

# Voluntary blood testing for per- and poly- fluoroalkyl substances (PFAS)

## Advice for General Practitioners

**The following information has been developed for general practitioners who may be approached by patients concerned about being exposed to per- and poly- fluoroalkyl substances (PFAS).**

### Key messages

- Per- and Poly-fluoroalkyl Substances (PFAS) are manufactured chemicals that have been widely used globally since the 1950's to make household and industrial products that resist heat, stains, grease and water.
- Their historical use in fire-fighting foams has raised concerns in a number of Victorian communities, including Gippsland.
- There is no consistent evidence that PFAS cause any specific illnesses in humans, including cancer.
- There is currently no consistent evidence that exposure to PFAS causes poor outcomes in pregnant women or their babies or that breastfeeding mothers living in or around sites contaminated with PFAS need to stop breastfeeding.
- As a precaution, human exposure to these chemicals should be minimised whilst the potential effects of these substances on human health continues to be researched.
- Blood tests have no diagnostic or prognostic value and are not recommended for the purpose of determining whether an individual's medical condition is attributable to exposure.

### What are PFAS?

Per- and Poly-fluoroalkyl Substances (PFAS) are manufactured chemicals that have been widely used globally since the 1950's to make household and industrial products that resist heat, stains, grease and water. They were previously used as ingredients in fire-fighting foams because they are heat resistant and film-forming in water.

There are many types of PFAS. The best known examples are perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS).

PFAS compounds can travel long distances through soil and water and enter groundwater. These substances don't break down in the environment and can accumulate in animals, and humans. However, in humans, there is no consistent evidence that PFAS cause any specific illness in humans, including cancer.

### How are people exposed to PFAS?

People in Australia commonly have a small amount of PFAS in their body due to the widespread use of PFAS in common household products. PFAS are readily absorbed through the gastro-intestinal tract, however dermal absorption is limited. As such, the major sources of human exposure to PFAS include:

- Drinking PFAS-contaminated water
- Ingesting food contaminated with PFAS, such as certain types of fish and shellfish.

Studies suggest that following ingestion, PFAS are almost completely absorbed from the gastrointestinal tract, minimally metabolised and do not undergo chemical reactions in the body. PFAS are primarily excreted in the urine. The half-life of various PFAS is variable, ranging from about two to nine years depending on the study.

For contaminated sites, advice about minimising exposure to PFAS is issued on a site-specific basis and will depend on whether exposure to contaminated water or food is likely. Public advice currently exists for consumption of barramundi from Hazelwood pondage in the Latrobe Valley.

## What are the PFAS levels in the Australian population?

Most people in Australia and in other industrialised countries have measurable amounts of PFAS in their blood due to the historic large range of uses of these chemicals. Assessment of background levels of PFAS in the Australian community can be undertaken by pooled blood testing. The background levels of three commonly identified PFAS in human blood from a study by Toms et al<sup>1</sup> on data collected in 2010/2011 were:

PFAS	Frequency of detection	Mean (ng/ml)	Standard Deviation (ng/ml)	Range (ng/ml)
PFOS	100%	10.2	3.7	4.4 – 17.4
PFHxS	100%	3.3	1.0	1.4 – 5.4
PFOA	100%	4.5	0.8	3.1 – 6.5

Adverse effects in workers exposed to high level of PFOS have not been reported at serum concentrations below 2000ng/ml.

## Health effects of PFAS

Research into potential health effects of PFAS is ongoing around the world. To date there is not enough information available to definitively say what, if any, health effects may be caused by exposure to PFAS.

Studies on animals with exposure levels much higher than levels found in people, have identified possible links with effects on the immune system, liver, reproduction, development and benign (non-cancerous) tumours.

However, studies in people have not provided definitive results. PFAS behaves differently in the bodies of animals compared to humans, so effects shown in one animal may not mean the same thing happens in humans.

Much of the research on humans has been conducted with people who were exposed to relatively high levels of PFAS through their work. Studies on people exposed to PFAS in the workplace have looked for effects on cholesterol levels, male hormones, heart disease, liver changes and other effects, including cancer.

There is currently no consistent evidence of adverse human health effects related to PFAS exposure, however, due to its long term persistence in the environment, bioaccumulation and long half-life in humans (approximately five years), the possibility cannot be excluded. Therefore as a precaution, human exposure to these chemicals should be minimised whilst the potential effects of these substances on human health continues to be researched.

## 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. However, the design of these studies means it is not possible to know if PFAS is the cause of this observed effect or if other factors are involved. Furthermore, there are also some studies that have not found any link between a lower birth weight and PFAS exposure during pregnancy.

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<sup>1</sup> Toms L, Thompson J, Rotander A, Hobson P, Clafat A, Kato K, Ye X, Broomhall S, Harden F and Mueller J. *Decline in perfluorooctane sulfonate and perfluorooctanoate serum concentrations in an Australian population from 2002 to 2011*. Environment International. 71(2014) 74-80.

## Breastfeeding

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. There is no evidence that breastfeeding mothers living in or around sites contaminated with PFAS need to stop breastfeeding.

## Treatment

There is no practical treatment available to remove PFAS from the body, therefore everyone should minimise exposure where possible.

## Blood testing

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.

A blood test can measure the level of PFOS, PFOA or PFHxS in a person's blood which may be compared with the levels seen in the general Australian population.

These tests are not routine and there is at present insufficient scientific evidence to determine whether specific blood levels are or will be associated with ill health now or later in life, or if any current health problems are related to the PFAS levels found in their blood.

In the absence of any test, including a blood test, being definitive in informing individual risk and clinical management, exposure reduction is the key measure to reduce any possible health risks posed by exposure to PFAS.

## Further information

If you require any further information or assistance please contact the Department of Health and Human Services on 1300 761 874.

**Information on PFAS including the value of blood testing can be found at:**

- [enHealth Guidance Statements on PFAS June 2016](http://www.health.gov.au/internet/main/publishing.nsf/Content/A12B57E41EC9F326CA257BF0001F9E7D/$File/enHealth-PFAS-Guidance-Statements.pdf)  
<[http://www.health.gov.au/internet/main/publishing.nsf/Content/A12B57E41EC9F326CA257BF0001F9E7D/\\$File/enHealth-PFAS-Guidance-Statements.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/A12B57E41EC9F326CA257BF0001F9E7D/$File/enHealth-PFAS-Guidance-Statements.pdf)>
- [Australian Health Protection Principal Committee PFAS Fact sheet June 2016](https://www.health.gov.au/internet/main/publishing.nsf/content/A12B57E41EC9F326CA257BF0001F9E7D/$File/PFAS-factsheet-15June2016.pdf)  
<[https://www.health.gov.au/internet/main/publishing.nsf/content/A12B57E41EC9F326CA257BF0001F9E7D/\\$File/PFAS-factsheet-15June2016.pdf](https://www.health.gov.au/internet/main/publishing.nsf/content/A12B57E41EC9F326CA257BF0001F9E7D/$File/PFAS-factsheet-15June2016.pdf)>

**Information on the Food Standards Australia New Zealand's review of the health-based guidelines for PFAS can be found at:**

- [Health based guidance values for per- and poly-fluoroalkyl substances \(PFAS\)](http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas-hbgv.htm)  
<<http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas-hbgv.htm>>
- [Consumption advice for recreational fishers - Hazelwood pondage fact sheet](http://www.epa.vic.gov.au/about-us/news-centre/news-and-updates/news/2017/april/03/hazelwood-pondage-updated-advice-for-recreational-fishers-eating-barramundi)  
<<http://www.epa.vic.gov.au/about-us/news-centre/news-and-updates/news/2017/april/03/hazelwood-pondage-updated-advice-for-recreational-fishers-eating-barramundi>>

**Information on defence site investigations and management program for PFAS can be found at:**

- <http://www.defence.gov.au/id/PFOSPFOA/Default.asp>  
<http://www.defence.gov.au/id/PFOSPFOA/Default.asp>

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Authorised and published by the Victorian Government, 1 Treasury Place, Melbourne. (April, 2017)