If you are exposed to high levels of manganese, you are at risk for severe health effects.

**AIR:**
- You can absorb manganese mostly by breathing manganese dust.
- There are high levels of manganese dust in the air near mining and processing activities of manganese.

**GROUNDWATER:**
- There can be high levels of manganese in ground water from pollution or rock elements, especially near mining activities.

**FOOD OR DRINKING WATER:**
- You can expose yourself to manganese if you eat or drink contaminated food or drinking water.

**YOU ARE AT RISK IF YOU...**
- Work in the mining or processing of manganese.
- Work in the manufacturing of steel.
- Work in the production of fertilizers or fungicides.
- Work in the production of manganese oxide or dry-cell batteries.
- Live near manganese mining activities.
- Live near industries using manganese.

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**MANGANISM (Chronic Manganese Poisoning):** You may have Manganism if you experience:...

In the beginning:...
- Feelings of weakness
- Irritability
- Indifference and apathy
- Aggressiveness or excitability
- Hallucinations
- Sleepiness
- Loss of appetite
- Headache

**Metal Fume Fever** symptoms include:...
- Chills and fever
- Upset stomach
- Vomiting
- Dryness of throat

**Air:**
- Manganese can cause you to cough more often.
- Manganese can cause bronchitis and pneumonia.
- Manganese can cause an illness similar to influenza called manganese pneumonitis.
- Manganese can cause chronic obstructive lung disease.

**Groundwater:**
- Manganese can weaken your lungs, making it more difficult to breathe.
- Manganese can cause an illness called metal fume fever.
- Manganese can result in permanent brain damage if you have been exposed to high levels for long periods of time.

**Water:**
- Manganese can cause bronchitis and pneumonia.
- Manganese can affect your brain in a way that impacts on your ability to think clearly. This is usually one of the first signs of manganese poisoning.
- Manganese can cause an illness called metal fume fever.
- Manganese can cause an illness called manganese pneumonitis.
- Manganese can cause chronic obstructive lung disease.

**Food or drinking water:**
- You can expose yourself to manganese if you eat or drink contaminated food or drinking water.

**Highlight:** You are especially vulnerable to manganese dust if you work in mining, smelting operations, or the processing of manganese ores.

**Highlight:** If you are exposed to high levels of manganese, you are at risk for severe health effects.

**How can manganese affect my lungs?**
- You can absorb manganese mostly by breathing manganese dust.
- There are high levels of manganese dust in the air near mining and processing activities of manganese.

**How can manganese affect my brain?**
- Manganese can affect your brain in a way that impacts on your ability to think clearly. This is usually one of the first signs of manganese poisoning.
- Manganese can cause an illness called metal fume fever.
- Manganese can cause an illness called manganese pneumonitis.
- Manganese can cause chronic obstructive lung disease.

**How long and length of exposure to manganese is what determines the effects. High levels and long periods of exposure are poisonous and dangerous.**

**Manganism symptoms may...**
- Appear slowly over months and years in different strengths.
- Appear together or in isolation.
- Improve when exposure to manganese stops. [However, in most cases, the symptoms continue for many years even after exposure to manganese ends.]
- Your condition becomes worse.
- Keeping balance is difficult.
- Your movements are slow.
- Tremors appear.
- Sweating or blushing.
- You forget things.
- Writing becomes difficult.
- You may be completely disabled.

Within a few months, disease continues to progress and cannot be reversed...

High levels and prolonged periods of manganese exposure can cause a condition known as Manganism.
**How can Manganese Affect my Children?**

- **Children are more sensitive to manganese than adults.**
- **Manganese levels in soil or water may be higher when near a mining district or industry using manganese.** As a result, there may be a higher risk to children who swallow contaminated soil by putting their hands in their mouth as children often do or by eating or drinking contaminated food or water.
- **High levels of manganese exposure in children may produce:**
  - changes in personality
  - difficulty in learning
  - negative effects on the development of the brain and muscles
  - Exposure during pregnancy or exposure from a spouse who is exposed to high levels of manganese may result in later problems with the child’s memory or attention.
  - Abortion or stillbirths can result for pregnant mothers exposed to manganese either directly or from contact with husbands exposed to manganese.
  - Workers may accumulate manganese dust on their work clothes and expose their families to the manganese dust when they come home.

**Mothers should not breast feed near a mining area or where manganese dust exists since this can contaminate the mother’s milk.**

**How can Manganese Affect my Children?**

- **Do’s and Don’t at the Manganese Mining Site**
  - At the mining site, to protect yourself from dust:
    - try to avoid dust becoming airborne (e.g. by covering piles and filling the sort material in sacks right away);
    - use facial masks; and
    - use working clothes that cover your skin.
  - Do not eat or drink contaminated food:
    - separate the working areas from areas where you eat and drink;
    - wash thoroughly before you eat and drink;
    - avoid drinking the water at the site, since it might be contaminated.
  - Do not allow children to stay at the mining site, since they are likely to swallow contaminated soil by putting their hands in their mouth, as children often do, or by eating or drinking contaminated food or water.

- **For further information, please contact**
  - BAPPEDA Provinsi Nusa Tenggara Timur
    - Jl. Polisi Militer No. 2 Kupang-NTT
  - ILO-East Programme
    - ILO Jakarta Office
    - Menara Thamrin, Level 22
    - Jl. M. H. Thamrin No. 3 - Jakarta 10250
    - Tel.: (021) 391 3112
    - Fax: (021) 310 0766
    - Email: jakarta@ilo.org
    - Website: www.ilo.org/jakarta

- **Do not eat or drink contaminated food:**
  - separate the working areas from areas where you eat and drink;
  - wash thoroughly before you eat and drink;
  - avoid drinking the water at the site, since it might be contaminated.

- **Do not allow children to stay at the mining site, since they are likely to swallow contaminated soil by putting their hands in their mouth, as children often do, or by eating or drinking contaminated food or water.**