

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 PFASs are formed when these chemicals are released into the environment.

PFASs are of concern around the world because they are not 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 PFASs 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, PFHxS and PFOA 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 PFASs. In Australia and internationally where the use of PFASs 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 PFASs 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 PFASs have been detected in human breast milk.

For some communities near facilities where PFOS, PFOA and PFHxS have been extensively used, higher levels may be found in the surrounding environment and 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 PFASs are related to specific illnesses, even under conditions of occupational exposure. Recent studies have found possible associations to 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 PFOS, PFOA and PFHxS, 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 PFASs 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 PFASs 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 PFOS, PFOA and PFHxS in a person's blood and can tell a person concerned about exposure to PFASs how their blood PFOS, PFOA and PFHxS 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 PFOS, PFOA or PFHxS.

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 PFASs.

At a population level, blood tests can inform a community that they have been exposed to PFASs 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 PFASs to the community, enHealth has developed these guidance statements on key health issues to support jurisdictional responses to incidents of environmental PFAS contamination.

Guidance statements:

1. Health impacts from exposure to PFOS and PFOA

There is currently no consistent evidence that exposure to PFOS and PFOA 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 PFOS and PFOA is the major human exposure pathway.

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

3. Reference values for PFOS and PFOA

In April 2016, enHealth convened an expert group to provide advice to the Australian Health Protection Principal Committee on the development of an Australian interim health reference value for PFOS and PFOA for consistent use in the undertaking of human health risk assessments. The interim health reference value considered relevant international guidelines, as well as contemporary scientific and technical issues.

In June 2016, the Australian Health Protection Principal Committee endorsed the enHealth statement on *Interim national guidance on human health reference values for per- and poly-fluoroalkyl substances for use in site investigations in Australia*, available at [enHealth publications](#).

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 PFOS or PFOA transferred through breast milk.

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

5. Pregnancy

There is currently no consistent evidence that exposure to PFOS or PFOA 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 PFOS and PFOA contaminated sites, with a view to minimising their exposure to PFOS and PFOA.

6. Blood tests

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

Given the uncertainty that PFASs 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 PFOS or PFOA 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 PFASs, 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.