

Per- and poly- fluoroalkyl substances (PFAS) Factsheet

What are per- and poly- fluoroalkyl substances?

Per- and poly- fluoroalkyl substances, also known as 'PFAS', are a large group of manufactured chemicals. PFAS are also known as perfluorinated chemicals (PFCs). This group of chemicals includes perfluorooctanesulfonic acid (PFOS) and the related chemicals perfluorooctanoic acid (PFOA) and perfluorohexanesulfonic acid (PFHxS).

PFAS have been used since the 1950s in a range of common household products and in some specialty applications. These include in the manufacture of non-stick cookware; fabric, furniture and carpet stain protection applications; food packaging; some industrial processes; and in some types of fire-fighting foam.

Why are these chemicals being phased out?

The manufacture and use of some PFAS are being discontinued or limited through international agreements and voluntary actions by manufacturers primarily because of their persistence in the environment, rather than because of any established health effects. PFAS break down very slowly in the environment under naturally occurring conditions. Because of this, they tend to accumulate in the food chain and in human tissue. The international scientific community has identified this characteristic as undesirable because of the potential for unforeseen effects resulting from accumulating levels, and the difficulty in removing these chemicals from the environment once they are released.

How are people exposed to PFAS?

PFAS are found at very low levels in the blood of the general population all over the world. The general public are exposed to small amounts of PFAS in everyday life through exposure to dust, indoor and outdoor air, food, water and contact with consumer products that contain these chemicals. For most people, food is thought to be the major source of exposure. Treated carpets and floors treated with waxes and sealants that contain PFAS can be an important source of exposure for babies and infants.

PFAS may be readily absorbed through the gut and are not metabolised or broken down in the body. These chemicals are only very slowly eliminated from the body. Studies have shown that Australians have small amounts of PFAS in their blood. PFAS can also be found in urine and breast milk.

People who work in industries that use PFAS, or use products containing these chemicals, may be exposed to higher levels than the general public.

Where larger quantities of PFAS have been released into the environment, communities located near those sites may be exposed to higher levels than the general public. It is important to understand how people living near contaminated areas may come into contact with PFAS so that exposure may be minimised. This could include by examining in detail the pathways through which people could be exposed to these chemicals may be one method used to determine potential exposure in these communities.

Are there any health effects linked to PFAS in humans?

The potential effects of exposure to PFAS to human health continue to be studied. These studies involve laboratory animal studies, as well as occupationally exposed workers (i.e. manufacturing workers), residents in communities with higher exposure and studies of the general population in the USA and other countries.

Adverse health effects have been demonstrated in animal studies, but at much higher exposure levels than are found in people. However, the results of these animal studies and how they apply to humans is not always clear.

Much of the research on humans has been done with people who were exposed to relatively high levels of PFAS through their work. Workers involved in the manufacture or use of PFAS usually have higher blood PFAS levels than the general public. Studies on PFAS workers have looked for effects on cholesterol levels, male hormones, heart disease, liver changes and other effects, including cancer. These studies have not consistently shown that PFAS exposure is linked to health problems.

Whether PFAS cause health problems in humans is currently unknown, but on current evidence the potential for adverse health effects cannot be excluded. Also, because the elimination of PFAS from the human body is slow, there is a risk that continued exposure to PFAS could result in adverse health effects due to accumulation of the chemicals in the body over time. As a precaution, people living in or near an area that has been identified as having been contaminated with PFAS should take steps to limit their exposure to these chemicals.

What is the evidence telling us so far?

A number of health conditions have been highlighted for further research based on the evidence so far. These conditions have been mentioned by international health agencies as being possibly linked to PFAS exposure. The following questions provide a brief explanation of the evidence available on some of these health conditions.

Does PFAS exposure affect cholesterol levels?

A number of studies show a possible link between PFAS exposure and increased blood cholesterol. Because of the design of the studies, it can't be determined if PFAS causes the increased blood cholesterol changes or if other factors are involved, such as diet.

Does PFAS exposure cause cancer?

There is no conclusive evidence that exposure to PFAS causes cancer in humans. Some studies have shown a possible link between prostate, kidney, and testicular cancers in workers involved in the manufacture of PFAS. In these studies other potential cancer-causing factors such as smoking were not considered. There are also some studies that have not shown a link between cancers and PFAS exposure.

Studies in rats have shown an increase in some types of thyroid cancer. The results are inconsistent, as rates of cancer only increased with one level of exposure. Higher and lower levels of exposure did not increase cancer in the rats.

Does PFAS exposure affect the immune system?

Some studies in animals show that immune problems may be associated with PFAS exposure. Other studies show that there isn't an effect. Some organisations are saying that PFAS is presumed to be an immune hazard to humans based on these animal studies. In studies that do show an effect on the immune system in certain people, there is no evidence that these people get more infections.

One study has shown that there is a possible link between PFAS and ulcerative colitis, but no other autoimmune disease. The evidence so far does not show any link between PFAS and autoimmune problems.

Does PFAS exposure cause problems during pregnancy?

There is currently no consistent evidence that exposure to PFAS causes poor outcomes in pregnant women or their babies. There are some studies that show a lower birth weight in babies born to mothers with higher levels of PFAS in their blood. Because of the design of these studies, it is not possible to know if PFAS causes this change or if other factors are involved. There are also some studies that have not shown a link between a lower birth weight and PFAS exposure during pregnancy.

How can I reduce my exposure to PFAS?

PFOS and PFOA are being withdrawn from service at commercial and industrial premises, and similar products are being phased out and replaced with more sustainable alternatives. However, PFAS chemicals may be present in the environment due to historic use or release from pre-treated articles imported into Australia.

The available data from the 24th Australian Total Diet Survey suggests that dietary exposure to PFAS from the general food supply is likely to be low as the majority of samples in studies reported in Australia and elsewhere did not detect these chemicals in testing.

If you live in or near a contaminated area, advice will be provided to your community on possible exposure. The advice will include information on how you may be exposed, and what actions you can take to reduce your exposure. This advice will be specific to the particular site, and information provided to communities in other areas may not apply to you. The extent of contamination, the movement of the chemicals in the environment, and likely routes of exposure will be different at different sites.

In areas where contamination of water (for example in underground springs, water bores, dams, ponds or creeks) has been identified, human exposure can be minimised by:

- not drinking the water or using it to prepare food
- not consuming food products (for example, eggs, milk, meat, fish, fruit or vegetables) grown or produced using, or in, contaminated water
- avoiding or minimising the use of the water for showering/bathing, sprinklers or to fill swimming pools or paddling pools due to the possibility of unintentionally drinking the water.

If people are concerned about use of contaminated water, an alternative water source, if available, may be considered for poultry and use on homegrown crops.

Should I continue to breastfeed?

Yes. While some PFAS have been detected in breast milk, the proven health benefits associated with breastfeeding outweigh any potential health risk to an infant from the transfer of PFAS through breast milk. Breastfeeding mothers living in or around sites contaminated with PFAS do not need to stop breastfeeding.

How long does it take for PFAS to leave my system?

The time it takes for PFAS to be excreted from the body is the same for adults and children. In humans, studies suggest that the half-life of PFAS could range from two to nine years.

Should I get my blood tested?

Blood tests are not recommended to determine whether any medical condition is attributable to exposure to PFAS and have no current value in informing clinical management, including diagnosis, treatment or prognosis, in terms of increased risk of particular conditions over time.

Blood testing will provide information on whether you have been exposed to a higher level of these chemicals than the rest of the Australian population.

It takes a very long time for levels of these chemicals to reduce in humans, with the levels of some people taking three to eight years to reduce by half if there is no ongoing exposure. This means that levels in the blood now may reflect exposure from years ago, not necessarily recent exposure. For these reasons, it is considered that there is no value in frequent blood monitoring.

Anyone concerned about their own health or that of family members should talk to their GP or call 13HEALTH (13 43 25 84).