

This fact sheet answers the most frequently asked health questions (FAQs) about hexamethylene diisocyanate. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to hexamethylene diisocyanate occurs mainly in the workplace, where it is used as a paint hardener. Hexamethylene diisocyanate may cause an allergic, asthma-like syndrome, consisting of coughing, wheezing, and shortness of breath. This chemical has been found in none of the 1,445 National Priorities List sites identified by the Environmental Protection Agency.

What is hexamethylene diisocyanate?

(Pronounced hex'uh-meth'el-een di i'so-si'an-ate)

Hexamethylene diisocyanate is a pale yellow liquid with a strong odor. It is an industrial chemical that is not known to occur naturally. It is also commonly known as HDI, 1,6-hexamethylene diisocyanate, 1,6-diisocyanatohexane, Mondur HX, and Desmodur H.

Hexamethylene diisocyanate is mainly used to make polyurethane foams and coatings. It is also used as a hardener in automobile and airplane paints.

What happens to hexamethylene diisocyanate when it enters the environment?

- Hexamethylene diisocyanate may be found in air near areas where spray paints containing it as a hardening agent are applied.
- It does not appear to be transported long distances in air.
- Hexamethylene diisocyanate does not easily evaporate from water into air.
- Hexamethylene diisocyanate will break down very quickly into other chemicals in water and soil.
- It does not build up in the food chain.

How might I be exposed to hexamethylene diisocyanate?

- By spray-painting a car with a paint that contains it as a hardening agent.
- Working in an industry or business in which hexamethylene diisocyanate is used.
- Drinking tap water contaminated with it.
- Living near a hazardous waste site where hexamethylene diisocyanate is disposed of.

How can hexamethylene diisocyanate affect my health?

People exposed to hexamethylene diisocyanate for a long time (a few months to a few years) have shown an allergic, asthma-like syndrome. The symptoms consist of shortness of breath, wheezing, bronchitis, and coughing. These symptoms are not usually seen when the person is not using a product that contains hexamethylene diisocyanate, but will start up again when they begin to use hexamethylene diisocyanate products again.

Laboratory animals exposed to very high concentrations of hexamethylene diisocyanate had pneumonia and difficulty in breathing, and some died. Studies in animals

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have also shown that breathing high concentrations can irritate the eyes, nose, and throat. When placed on the skin of animals, hexamethylene diisocyanate caused redness, irritation, and skin damage.

It is not known whether hexamethylene diisocyanate can affect reproduction in people or animals.

How likely is hexamethylene diisocyanate to cause cancer?

The Department of Health and Human Services, the International Agency for Research on Cancer, and the Environmental Protection Agency (EPA) have not classified hexamethylene diisocyanate as to its human carcinogenicity.

No carcinogenicity studies are available in people. An animal study showed no increase in cancer when rats breathed air containing hexamethylene diisocyanate for 2 years.

Is there a medical test to show whether I've been exposed to hexamethylene diisocyanate?

Tests are available that measure the antibodies in your blood made by your body after you have been exposed to hexamethylene diisocyanate. However, there are problems with these tests: antibodies can react with other substances that look like hexamethylene diisocyanate in your blood and indicate that you have been exposed to hexamethylene diisocyanate when you have not been. In addition, some people do not develop antibodies to hexamethylene diisocyanate after they have been exposed.

A test is available that measures hexamethylene diisocyanate in your urine. However, this test only works if you were exposed to the chemical within the last 12 to 15 hours. It is not a good test to find out if you have been

exposed to low amounts of hexamethylene diisocyanate over many months or years.

Has the federal government made recommendations to protect human health?

The EPA requires that spills or accidental releases into the environment of 100 pounds or more of hexamethylene diisocyanate be reported to the EPA.

The National Institute for Occupational Safety and Health and the American Conference of Governmental Industrial Hygienists recommend that workers should not breathe air containing more than 0.035 milligrams of hexamethylene diisocyanate per cubic meter of air (0.035 mg/m³) during a 10-hour workday, 40-hour workweek.

Glossary

Antibodies: Substances produced by the body to fight agents causing disease.

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1998. Toxicological profile for hexamethylene diisocyanate. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.