

Arsenic and Health

Are you Living in an Area with Mine Tailings?



Did you know?

- Mine tailings from gold mining often contain high levels of arsenic.
- Arsenic in mine tailings may be harmful to health.
 - Most people have only a very small chance of being affected.
 - Babies and young children are more likely to be affected than adults.
 - Children who eat small handfuls of mine tailings are especially at risk—they may even get arsenic poisoning.
- If you live near mine tailings, you can reduce the risk to your health by reducing the amount of soil and dust that you swallow.
- Fruit and vegetables that are grown on mine tailings may absorb arsenic.
 - Eating fruit and vegetables with raised levels of arsenic may sometimes be harmful to health.

Many towns and cities in Victoria have been built in areas with a history of gold mining. Mine tailings that contain arsenic are spread over large areas of land, including land now used for housing.

This booklet contains information for people who live in these areas. It gives information on what you need to know and actions you can take to protect your family's health.



What is arsenic?

Arsenic is a substance that is found naturally in rock, often near gold deposits. It has been used to kill insects that attack animals, timber, fruit and vegetables. In some situations, arsenic causes health effects in people.

What are mine tailings and why do they contain high levels of arsenic?

When gold is mined, rocks are brought to the surface and crushed to extract the gold. The crushed rocks that are left over after the gold is extracted are known as **mine tailings** (also called battery sand or tailings sand). Mine tailings are often found in large piles or 'tailings dumps'. In many gold mining areas, mine tailings have been used for landscaping instead of normal soil.

Mine tailings often look like clay or sand and, as they contain finely crushed rock, they can easily produce dust. They are usually white, pale yellow or grey in colour. As the rock surrounding the gold often contains high levels of arsenic, mine tailings can contain high levels of arsenic too.



Sometimes the rocks containing the gold are roasted as well as being crushed. The mine tailings left over from this process are known as *calcined sands* and are usually red or purple. *Calcined sands* usually contain much higher levels of arsenic than other mine tailings.

How does arsenic enter and leave the body?

Small amounts of arsenic are normally taken into the body each day from the low levels of arsenic that are naturally present in soil, water, air and food.

- Arsenic commonly enters the body in food and water – usually in food. It can also enter the body when we swallow soil or dust.

- Arsenic can also enter the body if we breathe in fine dust that contains arsenic.
- Arsenic is not absorbed very well through the skin.

Arsenic does not usually accumulate (build up) in the body. It leaves the body in a few different ways.

- The arsenic that we swallow but is not absorbed leaves the body in the faeces (poo).
- Most of the arsenic absorbed by the body is passed out in the urine.
- Some of the arsenic is deposited inside the hair and nails, and leaves the body as the hair and nails grow.

How does arsenic in mine tailings enter the body?

Everyone normally swallows very small amounts of dust and soil every day. Young children swallow more dust and soil than older children and adults. This is because they get dust or soil on their hands when they crawl or play on the ground. Then, they often put their dusty or dirty fingers or toys in their mouths.

Arsenic can enter the body if we swallow dust or soil that comes from mine tailings that contain arsenic. As babies and young children swallow more dust and soil than adults, they can swallow more arsenic too.

Arsenic in dust or soil is usually not as well absorbed by the body as arsenic in food or water. This is because arsenic is often held firmly inside the soil particles and is not as easily dissolved by the acids inside the stomach.



How can arsenic affect your health?

People can swallow **small** amounts of arsenic every day for a long time without any obvious health effects. However, swallowing larger amounts of arsenic may be harmful to health.

- Swallowing **medium** amounts of arsenic every day for many years may cause **'long-term health effects'**.
- Swallowing a **large** amount of arsenic in a short period of time (such as hours or days) can cause **arsenic poisoning**.

Long-Term Health Effects

If people swallow medium amounts of arsenic every day for many years they may get **'long-term health effects'** which include:

- Skin changes, such as light and dark spots, and thickened skin on the palms, soles and trunk of the body.
- Damage to the heart, blood vessels, nerves, liver and kidney.
- Cancers of the skin, liver, bladder, kidney and lung.

These health effects have been seen in the following situations:

- In people who have higher than normal levels of arsenic in their drinking water for many years.
- In people who, in the past, have taken medicines containing arsenic for a long time.
- In people exposed to arsenic at their workplace for a long time.

Arsenic Poisoning

Swallowing a large amount of arsenic in a short time can cause severe health effects or even death. Large amounts of arsenic can irritate the stomach and intestines and may damage the heart, nerves, liver and blood. Someone with arsenic poisoning may suffer from:

- Stomach pains, nausea (feeling sick), vomiting and diarrhoea (many runny bowel actions).
- Extreme tiredness, abnormal heartbeat and bruising.
- A 'pins and needles' feeling in the hands and feet.

Can arsenic in mine tailings affect your health?

Health authorities consider that arsenic in mine tailings may be harmful to health in a number of situations. The risk (or chance) of health effects depends on a number of factors including:

- The level of arsenic in the mine tailings.
- The amount of soil and dust that is swallowed (from mine tailings).
- The size of the person.
- The length of time that they are exposed.

Long-Term Health Effects

Some studies have shown that some people living in areas with high levels of arsenic in soil or mine tailings absorb more arsenic than people living in other areas. There are no definite reports of **'long-term health effects'** in people living in areas with arsenic in mine tailings but there has been very little research in this area.

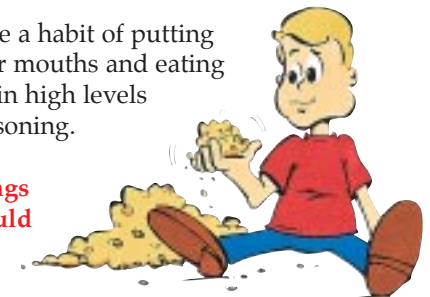
Health authorities have considered the available information and believe that:

- Adults and older children who swallow only very small amounts of soil and dust from mine tailings for a long time have a **very small** risk of long-term health effects.
- Babies and young children are usually more at risk of health effects than adults. This is because they usually swallow more soil and dust than adults and their bodies are smaller.

Arsenic Poisoning

Some babies and young children have a habit of putting small handfuls of dirt or sand in their mouths and eating it. If they eat mine tailings that contain high levels of arsenic, they could get arsenic poisoning.

Eating small handfuls of mine tailings containing high levels of arsenic could be dangerous.



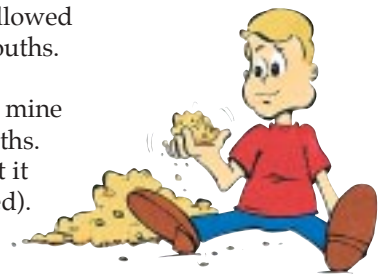
What actions can you take?

If you live in an old gold mining area, your health and your family's health may be at risk from arsenic in mine tailings. However, you can reduce any health risk by reducing the amount of soil and dust from mine tailings that you or your children swallow.

Here are some simple steps that you can take.

In all situations (where there are mine tailings on or near your property)

- Do not let children play on mine tailings, especially young children. The soil and dust can stick to their hands and toys and can be swallowed when they put them in their mouths.
- Prevent young children putting mine tailing sand or soil in their mouths. (It may look like beach sand but it could be dangerous if swallowed).
- Do not put mine tailing sand in your child's sand pit.



- Wash your hands before eating and sleeping.
- Wash young children's hands frequently.
- Wash children's toys frequently to remove soil and dust.
- Wash all fruit and vegetables to remove dust or soil before eating.
- Wash family pets often.

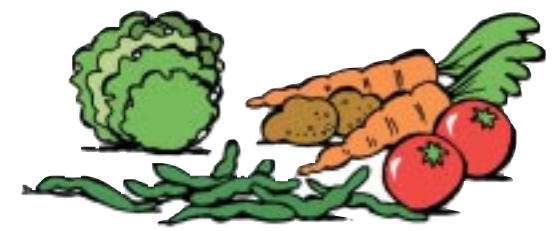
- Mop and dust frequently. Mopping and dusting should be done with a damp cloth.
- Place mats at the front and back doors to prevent soil being walked through the house.



- Do not swim or fish in dams with walls made from mine tailings.
- Do not eat fish or yabbies collected from areas with mine tailings.

If you think that there are mine tailings on your property

- If mine tailings are in a children's play area, cover them with a layer of clean soil and grow grass over the top.
- Cover mine tailings with soil and plants (especially those plants known as groundcovers) to reduce the dust.
- If you decide to remove mine tailings from your property, you will need to contact the Environment Protection Authority (EPA) first. This is because there are laws on how mine tailings must be moved.
- If you grow fruit and vegetables on your property, see the information on the next page.



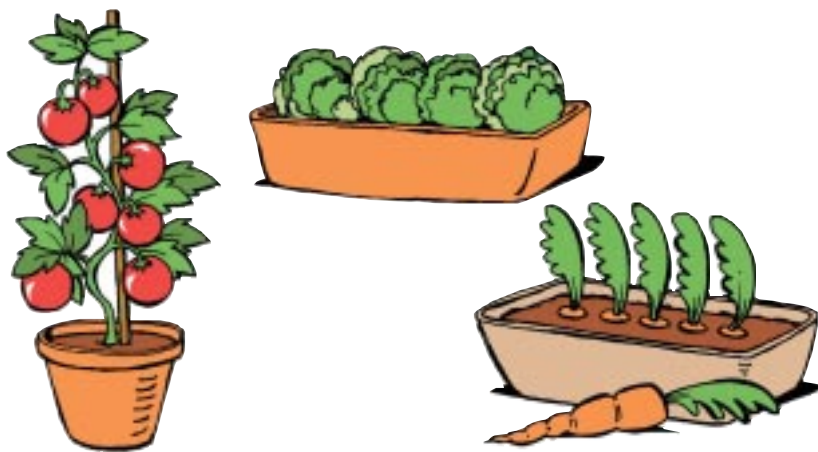
Home-Grown Fruit and Vegetables

It is difficult to know how much arsenic is absorbed by fruit and vegetables that are grown on mine tailings (or soil containing mine tailings).

Research has shown that, in some situations, arsenic in soil can be absorbed into vegetables and build up above the recommended limit for foods. This can happen in vegetables that are grown in the ground (such as radishes, turnips and carrots) or those grown above the ground (such as silver beet and beans). Other fruit and vegetables may also be affected. Studies have also shown that washing and peeling may not remove all of the arsenic. More research is being done in this area.

If you have mine tailings on your property, your home-grown fruit and vegetables may contain raised levels of arsenic. If you eat fruit and vegetables containing raised levels of arsenic, you may increase the chance (or risk) of long-term health effects. This is because any arsenic that you absorb from these home-grown fruit and vegetables adds to any arsenic that you absorb from the soil and dust from the mine tailings. Children are most likely to be affected. Adults who regularly eat home-grown fruit and vegetables may also be at risk.

- To grow vegetables that contain little or no arsenic, bring in clean soil for garden beds. The clean soil will need to be at least 30 centimetres deep. You can also grow vegetables in pots that contain clean soil or potting mixture.
- For further advice on this issue, ring the Environmental Health Unit (details are on the back page).



Are all types of arsenic the same?

There are two main types of arsenic: inorganic arsenic and organic arsenic.

Inorganic arsenic is found in minerals, rocks and mine tailings. Organic arsenic is found in fish and shellfish, and is sometimes called 'fish arsenic'. Organic arsenic is less harmful than inorganic arsenic.



Is there a medical test to check for arsenic?

There are several medical tests to check if the body is absorbing abnormally high amounts of arsenic. However, some of these tests are not recommended for checking the amount of arsenic that is absorbed from mine tailings.

Urine Testing

Urine testing can show if people have been absorbing large amounts of arsenic in the few days before the test. This test is recommended for people living in areas with arsenic in mine tailings. However, the test also measures the less harmful type of arsenic contained in fish and some other seafood (known as 'fish arsenic'). These foods should not be eaten for 2 days before the test. If this is not possible, you should let the doctor know that you have eaten these foods.



Blood Testing.

Blood testing is not usually recommended as the body removes arsenic from the blood within a few hours.

Hair Testing.

Hair testing is not recommended for people living in areas with arsenic in mine tailings. This is because the arsenic in dust that comes from the mine tailings can stick onto the **outside** of the hair. This makes it difficult to test for arsenic that has been absorbed by the body and deposited inside the hair.

Where can you get more information?

- If you are concerned about your own personal health or your children's health, contact your family doctor for advice.
- The pamphlet *Arsenic in mine tailings: Questions and Answers* provides information on the identification of mine tailings, government regulations, growing commercial vegetables, raising animals and other issues. This pamphlet is available from local councils and offices of the Environment Protection Authority (EPA), Department of Human Services and the Department of Natural Resources and the Environment.

For general information on arsenic and health, contact:

**Environmental Health Unit
Department of Human Services**

PO Box 4057 Melbourne Victoria 3001

or phone (03) 9637 4156

**or the nearest Department of Human Services
office in your region.**

This publication is available at the Internet Address:
<http://www.dhs.vic.gov.au/phd/environmental/>