

Ethylene Oxide

Frequently Asked Questions

What is ethylene oxide?

Ethylene oxide (EtO) is a flammable, colorless gas used to sterilize medical equipment, spices, and some plastics. Half of all medical equipment nationwide is sterilized with EtO. EtO is also used in making chemicals for antifreeze and other products. While EtO is widely used, viable alternatives for sterilization and its other applications are available.

How can ethylene oxide affect my health?

Breathing EtO emitted from facilities that use this chemical is known to increase your risk of cancer. Both national and international agencies, including the US Environmental Protection Agency (EPA), have determined that EtO is a carcinogen. Breathing EtO over the course of a life is associated with developing white blood cell cancers such as non-Hodgkin's lymphoma, myeloma, and lymphocytic leukemia. It is also linked to breast cancer in women. Children are especially vulnerable because their cells are dividing rapidly as they grow, and EtO can damage DNA, which is in cells. People who work at facilities that use and produce ethylene oxide also face elevated cancer risks (Reed 2022).

How does ethylene oxide affect my community?

People who live, work, or attend school near a facility that emits EtO may be at risk. Among the most significant emitters of EtO are commercial sterilizers, which use it to sterilize medical equipment and other products. Although the United States has nearly 100 commercial sterilizers, many people may be unaware of nearby facilities, which often look like warehouses.

In 2022, the EPA identified [23 commercial sterilizers in US states and Puerto Rico](#) that emit EtO at levels that increase cancer risk for surrounding communities (EPA 2022). Yet commercial sterilizers are only one type of EtO-emitting facility. Hundreds of other facilities nationwide emit this toxic chemical, and the EPA does not require them to limit EtO emissions to less harmful levels. EtO is used by several types of facilities, including hospital sterilizers, miscellaneous organic chemical manufacturing (MON), manufacturing of polymers and resins (neoprene), synthetic organic chemical manufacturing, polyether polyols

production, and “chemical manufacturing area sources” (known as CMAS).

According to a Union of Concerned Scientists (UCS) analysis, more than 14 million people live within five miles of either of two facility types (including commercial sterilizers) that emit EtO (104 facilities total; see Figure 1, next page). UCS research shows that this is an urgent environmental justice issue. More than 48 percent of the people who live within five miles of these facilities identify as people of color, nearly 32 percent are people with low income, and nearly 8 percent are people with limited English language proficiency.

UCS also found that 28 percent of commercial sterilizers are in “sterilizer hotspots,” which we defined as areas with two or more sterilizers located less than 10 miles apart. Communities in hotspots may be exposed to EtO from more than one facility. In particular, communities with a higher proportion of people of color are more likely to be in sterilizer hotspots, to face higher cancer risks from air toxics, and to be located near facilities that are failing to comply with the Clean Air Act.

EtO emissions are also significant contributors to overall cancer risk from air pollution in these communities. In the census tracts where these 104 facilities are located, EtO emissions contribute to roughly one-third of the total cancer risk from nearly 140 toxic air pollutants.

How can I protect myself and my community?

In 2023, the EPA plans to update standards for commercial sterilizers, requiring stricter emissions controls for ethylene oxide and reducing cancer risks to surrounding communities. The EPA also plans to update regulations for the other facilities that use and emit EtO. Without proper controls, people will continue to be exposed to this cancer-causing chemical. **Make your voice heard (via the [UCS website](#)) by submitting comments urging the EPA to: require strong emissions controls, require these facilities to install fenceline monitors, and require multilingual information on the facilities and risks to surrounding communities.**

FIGURE 1. Two Types of EtO-Emitting Facilities in the United States and Puerto Rico



Living within five miles of the 104 ethylene oxide-emitting facilities shown here are more than 14 million people—many of whom are people of color, people with low income, and/or people with limited English language proficiency. An interactive version of this map is available at the [UCS website](#).

If you are concerned about a commercial sterilizer or other facility in your community that emits EtO, you can contact your state environmental agency or email the EPA at eto@epa.gov.

Less toxic alternatives to ethylene oxide are available. The EPA and the US Food and Drug Administration (FDA) should work to phase out EtO at all commercial sterilizers. The FDA, which regulates medical devices, has [indicated](#) that it seeks to identify alternatives to EtO for sterilizing medical equipment, but the status of that effort is unclear (FDA n.d.). Urge the FDA to approve alternatives; you can email the FDA at cdhr-innovation-sterilization@fda.hhs.gov.

Visit the [UCS website](#) for our full report and interactive map on ethylene oxide risks, an explanatory video, a link to submit a public comment to the EPA, and other helpful community resources. Spanish-language versions of this fact sheet, the interactive map, video, and a press release are on the [Spanish-language UCS website](#).

References

- EPA (US Environmental Protection Agency). 2022. “National Emissions Standards for Hazardous Air Pollutants (NESHAP).” Accessed December 11, 2022. <https://www.epa.gov/stationary-sources-air-pollution/national-emission-standards-hazardous-air-pollutants-neshap-8>
- FDA (US Food and Drug Administration). n.d. “Sterilization for Medical Devices.” Accessed December 16, 2022. <https://www.fda.gov/medical-devices/general-hospital-devices-and-supplies/sterilization-medical-devices>
- Reed, Genna. 2022. “What is Ethylene Oxide? Answers to Your Questions about the Cancer-Causing Chemical.” *The Equation* (blog), October 6. <https://blog.ucsusa.org/genna-reed/what-is-ethylene-oxide-answers-to-your-questions-about-the-cancer-causing-chemical>