It can also come from combustion, cigarette smoking and vaping, and can be formed naturally and within the human body.

The California Air Resources Board (CARB) and the California Office of Environmental Health Hazard Assessment (OEHHA) are committed to providing clear and accessible information about EtO, where it comes from, its health risks, and the actions California is taking to protect public health.

Recently released draft estimates of cancer risk reflect the best available science and indicate a cause for concern. However, this risk is based on limited air monitoring data with known limitations and uncertainties. Fully understanding the extent of this risk and sources will require additional study and remain an active area of research.

How ethylene oxide (EtO) can affect your health



SHORT-TERM EFFECTS

- Headaches
- Dizziness
- Fatigue
- Nose and throat irritation
- Nausea
- Stomach distress

LONG-TERM EFFECTS

- Non-cancer and cancer effects
- Lymphohematopoietic (white blood cell) cancers
- Breast cancer in women

Current understanding of cancer risk

In May 2026, OEHHA released a draft report with new findings about EtO.

- The report relies on the latest research that would estimate the potential excess cancer risk from long-term exposure.
- Cancer risk can vary widely based on a person's proximity to sources, individual susceptibility, and other factors.
- Based on the research and data from limited air monitoring sites in Southern California, the average excess cancer risk from EtO is approximately 980 in a million.
  - This means that if one million people were exposed to the measured levels of EtO over a lifetime (70 years), it is estimated that approximately 980 of them may develop cancer due to that exposure, in addition to the background rates of developing cancer from all other causes.
  - The estimated risks are more than 10 times the cancer risk associated with benzene and puts it on par with the cancer risk diesel exhaust posed when it was first identified as a major concern in the late nineties.
- It is important to note this does not represent new risk but rather better quantifies existing risk based on current science.
- However, uncertainties remain, including the fact that monitoring very low levels of EtO in the air is difficult.
- CARB is working to improve monitoring and address other uncertainties and will update the risk estimation when better data is available.
- The draft report will be peer reviewed by a panel of experts and public comments will be considered before adoption.

Ethylene Oxide

More research is needed

While the EtO emissions from regulated sources, like sterilization facilities, are well understood – and well-regulated in California – more research is needed to characterize the contributions of other sources of EtO to the air we breathe.

Recognizing the gaps in our understanding, the May Revision to the Governor's 2026 Proposed Budget requests $2.5 million to improve our scientific understanding of two toxic air contaminants, including EtO, to enable risk reduction strategies.

Reducing ethylene oxide emissions now

EtO in California is most commonly used in medical sterilizers. CARB adopted a statewide Air Toxics Control Measure for commercial and non-commercial sterilizers and aerators in 1990 (with updates made in 1998).

Local air districts have adopted additional rules. Notably, there are several large medical sterilizers within the South Coast Air Quality Management District which has adopted more stringent controls. Existing statewide strategies to reduce mobile source emissions and transition to cleaner technologies, as well as efforts from local air districts to reduce wood smoke, may also contribute to reducing EtO emissions from these potential sources.

CARB will spearhead a statewide strategic plan to identify additional control strategies for EtO. This plan will be informed by scientific advancements from the research program, along with considerations for technology readiness, regulatory authority and cost.

Learn more

OEHHA and CARB will host public workshops where community members can learn more about EtO, ask questions and share input. For workshop information, visit *oehha.ca.gov/air/eto-iur*.

For more information on EtO, visit *arb.ca.gov/CARB-EtO-FAQ*.

Sources of ethylene oxide

Medical equipment sterilizer

Chemical manufacturing

Natural processes

Combustion of fuels like wood, gasoline and diesel

Note: EtO has also been detected in rural and remote locations, suggesting that there may be additional sources of EtO as well as potential contributions from long-range transport.

Protect yourself from ethylene oxide

Avoid smoking and vaping

Keep children away from tobacco smoke

Limit exposure to smoke from fires and vehicle exhaust

Learn how to protect yourself from wildfire smoke and get information on real-time air monitoring at *arb.ca.gov/smokereadyca*

Use air cleaners to lower your overall exposure to air pollution