Ethylene Oxide. IRIS quick summary. Available at:
https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?&substance_nmbr=1025

Noncancer Assessment

Reference Dose for Oral Exposure (RfD) (PDF) (9 pp, 207 K)
Not assessed under the IRIS Program.

Reference Concentration for Inhalation Exposure (RfC) (PDF) (9 pp, 207 K)
Not assessed under the IRIS Program.

Cancer Assessment

Weight of Evidence for Cancer (PDF) (9 pp, 207 K) last updated: 12/16/2016

WOE Characterization	Framework for WOE Characterization
Carcinogenic to humans (inhalation route)	Guidelines for Carcinogen Risk Assessment (US EPA, 2005)

Basis:

- Under the Guidelines for Carcinogen Risk Assessment (U.S. EPA, 2005), ethylene oxide is "carcinogenic to humans" by the inhalation route of exposure, based on (1) strong, but less than conclusive on its own, epidemiological evidence of lymphohematopoietic cancers and breast cancer in EtO exposed workers, (2) extensive evidence of carcinogenicity in laboratory animals, including lymphohematopoietic cancers in rats and mice and mammary carcinomas in mice following inhalation exposure, (3) clear evidence that EtO is genotoxic and sufficient weight of evidence to support a mutagenic mode of action for EtO carcinogenicity, and (4) strong evidence that the key precursor events are anticipated to occur in humans and progress to tumors, including evidence of chromosome damage in humans exposed to EtO.
- This may be a synopsis of the full weight-of-evidence narrative.

Quantitative Estimate of Carcinogenic Risk from Oral Exposure (PDF) (9 pp, 207 K)
Not Assessed under the IRIS Program.

Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure (PDF) (9 pp, 207 K)
Inhalation Unit Risk: 3×10^{-5} per $\mu g/m^3$
Extrapolation Method: Linear extrapolation. Two-piece linear spline model with knot at 1,600 ppm × days for lymphoid cancer. Two-piece linear spline model with knot at 5,750 ppm × days for breast cancer incidence in females. POD of 1% extra risk was used for both cancer types.
Tumor site(s): Reproductive, immune
Tumor type(s): Lymphoid cancer, (female) breast cancer (Steenland et al., 2003, 2004)
Note: ADAF -- EPA has concluded that ethylene oxide is carcinogenic by a mutagenic mode of action. Application of age-dependent adjustment factors (ADAFs) to the inhalation unit risk is recommended in combination with appropriate exposure data when assessing risk associated with early-life exposure.