

## enHealth Guidance Statements on per- and poly-fluoroalkyl substances

### **Background and context:**

Per- and poly-fluoroalkyl substances, or “PFAS”, are a class of manufactured chemicals that have been used since the 1950s to make products that resist heat, stains, grease and water. Until recently, this group of chemicals was known as “perfluorinated chemicals”, or “PFCs”. The name change has come about to avoid confusion with another group of chemicals that are relevant to climate change, which are also known as “PFCs”.

Products that may contain PFAS include furniture and carpets treated for stain resistance, foams used for firefighting, fast food or packaged food containers, make up and personal care products and cleaning products. Other chemicals used in these applications may be precursors to PFAS, and the PFAS are formed when these chemicals are released into the environment.

PFAS are of concern around the world because they are not readily broken down in the environment and so can persist for a long time. Their widespread use and persistence means that many types of PFAS are ubiquitous global contaminants.

The PFAS of most concern are perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). Many countries have phased out, or are in the process of phasing out the use of PFOS and PFOA due to concerns about their persistence, bioaccumulation and toxicity. Perfluorohexane sulfonate (PFHxS) is another chemical of the PFAS group and is present in some fire-fighting foams. PFHxS have also been used as raw materials or precursors to produce PFAS-based products.

Because of their widespread use, people in Australia commonly have some PFOS, PFOA and PFHxS in their body. PFOS and PFOA are readily absorbed through the gut, and once these chemicals are in a person’s body it takes about two to nine years, depending on the study, before those levels go down by half, even if no more is taken in.

The Australian Government has been working since 2002 to reduce the importation of some PFAS. In Australia and internationally where the use of PFAS has become restricted, a general trend towards lower PFAS levels in a person’s body has been observed.

Outside of the occupational setting, exposure to PFAS can occur from the air, indoor dust, food, water and various consumer products. For most people food is expected to be the primary source of exposure to these chemicals. Human breast milk may contribute to exposure in infants since some PFAS have been detected in human breast milk.

For some communities near facilities where PFAS have been extensively used, higher levels may be found in the surrounding environment and human exposure may occur through other means, including drinking water supplied from groundwater.

In chronic exposure studies on laboratory animals, research into PFOS and PFOA has shown adverse effects on the liver, gastrointestinal tract and thyroid hormones. However, the applicability of these studies to humans is not well established.

The existing limited studies on PFHxS suggest that this chemical can cause effects in laboratory test animals similar to the effects caused by PFOS. However, based on available studies, PFHxS appears to be less potent in animal studies than PFOS.

In humans, research has not conclusively demonstrated that PFAS are related to specific illnesses, even under conditions of occupational exposure. Recent studies have found possible associations with some health problems, although more research is required before definitive statements can be made on causality or risk.

Because the human body is slow to rid itself of PFAS, continued exposure to these chemicals can result in accumulation in the body. Due to the potential for accumulation, and while uncertainty around their potential to cause human adverse health effects remains, it is prudent to reduce exposure to PFAS as far as is practicable. This means that action needs to be taken to address the exposure source or possible routes of exposure. Determination of exposure is best achieved through a full human health risk assessment that examines all routes of exposure.

It is understandable that communities living in PFAS affected areas may want to know what their level of exposure to PFAS is and what this means for their health and the health of their families. The lack of certainty around the potential for health effects can compound concerns.

A blood test can measure the level of PFAS in a person's blood and can tell a person about their exposure to PFAS and how their blood PFAS levels compare with the levels seen in the general Australian population. However, these tests are not routine and there is at present insufficient scientific evidence for a medical practitioner to be able to tell a person whether their blood level will make them sick now or later in life, or if any current health problems are related to the PFAS levels found in their blood.

As such, 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 to PFAS.

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 risks posed by PFAS.

At a population level, blood tests can inform a community that they have been exposed to PFAS at a level above that of the general population. The monitoring of pooled community blood samples over time may help determine the success of exposure reduction measures.

Recognising the difficulty in assessing and communicating the risks posed by PFAS to the community, enHealth has developed these guidance statements on key health issues to support jurisdictional responses to incidents of environmental PFAS contamination.

## **Environmental Health Standing Committee (enHealth) Guidance Statements:**

### **1. Health impacts from exposure to PFAS**

There is currently no consistent evidence that exposure to PFAS causes adverse human health effects.

Because these chemicals persist in humans and the environment, enHealth recommends that human exposure to these chemicals is minimised as a precaution.

### **2. Major human exposure pathways**

For the general community, enHealth considers ingestion of food contaminated with PFAS to be the major human exposure pathway.

In sites contaminated by PFAS, drinking water and specific foods may also be important exposure pathways.

### **3. Reference values for PFOS, PFOA and PFHxS**

On 3 April 2017, the Australian Government Department of Health published health based guidance values for use in site investigations across Australia for PFOS, PFOA and PFHxS.

These values replaced the interim human health reference values adopted by enHealth in June 2016 and are available at [health.gov.au/pfas](http://health.gov.au/pfas).

### **4. Breast feeding**

The significant health benefits of breast feeding are well established and far outweigh any potential health risks to an infant from any PFAS transferred through breast milk.

enHealth does not recommend that mothers living in or around sites contaminated with PFAS cease breast feeding.

### **5. Pregnancy**

There is currently no consistent evidence that exposure to PFAS causes adverse human health outcomes in pregnant women or their babies.

Nonetheless, enHealth recommends that pregnant women should be considered a potentially sensitive population when investigating PFAS contaminated sites, with a view to minimising their exposure to PFAS.

## 6. Blood tests

There is currently no accepted clinical treatment to reduce levels of PFAS in the human body.

Given the uncertainty that PFAS are directly linked to adverse health outcomes, blood tests cannot determine if the PFAS levels in a person's blood will make them sick now or later in life.

Therefore, 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.

It is noted that various organisations around the world have collected blood samples from people as part of ongoing investigations into PFAS contamination of soil and water. The purpose of these tests was either as part of a defined research program, or to determine how much of these chemicals may be entering a person's body. The value of blood testing is limited to assessing exposure, such as monitoring over time, which may help determine the success of exposure reduction measures. However, given the long biological half-life of PFAS, frequent blood monitoring is of no value.

enHealth recommends that:

- blood testing has no current value in informing clinical management; and
- the monitoring of pooled community blood samples over time may help determine the success of exposure reduction measures.