

Manganese Air Guidance

OCTOBER 2025

Manganese is a naturally occurring metal that is found in all parts of the environment – air, soil, dust, water – where it combines with other elements like oxygen, sulfur, and chlorine. It is also present in various industrial processes. Manganese is widely used in the steel industry to enhance hardness and strength, and it is added to gasoline to improve engine performance.

Manganese doesn't break down in the environment. Instead, it becomes attached to or separated from other particles or chemicals.

Manganese is an essential element, and eating a small amount of it daily is important for the human body to stay healthy. Being exposed to either too little or too much manganese may lead to harmful health effects. Adults and children normally get enough manganese through their diet.

Ways you are exposed to manganese in air

- Breathing naturally occurring manganese in the air around us
- Working or living in an area impacted with manganese as part of an industrial or manufacturing process
- Living near areas with high motor vehicle emissions
- Inhaling tobacco smoke, which contains manganese along with many other chemicals

Potential health concerns from breathing manganese

In human and animal studies, harmful effects to the nervous system – collectively known as neurotoxicity – are the health effects observed at the lowest manganese exposure levels. Human and animal studies show that breathing higher levels of manganese may also cause lung irritation and reproductive system effects in males.

The U.S. Environmental Protection Agency (EPA) has concluded that the existing scientific information cannot determine whether or not excess manganese can cause cancer.

Manganese Risk Assessment Advice

Sufficient toxicity data allowed MDH to use an expedited process to develop Risk Assessment Advice (RAA) for chronic manganese exposures (see table). Neurotoxicity is the critical effect, and this is associated with subtle impacts to mood, movement, and thinking ability. The chronic RAA is a level in air that is likely to pose little or no risk to human health over that time period, and it is protective for the general public, including subpopulations who are at greater risk.

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Breathing an amount of manganese that is above the chronic RAA does not mean health effects will occur; however, the risk for health effects can increase as the

Duration	2025 RAA ($\mu\text{g}/\text{m}^3$)	Health Endpoint
Chronic (>1 year-to a lifetime)	0.1	Nervous system

level of exposure and / or time of exposure increases. When air guidance values are exceeded, MDH recommends taking steps to reduce or avoid exposures.

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