

Per- and poly-fluoroalkyl substances (PFAS)

BACKGROUND

What are per- and poly-fluorinated alkyl substances (PFAS)?

Per- and poly-fluoroalkyl substances (PFAS) are a class of manufactured chemicals that have been used since the 1950s to make products that resist heat, stains, grease and water.

Firefighting foams used to contain PFAS due to their effectiveness in extinguishing fuel fires.

There are many types of PFAS, with the most well-known known examples being perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS).

Why are PFAS an issue?

These chemicals have been identified worldwide as emerging contaminants.

Firefighting foams containing PFAS were used by the NT Fire and Rescue Service until the mid 2000s and the Australian Defence Force until 2011.

These foams would have most likely entered the environment through the ground and nearby waterways.

There is potential for PFAS to impact the environment but the extent of that impact is uncertain and will vary from location to location.

The science in this area is evolving and further sampling is needed to investigate the risks to ecological communities.

National environmental water quality guidelines for PFAS are currently being finalised and these will be important in assessing the ecological significance of PFAS in the environment.

HEALTH EFFECTS

Are PFAS harmful?

National health authorities advise there is currently no consistent evidence that exposure to PFAS causes adverse health effects.

Food Standards Australia New Zealand (FSANZ) was contracted by the Australian Department of Health in June 2016 to examine and report on all of the available evidence, including a number of comprehensive international assessments on the health effects of three main PFAS (PFOS, PFOA and PFHxS). FSANZ provided its report titled *Perfluorinated chemicals in food* which contained four supporting documents (Hazard Assessment Report—PFOS, PFOA and PFHxS, Dietary Exposure Assessment, Summary of Other Controls for Perfluorinated Chemicals, and Criteria for the Establishment of Maximum levels in Food) to the Department of Health in April 2017. The FSANZ report contained recommendations on final health based guidance values that included Tolerable Daily Intake (TDI), drinking water and recreational water quality values for PFOS/PFHxS and PFOA.

A TDI is a conservative estimate of the amount of a chemical in food or drinking water that can be consumed daily over a lifetime without appreciable health risk to the consumer, expressed on a body weight basis. For PFAS, the major routes of exposure in communities are through contaminated drinking water and contaminated food.

The new national recommended health based guidance values are as follows:

	PFOS/PFHXs combined	PFOA
Tolerable daily intake ($\mu\text{g}/\text{kg}$ bw/day)	0.02	0.16
Drinking water quality value ($\mu\text{g}/\text{L}$)	0.07	0.56
Recreational water quality value ($\mu\text{g}/\text{L}$)	0.7	5.6

The new health based guidance values will be used consistently in undertaking human health risk assessments across Australia.

The new health based guidance values are protective of human health; are a precautionary measure for use when conducting site investigations; and are to assist in providing advice to affected communities on how to minimise exposure to PFAS.

What are the health effects of exposure to these chemicals?

Whether significant health problems in humans occur because of exposure to PFAS is currently unknown, but on current evidence from studies in animals, the potential for adverse health effects cannot be excluded. Because the elimination of PFAS from the human body is slow, there is a risk that continued exposure to PFAS could cause adverse health effects, hence the current precautionary approach that people minimise their exposure to PFAS.

EXPOSURE

Should people concerned about exposures to PFAS get themselves tested?

Blood testing has no current value in informing clinical management.

The Australian Department of Health does not advise individuals to be tested for PFAS exposure, although specific PFAS can be measured in serum (blood) to measure trends in areas affected areas around Australia. The measurements must be done in specialised laboratories. Importantly, a serum PFAS concentration does not provide medical practitioners with meaningful diagnostic or treatment information, and cannot predict future health effects.

Blood testing does not indicate when exposure to PFAS occurred or the source of the exposure, although it may be suggestive.

It is important to keep in mind that most Australians have serum concentrations of one or more specific PFAS, including PFOS and PFOA, due to exposure to these chemicals through its former uses in various household and commercial products.

If you think you have been exposed to PFOS or PFOA and you have any health concerns, please consult your general practitioner.

Are there methods to show whether people have been exposed to PFAS?

Various methods are available for testing if people have been exposed to PFAS. One method, known as biomonitoring, involves measuring how much of a chemical is present in the human body. Levels of a contaminant in the body suggest that some level of exposure has occurred, but biomonitoring cannot determine which exposure(s) caused the chemical to be present. Moreover, the presence of chemicals in the blood or other body tissue does not automatically mean that harmful health effects will occur. Scientists do not currently know whether and at what common levels of exposure many contaminants, including PFAS, in the blood could lead to harmful effects.

How do I eliminate PFAS from my body if I have been exposed?

Currently, there are no medical interventions that will remove PFAS from the body.

The best intervention is to reduce exposure to PFAS sources.

I am pregnant and I am concerned – should I be concerned?

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

Nonetheless, the DOH 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.

Can I breast feed my child?

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.

Hence, it is not recommended that mothers living in or around sites contaminated with PFOS or PFOA cease breast feeding.

GOVERNMENT RESPONSE

What is the Government's response?

The Northern Territory Environment Protection Authority and the Northern Territory Department of Health are co-chairing a PFAS Interagency Working Group. Other members include:

- Department of Defence
- NT Airports
- Airservices Australia
- Department of the Chief Minister
- Power and Water Corporation
- Department of Environment and Natural Resources
- Department of Primary Industry and Resources
- Department of Trade, Business and Innovation
- NT Worksafe
- Northern Territory Police, Fire and Emergency Services
- Commonwealth Department of Infrastructure and Regional Development

This working group is responsible for a co-ordinated approach to the investigation and response to potential environmental and health issues related to PFAS, including the development and coordination of a Northern Territory PFAS Legacy Site Investigation Strategy.

This strategy guides an expanded investigation into the presence of PFAS in water and soils at locations where they may have been used in large quantities in the NT, including airports, firefighting training facilities and some industrial sites.

The response has included testing of drinking water supplies, sediment and aquatic foods in natural waterways around the NT.

PFAS and WATER

Can I drink the water?

The Northern Territory Chief Health Officer has advised that public drinking water is safe for consumption. Drinking water testing results in Alice Springs, Katherine, Batchelor, Adelaide River and Darwin regions indicate PFAS levels are within the drinking water quality guidance values.

Residents in the Katherine region living near RAAF Base Tindal who rely solely on bore water and don't have access to the town water supply are advised to contact the **Department of Defence national hotline on 1800 365 414**.

Should I drink bottled water?

If your water contains PFAS, you may reduce exposure by using an alternative water source for drinking, food preparation, cooking, brushing teeth, and any activity that might result in ingestion of water.

Residents in the Katherine region living near RAAF Base Tindal who do not have a town water supply are advised to contact the **Department of Defence national hotline 1800 365 414**.

Is it safe to take a shower or bath?

The Australian Government Department of Health has stated that routine showering or bathing will not likely cause a significant exposure to PFAS.

Studies have shown very limited absorption of PFAS through the skin. Many PFAS chemicals including PFOS and PFOA are essentially non-volatile, such that inhalation while bathing or showering is not likely to be a major pathway.

Should I filter my tap water before drinking?

There is no recommended specific point-of-use filters for drinking water because the effectiveness and proper use of these devices has not been established. If your water contains PFAS at a combined level that exceeds the guidance value of 0.07µg/L for PFOS + PFHxS and 0.56µg/L for PFOA, you can reduce exposure by using an alternative water source for drinking, food preparation, cooking, brushing teeth, and any activity that might result in ingestion of water.

Residents in the Katherine region living near RAAF Base Tindal who do not have a town water supply are advised to contact the **Department of Defence national hotline 1800 365 414**.

Can I do laundry and wash dishes with tap water?

Yes. Doing laundry or washing dishes is not likely to pose any significant exposure to PFAS.

PFAS and SOIL

Can you remove PFAS from soil and water?

There is currently no known way of extracting PFAS out of soil and water without doing greater harm to the environment.

Strong wet season rains has the potential to dilute and disperse PFAS which could be beneficial, given the low levels of current detection.

Can I eat food grown or sourced in the Northern Territory?

The effect of PFAS on agriculture and food is unclear but there is no evidence to suggest you should stop eating food grown in the Northern Territory. Government departments around Australia are working together to understand the impacts of PFAS on agricultural and related food issues. National studies will help better inform the Northern Territory on any potential impacts on produce. The Northern Territory Department of Primary Industry and Resources is closely monitoring results for environmental testing and will use these to assess the potential risk to produce.

PFAS and SEAFOOD

What fish consumption advice would you provide?

Territorians and visitors to the Territory are advised that there is very little public health risk associated with eating fish if they do so in accordance with the Food Standards Australia New Zealand Advice (FSANZ) [guidelines](#) on fish consumption.

These guidelines relate to mercury levels in fish and detail for the general population that 2-3 serves of fish consumed per week is acceptable except for shark (flake), billfish (swordfish/broadbill and Marlin) which should be limited to one serve per week. Lesser amounts of fish can be safely consumed by pregnant women and children up to 6 years old.

What about long bums and periwinkles?

Current advice is there is a low risk to public health with people consuming aquatic foods (including long bums and periwinkles) from creeks potentially affected by PFAS contamination.

What about fish, crabs and prawns?

Current advice is that the recommended seafood intake remains the same that it has been for many decades - an average 3 serves of these foods per week for an adult and 2 for a pregnant woman or a child. Fish and other aquatic species are highly nutritious foods and a source of protein, omega-3 fatty acids, vitamins and minerals and should be eaten as part of a varied and balance diet.

However, overconsumption of these is not recommended because it may lead to potentially higher intake of harmful substances such as mercury.

FURTHER INFORMATION

Where can I get more information?

More information is available at:

www.ntepa.nt.gov.au

www.defence.gov.au/ID/PFOSPFOA

<http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas.htm>