



Cadmium

General Information

Key Points

- cadmium is an element that is widely distributed in the earth's crust, air and water
- the uses of cadmium include nickel-cadmium batteries, conductors, pigments, stabilisers in plastics, electroplating of other metals and making alloys for coating other materials
- it enters the environment from natural sources such as fires and volcanoes, but mostly through human activity such as burning fossil fuels
- Food and cigarette smoke are the biggest sources of cadmium exposure for people in the general population
- welders or workers producing batteries or plastics may be exposed to cadmium
- breathing air with high levels of cadmium can cause a metallic taste in the mouth, shortness of breath, chest pain, cough and flu like symptoms; in severe cases it can cause lung damage
- ingestion of cadmium can cause irritation to the stomach with nausea and diarrhoea
- exposure to cadmium for a long period of time may result in damage to the kidneys and bones
- repeatedly breathing in cadmium over a long period of time may cause lung cancer

Public Health Questions

What is cadmium?

Cadmium is an element that is widely distributed in the earth's crust (soil and rocks), air and water. Cadmium also exists as a number of compounds due to it combining with other elements, including oxygen to form cadmium oxide chlorine to form cadmium chloride or sulphur to form cadmium sulphate. Cadmium oxide is most commonly found in the air whereas cadmium chloride and cadmium sulphate dissolve in water.

What is cadmium used for?

Cadmium has previously been used in a number of consumer and industrial materials. However many of these uses are declining and are now heavily restricted in the EU. Currently the largest use of cadmium is in the production of nickel-cadmium batteries. Other uses include making conductors in electronic devices, pigments, stabilisers in plastics, in electroplating of other metals such as steel, iron and copper and in alloys for coating other materials.

How does cadmium get into the environment?

Cadmium is found naturally in the earth's crust. It is distributed more widely throughout the environment by volcanoes and forest fires and human activities such as burning of fossil fuels, use of phosphate fertilisers and industrial processes.

Cadmium may enter water and soil from industrial waste or waste from disposal plants.

How might I be exposed to cadmium?

Food and cigarette smoke are the biggest sources of cadmium exposure for people in the general population. Cadmium enters the food chain from the environment, with some foods accumulating more cadmium than others. In the UK the greatest sources of cadmium in the diet are cereals, vegetables and potatoes. Offal (e.g. livers and kidneys) and seafood contain more cadmium, however people typically eat less of these foods so they do not contribute as much to total dietary exposure.

People can also be exposed by breathing air near where fossil fuels are burnt or near waste plants. Soil may also be a source of exposure to cadmium, especially for children.

Welders or workers producing batteries or plastics may be exposed to cadmium, although safe levels of exposure are enforced to protect workers. Such levels are below those that are thought to cause harmful effects.

If I am exposed to cadmium how might it affect my health?

The presence of cadmium in the environment does not always lead to exposure. In order for it to cause any adverse health effects you must come into contact with it. You may be

exposed to cadmium by breathing or ingesting it. Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

Breathing air with high levels of cadmium can cause a metallic taste in the mouth, shortness of breath, chest pain, cough and flu like symptoms (metal fume fever), which may occur some hours after the exposure. In severe cases exposure can lead to lung damage extensive fluid loss, multiple organ failure and death. Levels of cadmium in the environment are typically not high enough to cause such effects.

Ingestion of cadmium can cause irritation to the digestive tract, with nausea and diarrhoea. Ingestion of large amounts may result in effects on metabolism, swelling of the face and a build-up of fluid in the lungs. Cadmium may cause irritation in contact with the skin.

Exposure to cadmium for a long period of time may result in damage to the kidneys, bones and may cause cancer.

Can cadmium cause cancer?

The International Agency for the Research on Cancer classified cadmium and its compounds as being carcinogenic in humans. Breathing cadmium in the air can cause lung cancer, although ingesting cadmium is not believed to increase the risk of cancer

Does cadmium affect pregnancy or the unborn child?

There is little evidence on the effects of exposure to cadmium during pregnancy. Therefore, it is not possible to draw any definitive conclusions.

How might cadmium affect children?

Children are likely to be effected in the same way as adults, following exposure to cadmium.

How should cadmium batteries be safely disposed of?

Nickel-cadmium batteries are rechargeable batteries used in cordless tools, mobile phones, laptop computers and digital cameras. They should be recycled at a designated recycling centre. Further advice may be gained from your local authority.

What should I do if I am exposed to cadmium?

If you have any health concerns regarding exposure to cadmium seek guidance from your GP or contact NHS 111.

Additional sources of information

HSE - Cadmium and you: <http://www.hse.gov.uk/pubns/indg391.pdf>

NHS Choices – Poisoning: <http://www.nhs.uk/Conditions/Poisoning/Pages/Introduction.aspx>

UKTIS. Best Use of Medicines in Pregnancy <http://www.medicinesinpregnancy.org/>

FSA - Cadmium in brown meat from crabs:

https://www.food.gov.uk/science/research/surveillance/food-surveys/fdsurvey_2013/cadmium_crabs_fsis913

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