

Arsenic and Health

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



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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, vegetables and fruit. In some situations, arsenic harms people's health.

How does arsenic enter and leave the body?

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

Young children, especially those with pica, 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 and often put their fingers or toys in their mouths.



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 different ways.

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

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 **moderate** 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 moderate amounts of arsenic every day for many years, they may get long-term health effects, which can 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, liver, kidney, nerves, blood and blood vessels
- cancers of the skin, lung, bladder, liver, kidney and prostate.

These health effects have been seen in people who:

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

Most overseas studies show that long-term effects are most commonly found in people who have high levels of arsenic in their drinking water. In some studies, it is uncertain whether arsenic in soil or drinking water, or both, is the cause of long-term effects.

Health authorities, having considered the available information, believe that:

- adults and older children who swallow only very small amounts of contaminated soil and dust for a long time have a very small risk of experiencing long-term health effects
- babies and young children, especially those with pica, who eat contaminated soil and dust are more at risk of experiencing health effects than adults, because they usually eat more of it, and have lower body weights than adults.

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 motions/poo)
- extreme tiredness and bruising
- abnormal heartbeat

- a ‘pins and needles’ feeling in the hands and feet.

Children who deliberately eat soil (pica) are at greater risk of arsenic poisoning.

Are you living in an area that has been contaminated with arsenic?

Sites that may have been historically contaminated with arsenic include sheep dips, timber treatment yards, agricultural land or old orchards treated with arsenical pesticides and scrap yards.

People can be exposed to arsenic in soil by:

- direct contact with the contaminated soil
- inhaling of dust
- directly ingesting soil by hand to mouth contact.

Can arsenic in contaminated soil affect your health?

Health authorities consider that arsenic in contaminated soil may be harmful to health depending on the:

- level of arsenic in the soil
- amount of soil and dust that is swallowed
- age and weight of the person living there
- length of time they are exposed.

What actions can you take?

If you live in an area that has soil contaminated with arsenic, your health and your family's health may be at risk. However, you can reduce any health risk by reducing the amount of soil and dust that you or your children swallow.

Here are some simple steps that you can take.

- Do not let children, especially young children, play on contaminated soil. 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 from putting contaminated soil in their mouths.
- Do not put contaminated soil in your child's sandpit.
- Wash your hands before eating and sleeping.
- Wash young children's hands frequently.
- Wash children's outdoor toys frequently to remove soil and dust.



- If you eat home-grown fruit and vegetables, then thoroughly wash all produce that may be contaminated with soil and peel the skin off root vegetables. See page 8 for more information about home-grown fruit and vegetables.
- Wash family pets often.
- Remove footwear before going indoors to avoid carrying soil dust indoors, especially if your household includes babies or young children.
- Mop and dust often. Mop and dust with a damp cloth. Using a vacuum cleaner or broom may spread dust around.
- Place mats at any outside doors to prevent soil being walked through the house.
- Leave shoes outside, where possible.
- Do not eat fish caught from areas with high levels of arsenic in the soil, which may move into the waterways.
- If a children's play area is contaminated with arsenic, cover it with a layer of clean soil and grow grass over the top. Keep it watered during dry weather if possible.
- Cover contaminated soil with clean soil and plants (especially ground-cover plants) to reduce dust, and stop direct access by young children.
- Do not dig soil that is known to have high levels of arsenic. Arsenic that is under the surface, or deeper, is not hazardous to people if the soil is not disturbed.

If you decide to remove contaminated soil from your property, first contact your local council for guidance. There are restrictions on how contaminated soil must be handled and moved.

Home-grown fruit and vegetables

Fruit and vegetables are good for health, and New Zealanders need to eat more, but be very cautious with what you eat when pregnant and what you give young children. It is hard to know how much arsenic is absorbed by fruit and vegetables that are grown on contaminated soil.



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 silverbeet 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. Research about arsenic in fruit and vegetables is ongoing.

If your property is contaminated with arsenic, your home-grown fruit and vegetables may contain raised levels of arsenic. If you regularly eat fruit and vegetables containing raised levels of arsenic, you may increase your risk of experiencing 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 your property. Children are most likely to be affected. Adults who regularly eat home-grown fruit and vegetables may also be at some 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 mix. If using timber for troughs or raised gardens, make sure it has not been treated with products containing arsenic, which will come out into the soil.

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, testing is not normally required. If you are unwell or concerned about possible symptoms, you should discuss this with your GP.

Urine testing

Urine (pee) testing can only show if people have been absorbing large amounts of arsenic in the few days before the test. However, the test also measures the less harmful type of arsenic contained in fish and some other seafood (known as ‘fish arsenic’). Seafood should not be eaten for three days before the test. If this is not possible, you should let your doctor know that you have eaten seafood.

There is no test that can measure chronic arsenic absorption accurately.



Blood testing

Blood testing is not usually recommended or useful 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 soil. This is because the arsenic in dust that comes from the contaminated soil 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.

This test is not routinely available in New Zealand.

Further information sources

- Regional, district or city councils for general enquiries.
- District health board (DHB) public health units (usually contacted through your local hospital) for general public health enquiries.
 - Your GP for personal health enquiries.
- Ministry for the Environment website www.mfe.govt.nz for more information about contaminated land.



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