



FACT SHEET

BENZENE

CAS #: 71-43-2

This fact sheet provides a summary of the Development Support Document (DSD) created by the Toxicology Section (TS) of the Texas Commission on Environmental Quality (TCEQ) for the development of [Regulatory Guidelines](#) (ESL and ReVs) for ambient exposure to this chemical. For more detailed information, please see the [DSD](#) or contact the TS by phone (1-877-992-8370) or e-mail (tox@tceq.state.tx.us).

What is benzene?

Benzene is a clear liquid that readily evaporates into the air. Benzene is a widely used industrial chemical. It is used to make glues and lubricants to certain drugs, and it is also contained in crude oil and gasoline. It is also called annulene, benzol, benzole, coal naphtha, cyclohexatriene, phene, phenyl hydride, pyrobenzol, pyrobenzole, polystream, benzol coal naphtha, benzine, motor benzol, and mineral naphtha.

How is benzene released into ambient air?

Benzene is released into the air from a variety of sources, including the production of gasoline, gasoline stations, exhaust from your car, tobacco smoke, and natural sources (volcanoes, forest fires). The United States Environmental Protection Agency has indicated that benzene emissions from mobile sources (automobiles, construction equipment, lawnmowers, etc.) account for about two-thirds of the total benzene emissions in Texas, with major facility sources and area/other sources (refineries, gas stations) comprising the remainder.

How can benzene affect my health?

Permitted levels of benzene should not cause adverse health and welfare effects. Both human and laboratory animal studies indicate that damage to blood cells is the most sensitive effect of breathing high levels of benzene. Some occupational workers, who have been exposed to some of the highest air concentrations of benzene for years, experienced a decrease in the number of white blood cells circulating in their blood. Short-term studies in laboratory animals exposed to high benzene air concentrations have confirmed that effects on blood cells are the main concern.

Workers exposed to long-term, high concentrations of benzene in the air have also shown a higher occurrence of cancer known as acute myelogenous leukemia (AML). As a result, several agencies, such as the TCEQ, the United States Environmental Protection Agency, the National Toxicology Program, and the International Agency for Research on Cancer, have designated benzene as a human carcinogen.

Is benzene odorous or harmful to plants?

Benzene has a sweet-solventy odor at high concentrations. No information was located regarding the potential effects of benzene on plants.



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Why does the TCEQ set Regulatory Guidelines for benzene?

The TCEQ has set various air quality guideline levels (ESLs and ReVs) to protect human health and welfare. Please see the [Regulatory Guideline Fact Sheet](#) for more information on ESLs and ReVs. The ESLs and ReVs for benzene have been designed to protect the general public from short-term and long-term adverse health and welfare effects. The general public includes children, the elderly, pregnant women, and people with pre-existing health conditions. If you would like to know more about the specific ESLs and ReVs developed, what the values are and what they are used for, please see the [DSD](#).

Study links Texas birth defects to benzene levels

Air pollutant tied to birth defect

Study shows women who live in areas with high levels of benzene are most affected

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Women who live in Texas neighborhoods with higher levels of benzene, a pollutant from refineries and tailpipes, are more likely to have babies with a serious neurological defect, according to a new study.

Scientists have long known that the highly toxic chemical can cause cancer and damage the immune system.

But the new study links benzene to a birth defect for the first time and adds to the growing body of evidence showing that air pollution can harm a fetus, the authors said.

A team of researchers from the University of Texas School of Public Health and Texas Department of State Health Services conducted the study, which appeared in the journal *Environmental Health Perspectives*.

The study suggested that pregnant women exposed to the highest concentrations of benzene had two times greater risk for their children to be born with spina bifida — a condition in which a piece of the spinal cord protrudes from the spinal column.

People with spina bifida may have paralysis of all or part of the lower body. They also may have water on the brain, learning disabilities and depression.

Benzene can pass from mother to fetus through the placenta, possibly causing damage to DNA material. The defects occur during the first month of pregnancy.

"Spina bifida is a relatively rare birth defect, and though our study may show greater risk if one lives in an area with high levels of benzene, the absolute risk is still very small," said Philip Lupo Jr., one of the study's authors and an epidemiologist at the UT School of Public Health.

Other pollutants

At the same time, the study's authors did not find statistically significant ties between neural tube defects such as spina bifida and other air pollutants - toluene, ethylbenzene and xylene.

The researchers studied data on live births, stillbirths and aborted fetuses with neural tube defects in Texas from 1999 to 2004 and U.S. Census tract-level emissions estimates.

They found that the risk of spine bifida more than doubled for those living in areas with estimated benzene concentrations greater than 3 micrograms per cubic meter of air. Federal data shows Harris, Bexar, Jefferson and Travis counties had median concentrations of benzene between 1.38 micrograms and 4.93 micrograms in 1999.

Texas leads the nation in benzene releases, accounting for more than one-third of emissions among the states. But Texas' benzene emissions have dropped 37 percent over the past five years, the U.S. Environmental Protection Agency's latest data shows.

Elena Craft, an Austin-based health scientist for the Environmental Defense Fund, who was not involved in the study, said the greater risk for spina bifida is significant.

In Texas, she noted, it's cause for concern, because state regulators don't consider chronic benzene concentrations less than 4.5 micrograms per cubic meter of air to be hazardous enough to affect health. Michael Honeycutt, chief toxicologist for the Texas Commission on Environmental Quality, said the agency would take a closer look at the study.

"This link to spina bifida at lower concentrations of benzene is interesting," he said.

Multivitamin intake

Honeycutt said he wanted more information about the women's use multivitamin pills containing folic acid. A recent study found that those who lived within a mile of an industrial facility or waste site are less likely to take the multivitamins, he said.

The authors acknowledge that lack of information on the maternal use of folic acid is one of the study's potential limitations.

But they noted that a recent study found little evidence linking neural tube defects and folic acid intake since a federal order to add the B vitamin to enriched grain products in 1998.

Lupo said the researchers intend to take a closer look at the mothers' lives, such as daily exposure to benzene and diet, in future studies.

"We see this study as a first step," he said. "It is not the end of the story."

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