

Frequently Asked Questions (FAQs)
Carcinogenic Emissions
Wisconsin Environmental Public Health Tracking
November 2008

What is a carcinogen?

What is a carcinogenic emission?

Which carcinogenic emissions are the focus of the WI EPHT?

What is the relationship between carcinogenic emissions and health?

What are the health effects from carcinogenic emissions?

How do you determine the health effects from carcinogenic emissions?

How am I exposed to carcinogenic emissions?

What can I do to protect myself from carcinogenic emissions?

How does WI EPHT measure carcinogenic emissions?

What are some limitations on interpreting carcinogenic emissions data?

Where can I find out more information about each pollutant?

What is a carcinogen?

A carcinogen is a compound that is known to cause cancer or promote the growth of cancerous tumors. The link to cancer is influenced by the amount of something a person is exposed to (dose) and the duration of the exposure.

What is a carcinogenic emission?

Carcinogenic emissions are cancer-causing compounds that are released from industries. Exposure can occur from the air, water, land and contaminated food supplies. The amount of compound released is reported annually to the Wisconsin Department of Natural Resources.

Which carcinogenic emissions are the focus of the WI EPHT?

The goal of the WI EPHT is to provide data that helps track the linkages between the environment and health. The WI EPHT focuses on carcinogenic emissions in the air.

Initially, the WI EPHT examined the full set of air contaminants. Then the list was narrowed to include only those meeting the criteria of carcinogenic because they will be useful when WI EPHT makes a future linkage with cancer data. To qualify, it was classified as carcinogenic:

- By both the US EPA (classified as a Group A “Human Carcinogen”) and the International Agency for Research on Cancer (IARC) (classified as a Group 1 “the agent is carcinogenic to humans”). The compounds that met this criteria include:
 - arsenic,
 - asbestos,
 - benzene,
 - benzidine,
 - bis(chloromethyl)ether,
 - chloromethyl methyl ether,
 - chromium VI,
 - coke oven emissions,
 - nickel refinery dust*,
 - nickel subsulfide*,
 - vinyl.
- Or, it met the criteria of US EPA Groups B1 or B2 (“probable human carcinogen”) plus the IARC classification of Group 1. These compounds are:
 - beryllium,
 - cadmium,
 - dioxin*

- ethylene oxide. Nickel compounds and dioxin were both excluded due to difficulties calculating a benchmark dose.
- Or, they have widespread production in Wisconsin and probably links to cancer. These compounds are:
 - diesel particulates,
 - perchlorethylene
 - trichloroethylene)

The final list of compounds included is:

	Carcinogenic Classifications	
	IARC	EPA
Arsenic	1	A
Benzene	1	A
Benzidine	1	A
Beryllium compounds	1	B2
Bis(chloromethyl)ether	1	A
Cadmium	1	B1
Chlormethyl methyl ether	1	A
Chromium VI	1	A
Coke oven emissions	1	A
Diesel particulate matter	2A	not categorized
Ethylene oxide	1	B1
Perchlorethylene	2A	B2
Trichlorethylene	2A	B2
Vinyl chloride	1	A

*These compounds were excluded due to inability to convert concentrations to cancer risk values.

What is the relationship between carcinogenic emissions and health?

It is generally believed that environmental contaminants in the air play a role in causing cancer. The exact degree contaminants have in causing cancer is unknown because there are other factors involved, e.g., lifestyle choices such as tobacco use. It is believed approximately 10% of cancers are related to environmental factors. While the data presented here cannot be used to measure links between cancer and the environment, they can be used to help prioritize emission sources that are of the greatest concern, identify locations of interest for further investigation, provide a starting point for local-scale assessments and inform monitoring programs.

What are the health effects from carcinogenic emissions?

The compounds presented for this topic are most closely associated with cancer as a health effect. However, the amount of exposure and length of time exposed are necessary to cause cancer are not well understood. It is likely environmental factors like emissions play less of a role in cancer than lifestyle choices such as tobacco use, unhealthy diet, obesity and excessive sun exposure. Respiratory irritation and neurological effects have been seen at lower levels of exposure to contaminants. The data presented here cannot be used to measure links between cancer and the environment, but provides one of the many pieces of determining the link between a specific pollutant and specific types of cancer.

How do you determine the health effects from carcinogenic emissions?

Measuring the link between cancer and carcinogenic emissions is a complex issue. The data presented here cannot be used to measure links between cancer and the environment because they are only part of the many steps that can help determine links between a specific pollutant and specific type of cancer. The health effect varies based on the amount of exposure and the length of time exposed.

The data presented are based on models that estimate the amount of the compound in the air during the year it was reported (1999). The estimates are used to classify certain areas of the state as having higher or lower risk of developing cancer if individuals are exposed to this amount of pollution continuously over 70 years. Thus, these

data can't be used to identify individual risk, but it does provide an estimate of how population risk is affected by emission.

How am I exposed to carcinogenic emissions?

“People are exposed to toxic air pollutants in many ways that can pose health risks, such as by:

- **Breathing contaminated air, which is the most likely route of exposure for carcinogenic emissions.**
- Eating contaminated foods, such as fish from contaminated waters; meat, milk, or eggs from animals that fed on contaminated plants; and fruits and vegetables grown in contaminated soil on which air toxics have been deposited.
- Drinking water contaminated by toxic air pollutants.
- Ingesting contaminated soil. Young children are especially vulnerable because they often ingest soil from their hands or from objects they place in their mouths.
- Touching (making skin contact with) contaminated soil, dust, or water (for example, during recreational use of contaminated water bodies).

What can I do to protect myself from carcinogenic emissions?

The first step is to view detailed data about your region. The data presented on the website are based on models that estimate the amount of compounds in the air and were taken in 1999. By contacting your regional Department of Natural Resources representative, you may be able to obtain more specific data results from samples taken in your region recently. While data are collected, they are sent to the US Environmental Protection Agency to be modeled. Once they are available, they will be provided on the WI EPHT.

How does WI EPHT measure carcinogenic emissions?

The WI EPHT program uses the public data provided by the US EPA from their National-Scale Air Toxics Assessment project (<http://www.epa.gov/ttn/atw/natamain/>). Data from the 1999 assessment are used (<http://www.epa.gov/ttn/atw/nata1999/>). Data specific for carcinogenic compounds are selected and included on the WI EPHT website. The measures are the concentrations of each chemical in the outdoor air as a result of industrial emissions.

What are some limitations on interpreting carcinogenic emissions data?

Below are some limitations to consider when interpreting the carcinogenic emissions data on the WI EPHT website

- The values presented are totals for a full year, and only for one year (1999). They do not have any information for emission levels for any specific point in time.
- The values are modeled data based on emissions data, and are not the same as individual human exposures.

Where can I find out more information about each pollutant?

Below is a table listing each of the compounds found on the WI EPHT. Here is a description of the types of documents found at the links in the table:

- The EPA Fact Sheets explain the basics about each compound.
- The National Toxicology Program (NTP) Documentation is a 1-3 page summary of technical toxicology information.
- The Agency for Toxic Substances and Disease Registry (ATSDR) Toxicology Profiles are a comprehensive technical report of toxicology information about each contaminant.

	EPA Fact Sheets	NTP Documentation	ATSDR Toxicology Profiles
Arsenic	http://www.epa.gov/ttn/atw/hlthef/arsenic.html	http://ntp.niehs.nih.gov/ntp/roc/eleventh/profiles/s015arse.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp2.html
Benzene	http://www.epa.gov/ttn/atw/hlthef/benzene.html	http://ntp.niehs.nih.gov/ntp/roc/eleventh/profiles/s015benz.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp2.html

	http://www.epa.gov/ttn/atw/hlthef/benzene.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s019benz.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp3.html
Benzidine	http://www.epa.gov/ttn/atw/hlthef/benzidin.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s020benz.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp62.html
Beryllium compounds	http://www.epa.gov/ttn/atw/hlthef/berylliu.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s022beryll.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp4.html
Bis(chloromethyl)ether	http://www.epa.gov/ttn/atw/hlthef/chlorome.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s039bcme.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp128.html
Cadmium	http://www.epa.gov/ttn/atw/hlthef/cadmium.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s028cadm.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp5.html
Chlormethyl methyl ether	http://www.epa.gov/ttn/atw/hlthef/cadmium.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s039bcme.pdf	not available
Chromium VI	http://www.epa.gov/ttn/atw/hlthef/chromium.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s045chro.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp7.html
Coke oven emissions	http://www.epa.gov/ttn/atw/hlthef/cokeoven.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s049cok.pdf	
Diesel particulate matter	not available	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s069dies.pdf	not available
Ethylene oxide	http://www.epa.gov/ttn/atw/hlthef/ethylene.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s085ethy.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp137.html
Perchlorethylene	http://www.epa.gov/ttn/atw/hlthef/tet-ethy.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s169tetr.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp18.html
Trichlorethylene	http://www.epa.gov/ttn/atw/hlthef/tet-ethy.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s180tce.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp19.html
Vinyl chloride	http://www.epa.gov/ttn/atw/hlthef/vinylchl.html	http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s186viny.pdf	http://www.atsdr.cdc.gov/toxprofiles/tp20.html

References:

1. U.S. Environmental Protection Agency, "About Air Toxics", <http://www.epa.gov/ttn/atw/allabout.html#exposed>
2. U.S. Environmental Protection Agency, "About Air Toxics", <http://www.epa.gov/air/toxicair/newtoxics.html>
3. International Agency for Research on Cancer, "Complete List of Agents Evaluated and their Classification", <http://monographs.iarc.fr/ENG/Classification/index.php>
4. U.S. Environmental Protection Agency, "Health Effects Notebook for Hazardous Air Pollutants", <http://www.epa.gov/ttn/atw/hlthef/hapindex.html>
5. U.S. Environmental Protection Agency, "Integrated Risk Information System," <http://www.epa.gov/iris>