



**Bureau of Environmental Health
and Radiation Protection**

“Protect and improve the health of all Ohioans by preventing disease, promoting good health and assuring access to quality care.”

Manganese

(man'-guh - neez)

Answers to Frequently Asked Health Questions

What is manganese?

Manganese is an element found in nature. Pure manganese is a silver metal that has no special smell or taste. Pure manganese combines with other elements to form different manganese compounds.

Manganese is an essential (needed) nutrient that plays an important role in our health. Everyone comes in contact with small amounts of manganese in air, water and food. Low levels of manganese are found in living things such as plants and animals. For nearly all people, food is the main source of manganese.

Manganese is also found in many types of rocks. Rocks with high levels of manganese compounds are mined and used to produce manganese metal. This metal is mixed with iron to make manganese steel.

Some manganese compounds are used in making batteries, found in diet supplements and used as ingredients in some ceramics, pesticides and fertilizers.

Can manganese make you sick?

Although manganese is a needed nutrient, you can get sick from breathing and eating or drinking (ingesting) high levels of manganese for long periods of time.

Getting sick will depend upon:
How much you were exposed to (dose).
How long you were exposed (duration).
How often you were exposed (frequency).
General Health, Age, Lifestyle

Young children, the elderly and people with chronic (on-going) health problems are more at risk to chemical exposures.

The health problems caused by breathing manganese dust include lung irritation and inflammation. It is likely that lung irritation begins shortly after exposure and continues for the duration of the exposure. *It is important to note that this inflammation and irritation is not unique to manganese-containing particles but is characteristic of nearly all particulate matter inhaled (such as dust, pollen, etc.).

It is unknown what effects occur at low-level exposures. Long-term exposure with manganese at very high levels may result in permanent neurological (brain and central nervous system) damage.

How health problems are seen with exposure to manganese?

Health problems, especially problems with the brain and central nervous system, occur on a “continuum of dysfunction” that is dose-related. In other words, if you are exposed to normal levels of manganese, you would not expect to see any health problems. If you are exposed to increased levels of manganese, very mild or unnoticeable effects may be or may not be seen. Health problems appear to increase in severity as the exposure levels and duration increases.

People who have long-term exposure (contact) to high levels of manganese compounds may develop central nervous system problems which look like Parkinson’s disease. This syndrome is called “manganism.”

Symptoms include a general feeling of weakness, slow, clumsy movements with “heavy” arms and legs. Early symptoms also include slow or halting speech without tone or inflection and a dull and emotionless facial expression. Other symptoms include

anorexia (severe weight loss), muscle pain, nervousness, irritability (emotionally upset), and headaches. People may be seem apathetic (a feeling of not caring) and dull. Other symptoms are impotence and loss of libido (sexual activity problems).

People who may have contact with higher levels of manganese include:

Workers in a factory where manganese metal is produced or where manganese compounds are used to make steel or other products. In these factories workers would be exposed mainly by breathing in manganese dust if not properly protected.

People who live near a factory that releases large amounts of manganese dust (particles) into the air.

Communities who live near a coal or oil burning factory because manganese is released into the air when these fossil fuels are burned.

People who do not correctly use pesticides (bug killers) such as maneb and mancozeb will be exposed to higher levels.

How can manganese affect children?

Remember that a daily intake of small amounts of manganese is needed for growth and good health in children and adults. A pregnant mother transfers the needed manganese to her baby during pregnancy. Manganese is also found in a nursing mother's breast milk at levels that are needed for proper development of a baby.

In most situations, there is no need to reduce the exposure to manganese because it is a needed nutrient for good health.

If the body comes in contact with higher levels of manganese, it will be naturally removed through the bodily function of waste removal. Children, as well as adults, who come in constant contact with high levels of manganese and lose the ability to remove excess from their bodies, may develop nervous system problems.

People who live near a factory that releases large amounts of manganese dust (particles) in the air may see excess levels of manganese present in the soil around that

factory. Because children are more likely to play outside in the soil, there is concern that children may be more at risk to the toxic effects of excess manganese. It is important to discourage hand-to-mouth activity in young children who live in areas that may have increased manganese levels in the soil.



Is there a medical test to show whether you have been exposed to manganese?

There are different tests to show levels of manganese in body fluids. Fluids such as blood, urine and feces can measure excess levels of manganese. Scalp hair can also be used.

Keep in mind that these tests may show the amount of manganese in your body but cannot tell you whether you will have any health problems. These tests also cannot tell you where the manganese came from.

Does manganese cause cancer?

The Environmental Protection Agency (EPA) concluded that current scientific data cannot determine whether exposure to excess manganese can cause cancer.

Has the federal government made recommendations to protect human health?

The U.S. EPA has set a Secondary Maximum Contaminant Level (SMCL) for manganese in public water supplies of 50 ppb. NOTE: The SMCL guidelines set by the EPA are not

health-based, but are based upon water aesthetics. Aesthetics include odor, taste, color and clarity. The US EPA has established a Life-time Health Advisory value of 300ppb for manganese in drinking water.

The National Research Council (NRC) has recommended safe and adequate daily intake levels for manganese that range from 0.003 for infants 0-6 months, 0.6 mg/day for children from 7 months to 1 year, 1.2 mg/day for children 1 to 3 years and 1.5 mg/day for children from 4 to 8 years. For daily intake levels for girls and boys ages 9-14 and 13-18 years, please reference the following NRC 2001 Dietary Reference Intakes for manganese at:

http://books.nap.edu/openbook.php?record_id=10026&page=405

References:

Agency for Toxic Substances and Disease Registry (ATSDR). 2012. Toxicological profile for manganese. Atlanta, GA: U.S.

Department of Health and Human Services, Public Health Service

Where Can I Get More Information?

Ohio Department of Health
Bureau of Environmental Health and Radiation Protection
Radiological Health and Safety Section
246 N. High Street
Columbus, Ohio 43215
Phone: (614) 644-2727

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