



## Styrene

### Key Points



#### Styrene

- Reasonably anticipated to be a carcinogen
- Widely used to make plastics and rubber
- Found in tobacco smoke

#### Report on Carcinogens Status

*Reasonably anticipated to be a human carcinogen*

#### What is styrene?

Styrene is a colorless, flammable liquid, which has a sweet odor and is highly volatile. It is an industrial chemical used to make polystyrene and resins, such as reinforced plastic and rubbers.

#### How is styrene used?

Styrene is widely used to make plastics and rubber, which are used to manufacture a variety of products, such as insulation, pipes, automobile parts, printing cartridges, food containers, and carpet backing.

#### How are people exposed to styrene?

People are exposed to styrene in the workplace and in the environment.

Workers in certain occupations are potentially exposed to much higher levels of styrene than the general population. For example, workers who fabricate boats, car and truck parts, tanks, and bath tubs and shower stalls with glass fiber-reinforced polyester composite plastics, may breathe in high levels of styrene in the workplace. Workers may also absorb styrene through the skin. Exposures in the workplace have decreased over time.

People may be exposed to styrene through breathing indoor air that has styrene vapors from building materials, photocopiers, tobacco smoke, and other products.

Smokers are exposed to styrene because it occurs in cigarette smoke.

Living near industrial facilities or hazardous waste sites is another way people may be exposed to styrene.

Styrene may also leach from polystyrene containers used for food products, but levels of styrene are very low.

#### What evidence is there that styrene causes cancer?

##### Human Studies

The limited evidence for cancer from styrene in humans is from occupational studies showing increased risks for lymphohematopoietic cancers, such as leukemia and lymphoma, and genetic damage in the white blood cells, or lymphocytes, of workers exposed to styrene. There is also some evidence for increased risk of cancer in the pancreas or esophagus among some styrene workers, but the evidence is weaker than that for lymphohematopoietic cancers.

##### Animal Studies

Styrene caused lung tumors in several strains of mice.

##### Mechanistic Studies

Exactly how styrene causes cancer is not fully understood, but styrene is converted, in laboratory animals and humans, to styrene-7,8-oxide, which is listed in the Report on Carcinogens as *reasonably anticipated to be a human carcinogen*. Styrene-7,8-oxide causes genetic damage and has been found in the blood of workers exposed to styrene.

#### What are some things I can do to prevent exposure to styrene?

- Stop smoking. Styrene is found in tobacco smoke.
- Limit children's exposure to tobacco smoke.
- Adhere to federal government regulations.

Workers and employers should practice good occupational health behaviors. This may include wearing protective clothing, respirators, and gloves. Work places should be well ventilated.

#### Where do I go for more information?

National Toxicology Program  
<http://ntp.niehs.nih.gov/go/roc12candidates>

Agency for Toxic Substances and Disease Registry  
<http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=74>

National Institute for Occupational Safety and Health  
<http://www.cdc.gov/niosh/topics/styrene>

Occupational Safety and Health Administration  
<http://www.osha.gov/SLTC/styrene/index.html>



The Report on Carcinogens, Twelfth Edition, is prepared by the National Toxicology Program, an interagency group coordinated by the U.S. Department of Health and Human Services. The report identifies agents, substances, mixtures, or exposures in two categories: *known to be a human carcinogen* and *reasonably anticipated to be a human carcinogen*. **The full Report on Carcinogens is available at <http://ntp.niehs.nih.gov/go/roc12>.**

