You have been given this factsheet because your water sample exceeded the recommended Prescribed Concentration or Value (PCV) set by the Drinking Water Regulations for Aluminium. You may wish to consider getting advice on further testing to help determine whether your water is likely to regularly exceed the PCV as there are various factors, such as seasonal variation (particularly wet or dry months), that could affect your results. This factsheet will give you more information about aluminium and will provide immediate precautionary advice, if necessary.

**Where does aluminium come from?**

Aluminium is the most abundant metal in the Earth’s crust and it occurs naturally in soil, water and air. Aluminium salts are widely used in water treatment to reduce levels of impurities and microorganisms. This may lead to low concentrations of aluminium in drinking water. Other sources of aluminium are foods, particularly those containing aluminium salts used as food additives, and some medicines. The aluminium we consume in drinking water usually makes up less than five per cent of our total intake.

**The results say I have an exceedance of aluminium. What does this mean and what are the possible health effects?**

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV for aluminium in drinking water is 200 micrograms per litre of water (µg/l) and is set to avoid depositions in the pipes of distribution system and discolouration of the water. An exceedance does not necessarily mean that the water is a potential risk to health. It is difficult to define a health-based level, due to uncertainties about amounts of aluminium absorbed into the body from water, but levels below the World Health Organization’s tentative health-based value of 900 micrograms per litre of water (µg/l) are very unlikely to produce any adverse health effect. Exceedance of 900 µg/l does not necessarily mean that adverse health effects will occur, but it erodes the margin of safety considered to be protective of health.

In general, if taken through the mouth, little aluminium is absorbed by the body and this small fraction is usually excreted in the urine or harmlessly deposited in bone, which acts as a 'sink' to remove it. The main health concern with aluminium is damage to the brain and nervous system from accumulation of the metal in the brain (neurotoxicity). Those groups most susceptible to aluminium are those with kidney disease, which can raise aluminium concentrations in the body. In the past, the adverse effects mentioned above have been seen in patients with kidney failure undergoing renal dialysis at home with tap water containing aluminium or who were taking aluminium-containing medicines.
Anyone who has been regularly consuming water from the affected supply and has adverse effects consistent with excessive aluminium consumption or is concerned about their health may wish to seek advice from their General Practitioner.

I/my family member have an existing health condition. Am I more at risk?

If you have kidney disease, you may be more at risk from aluminium than other people as the condition means that the body cannot get rid of any absorbed aluminium so well. Patients having kidney dialysis at home should not use tap water for dialysis with aluminium levels which exceed the PCV.

What about the effects of exposure to my children? What about my unborn child?

Recent reviews of the scientific literature on aluminium have suggested that the developing infant might be more susceptible to aluminium than adults. However, babies, young children and pregnant women can drink water containing less than the World Health Organization’s health based guidance value of 900 micrograms of aluminium per litre (µg/l).

Does aluminium cause Alzheimer's disease?

The evidence is conflicting as to whether aluminium plays a role in the development of Alzheimer’s disease. The Alzheimer’s Society says that the overwhelming medical and scientific opinion is that the evidence does not convincingly demonstrate a causal relationship between aluminium intake and Alzheimer’s disease. Researchers believe that, in the majority of those affected, the disease results from a combination of different risk factors rather than one single cause. Such factors, which vary from person to person, may include age, genetic predisposition, other diseases or environmental agents. For the Alzheimer’s Society factsheet on Aluminium and Alzheimer’s disease, see: http://www.alzheimers.org.uk/site/scripts/documents_info.php?documentID=99

Immediate, precautionary, health advice:

- Patients having kidney dialysis at home should not use tap water containing the detected level of aluminium for dialysis. If you have used your tap water for dialysis then you should seek medical advice and alternative dialysis arrangements should be made.

- You can continue to drink water containing less than the World Health Organization’s health based guidance value of 900 micrograms of aluminium per litre (µg/l).

Where can I get further information?


For further FAQs, try the US Agency for Toxic Substances and Disease (ATSDR) Toxic Substances Portal for aluminium at: http://www.atsdr.cdc.gov/toxFAQs/TF.asp?id=190&tid=34

Public Health England’s Compendium of Chemical Hazards for aluminium at: http://www.hpa.org.uk/Topics/ChemicalsAndPoisons/CompendiumOfChemicalHazards/

Can I use bottled water to make up baby formula (infant formula)? NHS Choices: http://www.nhs.uk/chq/Pages/1945.aspx?CategoryID=62&SubCategoryID=64
You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for antimony. You may wish to consider getting advice on further testing to help determine whether your water is likely to regularly exceed the PCV as there are various factors, such as seasonal variation (particularly wet or dry months), that could affect your results.

This factsheet will give you more information about antimony and will provide immediate precautionary advice, if necessary.

Where does antimony come from?

Antimony is a silvery-white metal that is found in the Earth's crust. Antimony is released to the environment from natural sources and from industry. It is found at low levels in some rivers, lakes, and streams.

Because antimony is found naturally in the environment, the general population is exposed to low levels every day, primarily in food, drinking water, and air. The most common source of antimony in drinking water appears to be metal plumbing and fittings.

Workers in industries that process antimony or use antimony ore may be exposed to higher levels than the general public. Alloys containing antimony are used in lead storage batteries, solder, sheet and pipe metal, bearings, castings, and pewter. Antimony oxide is added to textiles and plastics to prevent them from catching fire. It is also used in paints, ceramics, and fireworks, and as enamels for plastics, metal, and glass.

The results say I have an exceedance of antimony. What does this mean and what are the possible health effects?

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV for antimony in drinking water is 5 micrograms per litre of water (µg/l) and is set at this level because water treatment can reasonably reduce quantities of antimony to this level. The World Health Organization’s (WHO) health-based guideline value is 20 micrograms per litre of water (µg/l). It is unlikely that you will experience any adverse health effects from drinking water containing antimony at the level measured in your drinking water as it is not substantially above the WHO health-based guideline value.

Although there is some evidence in animals that inhalation of certain antimony compounds increased the risk of cancer, there are no data to indicate whether or not antimony can cause cancer in people by the oral route.
I/my family member have an existing health condition. Am I more at risk?

There is no scientific evidence to indicate that a person with an existing health condition will be at more risk from exposure to antimony in their drinking water.

What about the effects of exposure to my children? What about my unborn child?

There is limited information about the effects of antimony on the unborn child. One study reported an increase in the number of spontaneous abortions (miscarriages) in women exposed to airborne antimony in the workplace. The level of antimony to which the women were exposed was not reported in this study.

Based on the available information, it is unlikely that any adverse health effects will occur in the unborn child or children from drinking water at the levels found in your drinking water.

Immediate, precautionary, health advice:

- Your sample has exceeded the PCV of 5 micrograms per litre of water ($\mu$g/l) but is not substantially above the WHO health-based value of 20 micrograms per litre of water ($\mu$g/l). Therefore, it is unlikely that drinking the level of antimony detected in your tap water will cause any adverse health effects.

Where can I get further information?


For further FAQs, try the US Agency for Toxic Substances and Disease (ATSDR) Toxic Substances Portal for antimony at: http://www.atsdr.cdc.gov/toxfaqs/TF.asp?id=331&tid=58
ARSENIC

You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for arsenic. You may wish to consider getting advice on further testing to help determine whether your water is likely to regularly exceed the PCV as there are various factors, such as seasonal variation (particularly wet or dry months), that could affect your results. This factsheet will give you more information about arsenic and will provide immediate precautionary advice, if necessary.

Where does arsenic come from?

Arsenic is a naturally occurring metal that is widely distributed in the soil, rocks, air and water. It is also released into the air from human activities including smelting metals such as lead and copper. Because arsenic is so widespread in the environment, it is not unusual to find it at very low levels in some private drinking water supplies and it can also be found in food and other sources.

The results say I have an exceedance of arsenic. What does this mean and what are the possible health effects?

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV and World Health Organization’s (WHO) provisional health-based guideline value for arsenic in drinking water is 10 micrograms per litre of water (µg/l) and is set to protect health. Long-term (many years) exposure to relatively high drinking water levels could produce skin lesions, such as moles, cysts, warts or skin tags that appear as darker areas of skin and have the appearance of small "corns" or "warts" on the palms, soles of the feet, and chest or back.

Anyone who has been regularly consuming water from the affected supply and has adverse effects consistent with excessive arsenic consumption may wish to seek advice from their General Practitioner.

Can I use the water for bathing?

It is unlikely that any adverse health effects will occur as a result of bathing in the affected water.

Does arsenic cause cancer?

The International Agency for Research on Cancer (IARC) has determined that inorganic arsenic (the form most commonly found in water) can cause cancer of the lung, skin and bladder. Because of this, levels of arsenic in water, air and food are reduced to the lowest practical level to minimise possible risks to health. Short-term exposure, i.e. over days or weeks, to water with arsenic levels above the PCV is likely to be associated with only a very small increase in the risk of cancer. Even long-term exposure, i.e. for many years, does not
mean that you will get cancer, but it poses an increased risk compared to drinking water which complies with the PCV.

I/my family member have an existing health condition. Am I more at risk?

There is no scientific evidence to indicate that a person with an existing health condition will be at more risk from exposure to arsenic in their drinking water.

What about the effects of exposure to my children? What about my unborn child?

Arsenic has been shown to cross the placenta and low levels have been found in breast milk. There is some evidence that arsenic exposure to the unborn baby or infants may lead to brain damage and therefore it is advisable that women who are pregnant or breastfeeding avoid drinking water containing arsenic at levels above the UK PCV. Children who are exposed to arsenic may have many of the same health effects as adults and are unlikely to be more susceptible to the adverse effects of arsenic than adults.

Immediate, precautionary, health advice:

- We recommend avoiding drinking and cooking with tap water containing arsenic at a concentration of more than 10 micrograms per litre of water (µg/l) on a long-term basis.

- Because your water sample result has shown an exceedance for arsenic, we would also recommend that you consider further testing as there are different factors such as seasonal variation (particularly wet or dry months) that could affect the results. If the results still exceed the PCV, we would recommend not drinking or cooking with the tap water on a long-term basis.

Where can I get further information?


For further FAQs, try the US Agency for Toxic Substances and Disease (ATSDR) Toxic Substances Portal for arsenic at: http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=19&tid=3

Public Health England’s Compendium of Chemical Hazards for arsenic at: http://www.hpa.org.uk/Topics/ChemicalsAndPoisons/CompendiumOfChemicalHazards/
You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for copper.

You may wish to consider getting advice on further testing to help determine whether your water is likely to regularly exceed the PCV as there are various factors, such as seasonal variation (particularly wet or dry months), that could affect your results.

This factsheet will give you more information about copper and will provide immediate precautionary advice, if necessary.

**Where does copper come from?**

Copper is a reddish-brown metal that has many industrial applications and is widely used in electrical wiring, switches, electroplating, plumbing pipes, coins, metal alloys and fireworks.

Copper can be released into the environment from natural sources such as volcanoes, forest fires, dust and decaying vegetation and from mining and industrial use. People can be exposed from air, drinking water, and food. The primary source in drinking water is the corrosion of copper plumbing materials within homes. Copper is an essential element for all living organisms and therefore small amounts are needed in the body.

**The results say I have an exceedance of copper. What does this mean and what are the possible health effects?**

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV and the World Health Organization’s (WHO) guideline value for copper in drinking water is 2000 micrograms per litre of water (2 milligrams/L) and is set to protect health. Acute copper toxicity is rare because, in high quantities, it induces vomiting and has an unpleasant taste. Signs of toxicity include abdominal pain, nausea, vomiting and diarrhoea (similar to symptoms of food poisoning). Symptoms have been reported at levels in water of 4000 micrograms/L (4 milligrams/L) copper and above. Therefore, it is possible that some individuals may experience a certain degree of gastrointestinal upset form drinking water containing copper at a concentration above 4000 micrograms/L. As the amount of copper in the body is controlled by homeostatic mechanisms (i.e. mechanisms maintaining stable copper levels) few data are available on chronic copper toxicity apart from in individuals with genetic defects in the homeostatic control mechanisms (see below).

**I/my family member have an existing health condition. Am I more at risk?**

People with chronic liver disease are potentially sensitive to copper levels in drinking water exceeding the UK PCV. People with genetic defects which make them susceptible to adverse effects of copper are also more at risk, such as sufferers of Wilson’s disease (an inherited disorder in which there is too much copper retained in the body's tissues) and Idiopathic Copper Toxicosis (ICT, when copper accumulates in the liver). If you consider yourself to be included in the ‘at risk group’ you may wish to contact your General Practitioner for medical advice.
What about the effects of exposure to my children? What about my unborn child?

There is a small possibility that children may be at more risk of copper toxicity as their uptake system is more efficient and because the mechanism for excreting copper from their bodies is not yet fully developed. But there is very little data showing any adverse health effects occurring in children consuming drinking water with levels of copper above the UK standard.

Immediate, precautionary, health advice:

- You can continue to drink water containing the detected level of copper, providing that you have not suffered stomach upsets from drinking this water and do not have any of the health conditions mentioned below.

- Patients undergoing dialysis treatment should not use tap water with this level of copper for dialysis. If you have used your tap water for dialysis, then you should seek medical advice and alternative arrangements for dialysis should be made. Patients with genetic disorders that make them susceptible to adverse effects of copper such as sufferers of Wilson’s disease or Idiopathic Copper Toxicosis (ICT) should make sure their GP is aware.

Where can I get further information?


FLUORIDE

You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for fluoride.

As your water sample result has shown an exceedance, we would recommend that you get another water test as there are different factors such as seasonal variation (particularly wet or dry months) that could affect the results.

This factsheet will give you more information about fluoride and will provide immediate precautionary advice, if necessary.

Where does fluoride come from?

Fluorides are naturally occurring compounds which are derived from the element fluorine. They are widely distributed in the Earth’s crust in a number of minerals, such as fluorspar, cryolite and fluorapatite. Fluorides are also released to the air from volcanoes and from industrial activity and are carried by wind and rain to nearby water, soil, and food sources.

Traces of fluorides are present in many waters, with higher concentrations often associated with groundwaters. All vegetation contains some fluoride, which is absorbed from soil and water. Virtually all foodstuffs contain at least traces of fluoride; tea in particular can contain high fluoride levels. Fluoride is can be added to drinking water supplies and to a variety of dental products, including toothpaste and mouth rinses, to prevent dental cavities.

The results say I have an exceedance of fluoride. What does this mean and what are the possible health effects?

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV and the World Health Organization’s (WHO) health-based guideline value for fluoride in drinking water is 1.5 milligrams per litre of water (mg/l) and both are set to protect health. Fluoride has beneficial effects on teeth at low concentrations in drinking water, but excessive exposure to fluoride in drinking water, or in combination with exposure to fluoride from other sources, can give rise to dental fluorosis (a discolouration of the teeth) Dental fluorosis can occur while the tooth enamel is developing and is the most sensitive effect following fluoride exposure. It describes the discolouration and mottling of the teeth, which occurs at varying degrees of severity e.g. mild, moderate and severe: only moderate or severe fluorosis is considered to be aesthetically significant. Children over the age of 8 years and adults are not susceptible to dental fluorosis.

Exposure to relatively high levels of fluoride over many years can adversely affect the bones of adults. The intakes that cause such an effect are not clear because of various problems in interpreting the relevant studies, such as the contribution of fluoride from sources other than water (e.g. from the diet and dental products etc.). Therefore, it would be advisable not to
drink your water over many years, especially if a retest indicates that the detected concentration is reasonably accurate.

I/my family member have an existing health condition. Am I more at risk?

For dental fluorosis, no susceptible groups have been identified other than children under the age of 8, particularly children of ages 3 to 4. Individuals with kidney disease may be more susceptible to adverse effects on the bone from relatively high levels of fluoride because they are less able to remove fluoride from the body in their urine.

What about the effects of exposure to my children? What about my unborn child?

Infants fed formula-milk made up with fluoridated water may exceed the level at which dental fluorosis can occur. However, because the critical time for development of aesthetically significant dental fluorosis is during the formation of permanent teeth between 3 to 4 years of age, infants have a lower risk of this effect than older children. Intake in children of this age may exceed the level for dental fluorosis and therefore it may be advisable that they avoid drinking water containing fluoride at the concentrations measured in your drinking water on a long term basis. It may also be advisable for them to avoid using fluoridated toothpaste.

Immediate, precautionary, health advice:

- If your sample has exceeded the PCV of 1.5 milligrams per litre of water (mg/l), it is possible that there will be an increased risk of a slight discolouration of the teeth for children under the age of 8 years. However, you should get your water retested.

- It is advisable that children who are under 8 years of age, particularly those who are 3 to 4 years of age, should avoid drinking the water on a long-term basis.

- As a precaution, it is advisable for older children and adults also not to drink water containing a relatively high concentration of fluoride over the long-term (i.e. many years) to prevent a possible increased risk of effects on the bones.

Where can I get further information?


For further FAQs, try the US Agency for Toxic Substances and Disease (ATSDR) Toxic Substances Portal for fluoride at: http://www.atsdr.cdc.gov/toxFAQs/tf.asp?id=211&tid=38
IRON

You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for iron.

You may wish to consider getting advice on further testing to help determine whether your water is likely to regularly exceed the PCV as there are various factors, such as seasonal variation (particularly wet or dry months), that could affect your results.

This factsheet will give you more information about iron and will provide immediate precautionary advice, if necessary.

Where does iron come from?

Iron is one of the most abundant metals in the Earth’s crust. Iron is an essential element in human nutrition and, in general, the human body regulates the level of iron by controlling the amount absorbed from food and drink, according to iron status. Iron in drinking water may be present as a result of corrosion of iron pipes or use of iron coagulants in drinking water treatment, but it is also found naturally in surface and ground water.

The results say I have an exceedance of iron. What does this mean and what are the possible health effects?

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV for iron in drinking water is 200 micrograms per litre of water (µg/l) and is set to avoid the water smelling or tasting bad or from being discoloured. An exceedance does not necessarily mean that the water is a potential risk to health. It is difficult to define a health-based level, due to uncertainties about amounts of iron absorbed into the body from water, but levels below the World Health Organization’s (WHO) health-based value of 2000 micrograms per litre of water (µg/l) are very unlikely to produce any adverse health effect.

In general, the body regulates the amount of iron in the body by controlling the amount absorbed from food and drink according to the amount required. Potential adverse effects of drinking water containing iron above 2000 micrograms per litre of water (µg/l) are largely gastrointestinal, especially constipation, but also nausea, diarrhoea and vomiting. The Food Standards Agency’s Expert Group on Vitamins and Minerals (EVM) has recommended, for guidance purposes, that a maximum supplemental intake, in addition to that from food, of 17 mg/day would not be expected to produce adverse effects in the majority of people. This is likely to be exceeded by an adult drinking water containing approximately 8500 µg iron per litre. Anyone who has been regularly consuming water from the affected supply and has adverse effects consistent with excessive iron consumption or our concerned about their health may wish to seek advice from their General Practitioner.
I/my family member have an existing health condition. Am I more at risk?

People who are at higher risk from excessive exposure to iron are those with metabolic defects that affect the body’s ability to regulate iron in the body, such as hereditary haemochromatosis (impaired ability to regulate iron absorption and distribution), β-thalassaemia (impaired ability to create red blood cells) and sideroblastic anaemia (impairment of red blood cells to incorporate iron). Those people with a pre-existing gastrointestinal tract disease or chronic hepatitis have also been shown to be vulnerable to the toxic effects of iron. If you consider yourself to be included in the ‘at risk group’ you may wish to contact your General Practitioner for medical advice.

What about the effects of exposure to my children? What about my unborn child?

Children who are exposed to iron may have many of the same health effects as adults.

Immediate, precautionary, health advice:

- You can drink water containing iron below the WHO health-based value of 2000 micrograms per litre of water (µg/l).

- If your water sample exceeds the WHO health-based value of 2000 µg/l but is below 8500 µg/l, you may continue to drink the water provided you are not experiencing persistent gastrointestinal effects and are not in an “at risk” group (see below).

- If you are in an “at risk” group, i.e. you have a metabolic defect that affect the body’s ability to regulate iron, such as hereditary haemochromatosis, or you have a pre-existing gastrointestinal tract disease or chronic hepatitis, you should make sure your GP is aware of your recent water sample result.

Where can I get further information?


Public Health England’s Compendium of Chemical Hazards for iron at: http://www.hpa.org.uk/Topics/ChemicalsAndPoisons/CompendiumOfChemicalHazards/
You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for Lead.

You may wish to consider getting advice on further testing to help determine whether your water is likely to regularly exceed the PCV as there are various factors, such as seasonal variation (particularly wet or dry months), that could affect your results.

This factsheet will give you more information about lead and will provide immediate precautionary advice, if necessary.

Where does lead come from?

Lead is a metal that is widely distributed in the soil, rocks, air and water. Lead predominantly gets into the environment as a result of industrial emissions from mining, smelting, recycling or waste incineration. You may be exposed to lead mainly through your food and drinking water, although exposure via soil, dust, air, plumbing pipes and paint chips significantly contribute to the overall exposure.

The results say I have an exceedance of lead. What does this mean and what are the possible health effects?

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV for lead in drinking water is 10 micrograms per litre of water (µg/l). The PCV is set at this level because water treatment can reasonably reduce quantities of lead to this level. Eating food or drink contaminated with lead or lead compounds for a short time (i.e. over days or weeks) usually does not cause any ill effects as the risks to health generally come from long-term (over many years) exposure as levels of lead build up in the body over time. There is evidence of effects on the nervous system, increased blood pressure and kidney toxicity in adults following long-term low level exposure to lead. It is not possible to identify a level of lead exposure that is not associated with some evidence of developmental neurotoxicity, effects on blood pressure or the kidney.

Current advice is that exposure to lead should be as low as reasonably practicable. Consuming water with lead levels above 10 micrograms per litre of water (µg/l should be avoided in the long-term.

Can I use the water for bathing?

It is unlikely that any adverse health effects will occur as a result of bathing in the affected water.

Does lead cause cancer?

Inorganic lead compounds (the form of lead most commonly found in food and water) have been classified by the International Agency for Research on Cancer (IARC) as a Group 2A carcinogen (probably carcinogenic to humans). However, lead is not considered to cause
cancer following exposure to this concentration in drinking water. The most sensitive health effects for lead exposure are considered to be on the development of the brain, the kidneys and effects on blood pressure.

I/my family member have an existing health condition. Am I more at risk?

The unborn child, infants, and children up to six years of age are most sensitive to the adverse effect of lead. If you/family member are thinking of having children, are pregnant or have children under the age of 6 you may wish to contact your General Practitioner for medical advice.

What about the effects of exposure to my children? What about my unborn child?

Children exposed to lead when in the womb or during the first few years of life may have a lower IQ, behavioural problems or effects on the nervous system. The unborn child, infants, and children up to six years of age are most sensitive. It is not possible to identify a level of lead exposure that is not associated with some evidence of developmental neurotoxicity. Therefore, current advice is that exposure to lead should be as low as reasonably practicable.

Immediate, precautionary, health advice:

- We recommend avoiding drinking and cooking with tap water with a lead concentration above 10 micrograms per litre (µg/l) on a regular basis, especially if you are pregnant or have young children in your household. You should use an alternate water supply for the reconstitution of infant formula for bottle-fed infants in line with NHS advice.

- It is important to note that the use of bottled water for making up infant formula is not recommended, as it may not be sterile. Also it should not contain more than 200 mg/L of sodium or 250 mg/L of sulphate. Appropriate advice can be obtained from the NHS website (NHS Choices website below).

- You may wish to consider getting advice on further testing to help determine whether your water is likely to regularly exceed the PCV as there are various factors, such as seasonal variation (particularly wet or dry months), that could affect your results.

- If your lead test result is substantially above the PCV of 10 micrograms per litre (µg/l), for example over 50 µg/l, then we would strongly recommend that you do not drink this water on a regular basis and that you investigate the cause of the relatively high concentration.

Where can I get further information?


For further FAQs, try the US Agency for Toxic Substances and Disease (ATSDR) Toxic Substances Portal for lead at: http://www.atsdr.cdc.gov/toxFAQs/tf.asp?id=93&tid=22

Public Health England’s Compendium of Chemical Hazards for lead at: http://www.hpa.org.uk/Topics/ChemicalsAndPoisons/CompendiumOfChemicalHazards/

Can I use bottled water to make up baby formula (infant formula)? NHS Choices: http://www.nhs.uk/chq/Pages/1945.aspx?CategoryId=62&SubCategoryId=64
MANGANESE

You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for manganese.

You may wish to consider getting advice on further testing to help determine whether your water is likely to regularly exceed the PCV as there are various factors, such as seasonal variation (particularly wet or dry months), that could affect your results.

This factsheet will give you more information about manganese and will provide immediate precautionary advice, if necessary.

Where does manganese come from?

Manganese is a silver-grey metal which occurs naturally in water, soil and rocks. Manganese is normally present in water and food, but more may be released into the environment from the manufacture, use and disposal of products containing manganese.

People are mainly exposed to manganese from eating food or drinking water, but the greatest exposure to manganese is usually from food. Nuts, grains, beans and tea are rich in manganese, therefore vegetarians and tea drinkers may have a higher intake than the average person, but these are unlikely to cause adverse health effects. Low levels of manganese are needed for good health.

The results say I have an exceedance of manganese. What does this mean and what are the possible health effects?

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV for manganese in drinking water is 50 micrograms per litre of water (µg/l) and is set at this level because water treatment can reasonably reduce quantities of manganese to this level. Water containing a higher level may taste unpleasant and when levels exceed 100 micrograms per litre of water (µg/l) it can stain plumbing fixtures and laundry. However, an exceedance does not necessarily mean that the water is a potential risk to health. The World Health Organization’s (WHO) health-based value for manganese is 400 micrograms per litre of water (µg/l). This guidance level is based on the higher level of manganese intake, identified in other surveys looking at dietary intake, at which there are no adverse health effects. More recently, the Food Standards Agency’s Expert Group on Vitamins and Minerals (EVM) has advised that a supplemental intake of 4000 µg manganese per day, in addition to the diet, would be unlikely to cause harm to health. This intake can be considered as equivalent to a concentration of manganese in drinking water of approximately 2000 micrograms per litre (µg/l).

From reports of health effects in people who are exposed to high levels of manganese at work by inhalation, the most common health problems involve the brain and nervous system. These effects include behavioral changes and other nervous system effects, which include movements that may become slow and clumsy. Although the majority of adverse health effects associated with manganese have been identified in studies of inhalation exposure, it is advisable to avoid long-term drinking of water with levels of manganese that
are above the 2000 µg/l. Drinking water exceeding a manganese concentration of 2000 µg/l does not necessarily mean that adverse health effects will occur, but it erodes the margin of safety considered to be protective of health.

**I/my family member have an existing health condition. Am I more at risk?**

People who are anaemic may be more vulnerable to the adverse effects of manganese due to the increased absorption of manganese that occurs when the body is short of iron. Other vulnerable individuals are those with impaired elimination processes or patients with liver disease, the elderly and infants because they may not control the levels of manganese in the body so well. The use of alcohol and long-term use of anti-psychotic drugs increases the susceptibility of people to the adverse effects of manganese. If you consider yourself to be included in the ‘at risk group’ you may wish to contact your General Practitioner for medical advice.

**What about the effects of exposure to my children? What about my unborn child?**

Infants and young children may be more vulnerable to the adverse effects of excess manganese consumption due to the fact that they absorb more manganese and excrete less from the body than adults do. If the manganese level in your drinking water exceeds the PCV of 50 µg/l manganese, we recommend that you use an alternative source of drinking water that complies with the manganese PCV as a precaution for younger children and infants (particularly if they are consuming formula milk reconstituted in tap water).

Some recent epidemiological studies provide some evidence (although the studies have limitations) that exposure to relatively high levels of manganese in drinking water can have neurodevelopmental effects in young children as detected by a decrease in IQ. Exposure during pregnancy could also be important, therefore, as a precaution, pregnant mothers may wish to use another source of drinking water.

**Immediate, precautionary, health advice:**

- Your water exceeds the regulatory limit of 50 µg/L. We recommend that you use an alternative source of drinking water for young children and infants as a precaution (particularly if they are consuming formula milk reconstituted in tap water). Pregnant women may also wish to use an alternative source of drinking water as a precaution.

- It is important to note that the use of bottled water for making up infant formula is not recommended, as it may not be sterile. Also it should not contain more than 200 mg/L of sodium or 250 mg/L of sulphate. Appropriate advice can be obtained from the NHS website.

- If you are in a “at risk group” i.e. individuals who are anaemic; those with impaired elimination processes; patients with liver disease; the elderly; people who are dependent on alcohol; or those who use anti-psychotic drugs, you should make sure your GP is aware.

All other adults can drink water containing manganese below a level of 2000 micrograms per litre (µg/l).
Where can I get further information?


Public Health England's Compendium of Chemical Hazards for manganese at: http://www.hpa.org.uk/Topics/ChemicalsAndPoisons/CompendiumOfChemicalHazards/
You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for nickel.

You may wish to consider getting advice on further testing to help determine whether your water is likely to regularly exceed the PCV as there are various factors, such as seasonal variation (particularly wet or dry months), that could affect your results.

This factsheet will give you more information about nickel and will provide immediate precautionary advice, if necessary.

Where does nickel come from?

Nickel is a metal that is widely distributed in the soil, rocks, air and water. Nickel is used to produce stainless steel and other alloys. Nickel alloys are used in coins, jewellery, household appliances and electrical equipment. Nickel compounds are also used in the production of nickel-cadmium batteries. Human activities including combustion of coal and oil, municipal incineration, steel and other nickel alloy production and electroplating all release nickel into the environment. Volcanoes and forest fires also release nickel into the environment.

Food is the dominant source of nickel exposure in the non-smoking, non-occupationally exposed population; water is generally a minor contributor to the normal total daily oral intake. However, where there is heavy pollution, where there are areas in which nickel occurs naturally in groundwater or where there is the use of certain types of kettles, of non-resistant material in wells or of water that has come into contact with nickel or chromium-plated taps, the presence of nickel in water may be significant.

The results say I have an exceedance of nickel. What does this mean and what are the possible health effects?

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV for nickel in drinking water is 20 micrograms per litre of water (µg/l) and is set because this concentration should be achievable by conventional water treatment techniques rather than being based on health effects. Ingestion of nickel at the concentration measured in your drinking water is unlikely to cause adverse effects in healthy humans as it is below the World Health Organization’s (WHO) guideline value of 70 micrograms per litre of water (µg/l) set based on health effects and would be considered protective of nickel-sensitive individuals (the group at risk).

I/my family member have an existing health condition. Am I more at risk?

The most common harmful health effect of nickel in humans is an allergic reaction. People can become sensitive to nickel when jewellery or other things containing it are in direct contact with the skin for a long time. Once a person is sensitised to nickel, further contact with the metal may produce a reaction. The most common reaction is a skin rash at the site of contact. Less frequently, some people who are sensitive to nickel have asthma attacks
following exposure. Some sensitised people react when they eat food or drink water containing nickel. The level of nickel present in your drinking water is unlikely to cause adverse health effects, unless you are allergic to nickel. If you are allergic to nickel, you may wish use an alternative source of water or consult your General Practitioner.

What about the effects of exposure to my children? What about my unborn child?

Children would be affected by nickel in the same way as adults, and therefore it is unlikely that the concentrations found in your drinking water would result in adverse health effects in children.

Immediate, precautionary, health advice:

- You can drink water containing nickel below the WHO health-based value of 70 micrograms per litre of water (µg/l).
- If your sample concentration exceeds 70 µg/l and you are allergic to nickel, we recommend that you use an alternative source of water or consult your General Practitioner for medical advice.
- If you are not allergic to nickel you can continue to drink water containing the detected level of nickel, even if it is above the WHO health based guidance value of 70 µg/L. This is because your concentration is not substantially above the health based value (which is set to protect individuals that are already allergic to nickel).

Where can I get further information?


For further FAQs, try the US Agency for Toxic Substances and Disease (ATSDR) Toxic Substances Portal for nickel at: [http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=244&tid=44](http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=244&tid=44)

You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for Nitrates.

As your water sample result has shown an exceedance, we would recommend that you get another water test as there are different factors such as seasonal variation (particularly wet or dry months) that could affect the results.

This factsheet will give you more information about nitrates and will provide immediate precautionary advice, if necessary.

**Where does nitrate come from?**

Nitrate is naturally present in the environment. It is produced during the natural decay of vegetable matter in soil or may be added as a fertiliser to arable land. Commercially, it is mainly used in fertilisers, but is also used in the production of explosives. The nitrate ion ($\text{NO}_3^-$) occurs naturally in drinking water as part of the nitrogen cycle - rainfall washes nitrate from the subsoil into ground and surface water and may give rise to elevated concentrations in drinking water. However, nitrate can also reach surface waters and groundwater as a result of agricultural activity, from waste-water treatment, and from oxidation of nitrogenous waste products in human and animal excreta, including septic tanks.

**The results say I have an exceedance of nitrate. What does this mean and what are the possible health effects?**

Standards (PCVs) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV for nitrate in drinking water is 50 milligrams per litre of water (mg/l) and is set to protect health. Ingested nitrate can be converted to nitrite in the gastrointestinal tract. Nitrite is involved in the oxidation of haemoglobin to methaemoglobin resulting in a condition known as methaemoglobinemia. This is a reduced ability of red blood cells to transport oxygen to tissues. Signs and symptoms of mild methaemoglobinemia include cyanosis (blue to grey lips, tongue and mucus membranes and slate grey skin), headache, fatigue, exercise intolerance, dizziness. Moderate effects include weakness, shortness of breath and quickened heartbeat.

At the levels measured in your drinking water, the concern is for infants up to the age of six months who are most susceptible to suffering methaemoglobinemia. It is recommended that when the level of nitrate in the water is between 50 and 100 milligrams per litre of water (mg/l), bottle fed infants up to the age of six months should be given ready-diluted liquid formulae or feeds made from an alternative low nitrate water supply. If the water can be shown to be microbiologically 'safe', then infants can continue to drink the water, providing the nitrate concentration is below 100 mg/l.

Infants receiving breast milk are not considered to be at risk and it is unlikely that adults, including pregnant women, or older children will experience adverse effects at the levels below 100 mg/l.
Where the drinking water nitrate concentration exceeds 100 mg/l, the total nitrate intake estimated from both the drinking water and from food is likely to exceed the health based long-term intake value of 3.7 milligrams per kilogram body weight per day considered to be protective of health. Therefore, it is not recommended that water with a concentration greater than 100 mg/l nitrate is drunk on a long-term basis. Drinking water containing nitrate above 100 mg/l does not necessarily mean that adverse health effects will occur, but it erodes the margin of safety considered to be protective of health.

I/my family member have an existing health condition. Am I more at risk?

Individuals deficient in glucose-6-phosphate dehydrogenase or methaemoglobin reductase are more susceptible to methaemoglobinaemia. If you consider yourself to be included in the ‘at risk group’ you may wish to contact your General Practitioner for medical advice.

What about the effects of exposure to my children? What about my unborn child?

Methaemoglobinaemia occurs more readily in bottle-fed babies and is then known as infantile methaemoglobinaemia (IM), also known as ‘blue baby syndrome’. Clinical symptoms of mild IM include cyanosis (bluish discoloration) of the skin, lips, tongue and nose, headache, fatigue and dizziness. There is no evidence of methaemoglobinaemia in pregnant women from drinking water containing elevated concentrations of nitrate, nor that appreciable amounts of ingested nitrate by pregnant women transferred to the unborn child.

Immediate, precautionary, health advice:

- If your water sample exceeds the recommended PCV of 50 mg/l, infants up to the age of six months should be given ready-diluted liquid formulae or feeds made from an alternative water supply in line with NHS advice.

- It is important to note that the use of bottled water for making up infant formula is not recommended, as it may not be sterile. Also it should not contain more than 200 mg/L of sodium or 250 mg/L of sulphate. Appropriate advice can be obtained from the NHS Choices website (see below).

- Your water can be continued to be used for bottle fed infants under six months of age, only if it has been confirmed to be free from microorganisms and below 100 mg/l.

- If you choose to continue to use the water (once it has been shown to be free from microorganisms) then you should make sure that your child’s GP is aware and increases their vigilance for methaemoglobinaemia.

- Adults and older children can continue to drink the water if the maximum level of nitrate measured in your drinking water is below 100 mg/l. However, if you consider yourself to be in the ‘at risk group’, as detailed above, you may wish to consult your GP for advice.

- It is not recommended that water with a nitrate concentration above 100 mg/l is drunk on a long-term basis (i.e. for more than a few weeks).

Where can I get further information?

For further FAQs, try the US Agency for Toxic Substances and Disease (ATSDR) Toxic Substances Portal for nitrate at: http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=1186&tid=258

Public Health England’s Compendium of Chemical Hazards for nitrate at: http://www.hpa.org.uk/Topics/ChemicalsAndPoisons/CompendiumOfChemicalHazards/

Can I use bottled water to make up baby formula (infant formula)? NHS Choices: http://www.nhs.uk/chq/Pages/1945.aspx?CategoryID=62&SubCategoryID=64
You have been given this factsheet because your water sample exceeded the recommended PCV set by the Drinking Water Regulations for Cadmium.

As your water sample result has shown an exceedance, we would recommend that you get another water test as there are different factors such as seasonal variation (particularly wet or dry months) that could affect the results.

This factsheet will give you more information about cadmium and will provide immediate precautionary advice, if necessary.

**Where does cadmium come from?**

Cadmium is a metallic element that is naturally present in the environment. Cadmium is used in a number of processes such as soldering, the production of fertilisers and nickel-cadmium batteries. Some cadmium is released into the environment from the natural weathering of minerals; from forest fires; and volcanoes. It is also released into the environment from human activities, such as the use of fertilisers; burning coal; making iron; steel; cement and the disposal of household waste. The greatest exposure to cadmium is usually from food.

**The results say I have an exceedance of cadmium. What does this mean and what are the possible health effects?**

Standards (PCV) for water quality are set by Government to ensure supplies of water consumed by the public are of a good quality. Some PCVs are set to protect health, but others are set to prevent the water tasting, smelling or looking bad or staining laundry, sinks and baths.

The UK PCV for cadmium in drinking water is 5 micrograms per litre of water (µg/l) and is set to protect health. The main potential risk to health from the long-term ingestion of cadmium is damage to the kidneys and bone.

At the concentration measured in your drinking water, there is unlikely to be a risk to health for adults and children over the short-term. However, there is some uncertainty over the precise intakes of cadmium over the long-term that are associated with adverse effects i.e. on the kidney. Therefore, you may wish to consult your GP if you have been drinking the water for many years.

Although inhalation of cadmium (and its compounds) can cause cancer, it is not considered to cause cancer following consumption via the oral route, such as of drinking water.

It is not recommended that water with a cadmium concentration exceeding the PCV should be consumed on a long-term basis.
I/my family member have an existing health condition. Am I more at risk?

Smokers may be at greater risk from cadmium because they are exposed to additional cadmium through smoking.

What about the effects of exposure to my children? What about my unborn child?

Children are expected to be affected in the same way as adults. However, due to their younger age, children would not be expected to suffer the cumulative kidney damage that may occur in some adults following many years of exposure.

Immediate, precautionary, health advice:

- It is not recommended that water with a cadmium concentration exceeding the PCV is drunk on a long-term basis.

Where can I get further information?


For further FAQs, try the US Agency for Toxic Substances and Disease (ATSDR) Toxic Substances Portal for cadmium at: http://www.atsdr.cdc.gov/toxFAQs/tf.asp?id=47&tid=15