



### Summary of Health Effects

Being exposed to benzene over a long period of time can cause cancer in humans, including leukemia.

### How is benzene used?

Benzene has been used in a variety of products including solvents and inks, and as feedstock to make other chemicals. Benzene is also an additive in gasoline and is found in cigarette smoke.<sup>1,2</sup>

### Toxicity: What are its health effects?

The International Agency for Research on Cancer determined that there is sufficient evidence for the carcinogenicity of benzene in humans.<sup>3</sup> The Agency for Toxic Substances & Disease Registry toxicological profile on benzene states that long-term exposure to benzene can cause leukemia.<sup>4</sup> The National Toxicology Program Report on Carcinogens states that benzene is a known human carcinogen.<sup>5</sup> The Environmental Protection Agency (EPA) classified benzene as a known carcinogen for all routes of exposure.<sup>1</sup>

Animals that inhaled benzene showed damage to the hematopoietic (blood cell production) system during development and this damage may continue into adulthood.<sup>2</sup>

### Exposure: How can a person come in contact with it?

A person can come in contact with benzene by breathing it in, eating or drinking contaminated food and water, or from skin contact.

Inhalation is the primary route of exposure for benzene.<sup>4</sup> Many products containing benzene (such as plastics, paints, and glues) release benzene into the air.<sup>2</sup> Benzene is also found in vehicle exhaust and cigarette smoke.<sup>7</sup>

The 2014 National Health and Nutrition Examination Survey (NHANES) detected benzene in urine samples and showed widespread benzene exposure throughout the U.S.<sup>7</sup>

Benzene was identified in the EPA's Urban Air Toxics Strategy as one of 33 hazardous air pollutants that present the greatest threat to public health in urban areas.<sup>6</sup>

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## References

1. U.S. Environmental Protection Agency, Technology Transfer Network (2012). *Hazard summary for benzene*. Retrieved from [www.epa.gov/sites/production/files/2016-09/documents/benzene.pdf](http://www.epa.gov/sites/production/files/2016-09/documents/benzene.pdf)

2. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (1997). *Hazard identification of the developmental and reproductive toxic effects of benzene*. Retrieved from [oehha.ca.gov/media/downloads/proposition-65/chemicals/benzene.pdf](http://oehha.ca.gov/media/downloads/proposition-65/chemicals/benzene.pdf)
3. World Health Organization, International Agency for Research on Cancer (2012). *IARC Monograph on the evaluation of carcinogenic risks to humans, chemical agents and related occupations, volume 100F*. Retrieved from [monographs.iarc.fr/ENG/Monographs/vol100F/mono100F-24.pdf](http://monographs.iarc.fr/ENG/Monographs/vol100F/mono100F-24.pdf)
4. Agency for Toxic Substances and Disease Registry (2007). *ATSDR Toxicological profile for benzene*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services. Retrieved from [www.atsdr.cdc.gov/toxprofiles/tp.asp?id=40&tid=14](http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=40&tid=14)
5. U.S. Department of Health and Human Services, National Toxicology Program (2014). *Report on carcinogens, thirteenth edition*. Retrieved from [ntp.niehs.nih.gov/ntp/roc/content/profiles/benzene.pdf](http://ntp.niehs.nih.gov/ntp/roc/content/profiles/benzene.pdf)
6. Centers for Disease Control and Prevention (2014). *Fourth report on human exposure to environmental chemicals, updated tables, (August, 2014)*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Retrieved from [www.cdc.gov/exposurereport/](http://www.cdc.gov/exposurereport/)
7. Environmental Protection Agency, National Air Toxics Program: Integrated Urban Strategy (1999). *List of the 33 urban air toxics*. Retrieved from [www2.epa.gov/sites/production/files/2014-08/documents/07061999-fs-air-toxics-strategy.pdf](http://www2.epa.gov/sites/production/files/2014-08/documents/07061999-fs-air-toxics-strategy.pdf)