Expert Health Panel for per and poly-fluoroalkyl substances (PFAS)

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About the Panel

• The PFAS Expert Health Panel (the Panel) was established to:
  • advise the Australian Government on the potential health impacts associated with PFAS exposure; and
  • identify priority areas for further research to inform the National Health and Medical Research Council’s (NHMRC’s) Per- and poly-fluoroalkyl substances – National Health Research Program.
• On 7 May 2018, the Panel’s Report was publicly released.
Methodology

Review of the Evidence

• The Panel considered 8 key national and international reports published from 2015 onwards, and 12 systematic reviews published from 2013 onwards.

• The Panel reviewed the human evidence on PFAS exposure and 14 health effects.

Public Consultation

• The Panel invited written submissions from the public to hear their views about potential health effects of PFAS and priorities for future research.
Public Consultation Outcomes

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.
Overall Assessment of the Evidence

• Although the evidence is limited, reviews and scientific research provided fairly consistent reports of an association with several health effects:
  • increased levels of cholesterol in the blood;
  • increased levels of uric acid in the blood;
  • reduced kidney function;
  • alterations in some indicators of immune function;
  • 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:
  • the differences reported are generally small; and
  • the levels reported are generally still within the normal ranges for the whole population.

• Many of the biochemical (e.g. higher cholesterol) and disease links may be explained by reverse causation or confounding.
Overall Assessment of the Evidence

The Panel concluded:

• There is mostly limited or no evidence for any link with human disease from exposure to PFAS.
• There is no current evidence that supports a large impact on a person’s health as a result of high levels of exposure.
• There is no current evidence that suggests an increase in overall cancer risk.

The Panel noted that even though the evidence for PFAS exposure 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.
Advice to the Australian Government

The Panel’s advice to the Minister for Health on this public health issue is:

• 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.
Potential Health Effect Findings
Cancer

• There is no current evidence that suggests an increase in overall cancer risk.

• The evidence does not support PFAS being a major contributor to cancer burden in workers and exposed community populations.

• Suggestive, but limited evidence, relates to two uncommon cancers (testicular and kidney cancer) in one cohort.

• Very limited evidence relates to bladder and prostate cancer.

• No suggestive or convincing evidence for any other types of cancer.

• The limited evidence for cancer is on PFOA, not PFOS (which is more common in Australia).
Immunological effects

• There is no consistent evidence for increased risk of infections or autoimmune disease.

• Impaired vaccine response is the most consistent reported association.

• Internationally, most studies that have observed decreased antibody levels have not found significant increases in incidence of human disease or associations of higher blood levels of PFAS with infectious disease.

• However, they were generally very underpowered to detect important differences in disease incidence (given the rarity of many of these diseases).
Metabolic biomarkers

• Studies generally show an association of PFAS with total cholesterol levels, but not other lipids.

• The reported increases in blood cholesterol are small.

• The levels reported in people with the highest exposures are generally within the normal ranges for the whole population.

• Established risk factors for high cholesterol and/or heart disease are usually of much greater magnitude than seen in studies on PFAS.
Liver function

• Studies generally show an association of PFAS with elevated liver enzyme ALT.

• The change is generally small and is not considered biologically significant.

• Scientific evidence does not support an association between PFAS and clinically important liver disease.

• Current standard medical tests for liver damage and function in Australians frequently show minor abnormalities such as those associated with PFAS.
Kidney function

• An association of PFAS with impaired kidney function and higher serum uric acid is consistently shown in key reports and reviews.

• The levels reported in people with the highest exposures are generally within the normal ranges for the whole population.

• There is not strong support for a link between PFAS and kidney pathology.
Thyroid effects

• PFAS exposure is unlikely to be a major contributor to the burden of thyroid dysfunction or disease in the community among infants, children or adults.

• For thyroid hormones, the levels reported in people with the highest exposure are generally still within the normal ranges for the population.

• For thyroid disease, there is limited evidence of an association between PFOA and women (in whom thyroid disease is more common), but not in men.
Neonatal, infant and maternal outcomes from exposure during pregnancy

• Current evidence does not support PFAS being a major cause of pregnancy-induced hypertension/pre-eclampsia or other complications of pregnancy.

• PFAS exposure in fetal life was often associated with lower birth weight and length in general population studies, but these decreases are mostly small and within the normal range.
Reproductive outcomes

• Overall the human evidence is weak for a link between PFAS and clinically important reproductive effects.

• The key reports and reviews conclude the strongest evidence for an association is for delayed puberty and reduced sperm quality but these are of unclear significance and quite likely confounded.
Other Health Effect Findings

- Neurodevelopmental and Neurophysiological Effects
- Diabetes, glycaemic control and metabolic syndromes
- Obesity, overweight and BMI
- Cardiovascular effects
- Respiratory effects
- Skeletal effects

For these health effects, there was either no associations or inconsistent associations found, very limited research or weak study designs.
Issues and limitations of the scientific studies

• Hundreds of scientific studies on PFAS and health effects are based on just seven cohorts of people
• There are very large numbers of comparisons being done in many studies
• There are lots of different PFAS chemicals and other environmental or occupational differences with possible interacting toxic effects
• Many of the studies had too few participants to detect important associations
Recommendations for Research Priorities

• 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.
Next Steps

PFAS – National Health Research Program

• The Panel’s Report has been provided to the NHMRC to inform its targeted call for research.

• The targeted call for research is expected to open shortly.

Review of enHealth Guidance Statements

• The Environmental Health Standing Committee (enHealth) has commenced a review of the *enHealth Guidance Statements on per and poly-fluoroalkyl substances*. 
Questions?

The Expert Health Panel for PFAS’ Report is available at: health.gov.au/pfas