



# Expert Health Panel for PFAS:

## SUMMARY

### Background

Per- and poly-fluoroalkyl substances (PFAS) are a group of man-made chemicals that resist heat, oil, stains, grease and water and have been widely used since the 1950s in household and industrial products. While there are many types of PFAS, the most common are those referred to as perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). Since 1970, firefighting foams containing PFOS and PFOA were widely used in Australia and in other countries because they were highly effective in fighting liquid fuel fires. However, PFAS chemicals do not break down readily in the environment, can travel long distances through soil and water and can get into groundwater. PFAS levels build up in animals and humans and remain for many years in the human body.

In Australia, decisions were made about 10 years ago to phase out the most concerning PFAS chemicals, including the firefighting foams, to reduce human exposure. Recently, a number of communities close to where these fire-fighting foams were used in the past have been advised to lessen further exposure by not drinking contaminated water sources and eating foods with high levels of PFAS.

It is not practically possible to prevent all PFAS exposure due to the large number of sources from which people may still get very low exposures. Internationally, everyone generally has low levels of PFAS chemicals in their blood. In other countries, people in highly exposed communities (for example, people who live near manufacturing plants where PFAS is made or used), typically have PFAS concentrations up to 10 times higher than those in the general population. In Australia, fire fighters may have concentrations up to 10 times higher. Workers in overseas PFAS manufacturing plants have been found to have PFAS concentrations up to 1,000 times higher than the general population. There are no PFAS manufacturing plants in Australia.

In Australia, available evidence indicates that the amount of the chemical PFOS in the blood is generally higher than PFOA in the general population. It is important to note that many overseas studies relating to workers in manufacturing plants have focussed more on PFOA.

### The Expert Health Panel

An Expert Health Panel was set up to advise the Australian Government on the scientific evidence about potential health impacts from PFAS exposure. The Panel was also asked to identify areas for research. The Panel includes members who are university professors, medical specialists, environmental or public health experts from Australia, and an international university academic.

### Methodology

The Panel reviewed 20 recently published key Australian and international reports and academic reviews that had examined scientific studies on potential human health effects of PFAS exposure. The Panel also undertook a public consultation to inform them of the communities' concerns regarding PFAS, and their suggestions for future research.

### Assessment of evidence

The Panel found that although the scientific evidence on the relationship between PFAS exposure and health effects is limited, current reports, reviews and scientific research provide fairly consistent reports with several health effects. These health effects were

- increased levels of cholesterol in the blood;
- increased levels of uric acid in the blood;
- reduced kidney function;
- alterations in some indicators of immune response;
- altered levels of thyroid hormones and sex hormones;
- later age for starting menstruation (periods) in girls, and earlier menopause; and
- lower birth weight in babies.

However, for the health effects above, the differences reported in the scientific studies between people who have the highest exposure to PFAS and those who have had low exposure, are generally small. The level of health effect reported in people with the highest exposure is generally still within the normal ranges for the whole population.

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*The Panel concluded there is mostly **limited or no evidence** for any link with human disease from these observed differences. Importantly, there is no current evidence that supports a large impact on a person's health as a result of high levels of PFAS exposure. However, the Panel noted that even though the evidence for PFAS exposure and links to health effects is **very weak and inconsistent**, important health effects for individuals exposed to PFAS cannot be ruled out based on the current evidence.*

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The Panel concluded that many of the biochemical (for example, higher cholesterol and uric acid levels in the blood) and disease links reported in the studies may be able to be explained by **reverse causation or confounding**. Reverse causation is when there is a link between the exposure to PFAS and a health effect, but it is not clear whether the exposure has caused the health effect or whether the health effect causes increased exposure. Confounding is where a third factor (for example, age, smoking, or socio-economic status), could influence the findings of the study.

For cancer, the Panel concluded there is **no current evidence that suggests an increase in overall cancer risk**. The Panel did however note that the most concerning signal reported in the scientific studies for life-threatening human disease is a possible link with an increased risk of two uncommon cancers: testicular and kidney cancer. However, these associations were only found in one cohort, and the Panel believes they were possibly due to chance, as they have yet to be found in other studies. Additionally, the Panel noted that the limited amount of evidence which is available on cancer relates to the PFOA chemical, not PFOS (which is more common in Australia).

The Panel noted there are **many issues and limitations** with the studies that make up the evidence base. Hundreds of scientific studies on PFAS and health effects are based on just seven cohorts of people, and that there is a high risk that bias or confounding is affecting the results reported. Bias can occur in any part of a study, from the type of people selected, through to how the researcher chooses to analyse the results. Additionally, there are very large numbers of comparisons being done in many studies. This brings an increased risk that findings may be interpreted as real whereas the finding may have in fact been due to chance. Another complicating factor is that there are lots of different PFAS chemicals, and other environmental or occupational differences, with possible interacting toxic effects, making it difficult to find exactly which chemical is involved or responsible for the study findings. Many of the studies had too few participants to detect important associations.

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*After considering all the evidence, the Panel's advice to the Minister on this public health issue is that the evidence **does not support** any specific health or disease screening or other health interventions for highly exposed groups in Australia, except for research purposes. Decisions and advice by public health officials about regulating or avoiding specific PFAS chemicals should be mainly based on scientific evidence about the persistence and build-up of these chemicals.*

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## Public consultation

The Panel invited written submissions from the public, affected communities and other stakeholders to hear their views about potential health effects of PFAS and priorities for future research. The Panel received 499 submissions through the public consultation.

The public consultation showed that:

- there is concern from the public, many of whom feel that PFAS exposure has already affected their health and it may affect their health in the future;
- public were concerned about past exposure to PFAS, occupational exposure to PFAS (especially in firefighters), and skin contact with PFAS;
- respondents felt they were not informed about the Government's response;
- respondents wanted research on the health effects of occupational exposure to PFAS (in particular among firefighters), and further research into potential health impacts for high-exposure communities;
- blood testing was suggested for those who have been exposed through their work or who live in or near an investigations site.

## Research priorities

The public consultation showed that the community has many concerns about PFAS exposure and several health effects. Cancer risk and risks for children and firefighters stood out as areas of very great concern but there were many other concerns also mentioned.

The Panel's suggestions for research priorities included:

- long-term studies to reduce the risk of bias and confounding;
- adding PFAS exposure analysis to existing large studies (e.g. existing studies of pregnancy or early life, or long-term health of fire fighters);
- studies of exposed communities or workers using linkable data from other health studies (e.g. cancer registries, electronic medical records, etc.);
- better understanding of how PFAS affects humans and at what level, possibly including long-term studies or identifying ways to speed up the body's elimination of PFAS.

The Panel also recommends involving representative(s) of the exposed occupational group and/or community in study advisory committees for future PFAS research.