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**Submission to Senate Inquiry into the
management of per- and polyfluoroalkyl
substances (PFAS) contamination in and
around Defence bases**

July 2018

Introduction

The Royal Australasian College of Physicians (RACP) welcomes the opportunity to contribute to the Senate Standing Committee on Foreign Affairs, Defence and Trade's inquiry into the management of per- and polyfluoroalkyl substances (PFAS) contamination in and around Defence bases.

The RACP trains, educates and advocates on behalf of over 15,000 physicians and 7,500 trainee physicians across Australia and New Zealand. The RACP represents physicians from a diverse range of disciplines including occupational and environmental medicine physicians, public health medicine physicians and clinical pharmacologists.

We note this inquiry is focused on the following terms of reference:

- a) the extent of contamination in and around Defence bases, including water, soil, other natural assets and built structures;
- b) the response of, and coordination between, agencies of the Commonwealth Government, including, but not limited to, the Department of Prime Minister and Cabinet, the Department of Health, the Department of the Environment and Energy, the Department of Defence and the Australian Defence Force;
- c) communication and coordination with state and territory governments, local councils, affected local communities and businesses, and other interested stakeholders;
- d) the adequacy of health advice and testing of current and former defence and civilian personnel and members of the public exposed in and around Defence bases identified as potentially affected by contamination;
- e) the adequacy of Commonwealth and state and territory government environmental and human health standards and legislation, and any other relevant legislation;
- f) remediation works at the bases; and
- g) what consideration has been given to understanding and addressing any financial impact to affected businesses and individuals.

This submission has been led by [the Australasian Faculty of Occupational and Environmental Medicine \(AFOEM\) Policy & Advocacy Committee](#). AFOEM is a Faculty of the RACP representing specialist occupational and environmental physicians (OEPs) in Australia and New Zealand. We are committed to establishing and maintaining the highest standards of practice in occupational and environmental medicine (OEM) in Australia and New Zealand through training, continuing professional development and advocacy.

This submission focuses on the following key issues:

- Health advice and risk communication including conveying the importance of the exposure-response relationship to the public
- Communication and coordination between agencies of the Commonwealth and other jurisdictions
- Exposure and contamination monitoring
- The precautionary principle

Health advice and risk communication including conveying the importance of the exposure-response relationship to the public

In 2017, the Department of Health established the Expert Health Panel for per- and poly-fluoroalkyl substances (PFAS) to advise the Australian Government on the evidence for potential health impacts associated with PFAS exposure. The Expert Health Panel's report,ⁱ published in May this year, outlines that 'the Panel focussed on identifying and reviewing the *latest* systematic reviews of human epidemiological studies and (inter)national authority/intergovernmental/governmental reviews and reports on potential human health effects of PFAS exposure'. The Expert Health Panel's Report presented the following key findings based on the best available evidence:ⁱⁱ

- "Exposure is largely via oral ingestion and PFAS accumulate in people due to extremely long elimination half-lives (may years)."
- "There are currently no known practical methods for people to speed up elimination."

- “Decisions have been taken to phase out the most persistent PFAS out of use to reduce accumulation.”
- “People have been advised to minimise excessive further exposure by not drinking contaminated water sources and consuming foods with high levels of PFAS (e.g. animals caught in certain areas).”
- “International evidence shows that the general population typically have measurable PFAS concentrations in their blood. And that people in highly exposed communities (e.g. those living near PFAS manufacturing plants) typically have PFAS concentrations up to tenfold higher than those in the general population.”
- “Although the evidence on health effects associated with PFAS exposure is limited, the current reviews of health and scientific research provide fairly consistent reports of associations with several health outcomes, in particular: increased cholesterol, increased uric acid, reduced kidney function, altered markers of immunological response, levels of thyroid and sex hormone levels, later menarche and earlier menopause, and lower birth weight.”
- “Differences between those with the highest and lowest exposures are generally small, with the highest groups generally still being within the normal ranges for the whole population. There is mostly limited or no evidence for an association with human disease accompanying these observed differences. There is no current evidence that supports a large impact *on an individual’s health*. In particular, there is no current evidence that suggests an increase in overall cancer risk. The main concerning signal for life-threatening human disease is an association with an increased risk of two uncommon cancers (testicular and kidney). These associations in one cohort were possibly due to chance and have yet to be confirmed in other studies. However, because the evidence is very weak and inconsistent in many respects, some degree of important health effects for individuals exposed to PFAS cannot be ruled out based on the current evidence.”
- “The published evidence is mostly based on studies in just seven cohorts. These cohorts have generated hundreds of publications but there is a high risk that bias or confounding is affecting most of the results reported. There are very large numbers of comparisons being done in many studies, such that the risk of random variation in exposures and outcomes being interpreted as real associations is greatly increased. This is compounded by the fact that there are multiple PFAS, and other environmental or occupational hazards, so that there may be interacting toxic effects, and it is hard to isolate the association with one or two analysed compounds. Many of the biochemical and disease associations may be explainable by confounding or reverse causation. Many studies had limited power to detect important associations.”
- “The Panel’s advice to the Minister of Health in regards to public health is that “the evidence does not support any specific biochemical or disease screening, or health interventions, for highly exposed groups (except for research purposes). Decisions to regulate or avoid specific PFAS chemicals should continue to be largely based on evidence of persistence and accumulation; they should not need to also be justified by strong evidence of adverse health effects.”

The Australian Government’s latest health advice, published following the Expert Health Panel’s Report, states that: ‘the release of PFAS into the environment is an emerging concern, because these chemicals are highly persistent, have been shown to be toxic to fish and some animals, and can accumulate in the bodies of fish, animals and people who come into contact with them. However, there is currently no consistent evidence that exposure to PFAS causes adverse human health effects.’ⁱⁱⁱ The latest available fact sheet from the Australia Government^{iv} provides the following overview of how PFAS can impact people’s health:

- “PFAS have not been proven to cause any specific illnesses in humans. However, since these chemicals remain in humans and the environment for many years, it is recommended that as a precaution human exposure to PFAS be minimised.
- Research into potential health effects of PFAS is ongoing around the world. To date there is not enough information available to definitively say what, if any, health effects may be caused by exposure to PFAS.
- In studies where large doses of PFAS are given to laboratory animals, possible links with effects on the immune system, liver, reproduction, development and benign (non-cancer) tumours have been identified. However, studies in people have not provided definitive results.

PFAS behaves differently in the bodies of animals compared to humans, so effects shown in one animal may not mean the same thing happens in humans.

- There is no current evidence that supports a substantial impact on an individual's health from PFAS exposure. A number of studies show a link between PFAS exposure and several health effects, however there is limited or no evidence of human disease accompanying these health effects. (...) Organisations that study toxic chemicals have concluded that it is not currently possible to identify any definite diseases caused by PFAS due to problems with study designs and contradictions in study results.
- As part of the Australian Government's response to PFAS contamination at Defence sites, the Australian National University has been commissioned to undertake an epidemiological study (a health study that looks at patterns of disease in a population) of three sites in Australia – Williamtown in New South Wales, Oakey in Queensland and Katherine in the Northern Territory. This study is expected to add to understanding the effects of PFAS on health in this population.”

In relation to the emphasis on caution with regard to PFAS exposure, we highlight the following examples of international advice:

- The USA Environmental Protection Authority's 2016 Fact Sheet 'PFOA & PFOS Drinking Water Health Advisories' "*Drinking water advice for PFOA and PFOS*" provides the following summary: it states that its guidelines are: "...based on the best available peer-reviewed studies of the effects of PFOA and PFOS on laboratory animals (rats and mice) and were also informed by epidemiological studies of human populations that have been exposed to PFASs. These studies indicate that exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes)."^{vi}
- In 2016 the German Human Biomonitoring (HBM) Commission advised that "*following evaluation of human epidemiological studies (status: July 2015/May 2016), the HBM Commission rates effects in the following areas as well proven, relevant, and significantly associated with exposure to PFOA and/or PFOS:*"
 1. *Fertility and pregnancy -Time to wanted pregnancy-Waiting period for pregnancies >1 year -gestosis and gestational diabetes*
 2. *Weight of newborns at birth*
 3. *Lipid metabolism*
 4. *Immunity after vaccination, immunological development*
 5. *Hormonal development, age at puberty/menarche*
 6. *Thyroid metabolism*
 7. *Onset of menopause* ^{vi}
- The 2009 British health advice lists "PFOA/PFOS Health Effects"^{vii} as follows:
 - Toxic by ingestion
 - Repeated exposure by ingestion can cause stomach upset, liver toxicity and effects on thyroid hormones
 - Skin or eye contact can cause irritation
 - Prolonged exposure may cause cancer
- In 2017, the International Agency on Research on Cancer (IARC) classified PFOA as a Group 2B carcinogen (possibly carcinogenic to humans), based on what the IARC Working Group considered to be limited evidence in both animal and human studies. In its opinion of 2 Dec 2011, the European Union's European Chemical Agency^{viii} (ECHA) Risk Assessment Committee concluded that the evidence is sufficiently convincing to classify PFOA for developmental effects as: Repro. 1B- may damage the unborn child, and as STOT RE1(liver) – causes damage to organs (liver) through prolonged or repeated exposure.

The Australian Environmental Health Standing Committee (enHealth) - a standing committee of the Australian Health Protection Principal Committee - advises that "*there is currently no consistent evidence*

that exposure to perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) causes adverse human health effects'.^{ix} Based on the findings of the Expert Health Panel and the conclusions of international agencies, this health advice should be updated to refer to the identified possible health effects.

In April 2017, the Department of Health released "*Health Based Guidance Values for PFAS for use in site investigations in Australia*".^x As outlined on the [Department of Health website](#), these values are for use in site investigations and human health risk assessments in Australia, they are "expressed as a tolerable daily intake (TDI) and can be used for assessing potential exposure to PFAS through food, drinking water and recreational water during site investigations for PFAS contamination in Australia". These final health based guidance values are not however reflected in the current health advice. AFOEM is concerned that the health advice "that there is currently no consistent evidence of health effects" could be interpreted to mean there is no unsafe dose and no health effects even for exposures above the interim values. We suggest that including a statement such as "at levels below the Tolerable Daily Intake ($\mu\text{g}/\text{kg}/\text{d}$); Drinking Water Quality Guideline ($\mu\text{g}/\text{L}$) and / or Recreational Water Quality Guideline ($\mu\text{g}/\text{L}$)" would be appropriate when discussing the difference between Australian advice for PFAS (as currently constructed) and international advice.

In light of the uncertainty in relation to health effects raised by US EPA, HBM and Public Health England's advice and while definite adverse health effects are not known, the precautionary principle should be applied in relation to human exposure. The precautionary principle is intrinsic to public health and environmental health approaches to ensuring health and wellbeing at a population level. As defined by the World Health Organization (WHO), the precautionary principle 'states that in the case of serious or irreversible threats to the health of humans or the ecosystem, acknowledged scientific uncertainty should not be used as a reason to postpone preventive measures.'^{xi} The precautionary principle has four central components: taking preventive action in the face of uncertainty; shifting the burden of proof to the proponents of an activity; exploring a wide range of alternatives to possibly harmful actions; and increasing public participation in decision making. All these principles lend themselves to action on PFAS and an alteration of the *status quo* with respect to both the health advice and the use of these substances.

Communication and coordination between agencies of the Commonwealth and other jurisdictions

AFOEM in collaboration with the Australasian Faculty of Public Health Medicine (AFPHM), also a Faculty of the RACP, made a submission to the Expert Health Panel in November 2017.^{xii} This submission highlighted that there are inconsistencies in the ways State/Territory and Commonwealth agencies manage PFAS contamination and called for a ban on firefighting foam containing PFOA and PFOS to be implemented nationally so that these inconsistencies are removed.

We are aware of recent initiatives taken by the Australian Government to improve communication and coordination between agencies of the Commonwealth and other jurisdictions since our submission:

- the *Intergovernmental Agreement on a National Framework for Responding to PFAS Contamination* which "supports collaboration and cooperation between the Commonwealth and the States and Territories to respond consistently and effectively to per- and poly-fluoroalkyl substances (PFAS) contamination" which came into effect on 20 February 2018, when the Commonwealth and South Australia became the first signatories."^{xiii}
- The PFAS National Environmental Management Plan (PFAS NEMP) published in January 2018. The PFAS NEMP 'has been developed as an adaptive plan, able to respond to emerging research and knowledge' and seeks to 'provide governments with a consistent, practical, risk-based framework for the environmental regulation of PFAS-contaminated materials and sites'.^{xiv}
- The establishment of the www.PFAS.gov.au Government Portal to provide a central website for access to information from a variety of sources.

Although these recent initiatives, including the www.PFAS.gov.au portal which seeks to provide a central access point to a range of sources with information on PFAS, aim to improve coordination amongst agencies and across jurisdictions as well as information flows, AFOEM feels there is a clear need to consolidate the relevant advice on PFAS found across these sources/websites ([Department of Defence](#), [Department of Health](#), [Department of Health National Industrial Chemicals Notification and Assessment Scheme](#), [Australian National University](#), etc.). As stated on the www.pfas.gov.au portal, the "volume of

information about PFAS from different sources can be overwhelming”. This portal is mainly a link to other sites – but most of these sites do not provide a link back to the <http://www.PFAS.gov.au/> portal. Nor does this portal indicate who has responsibility for the information provided and there are no contact details or ability to provide feedback. AFOEM also strongly recommends the development of a list of frequently asked questions (FAQs) for the varying stakeholders covering the range of issues presented by PFAS (i.e. health, environment, occupational exposure, etc.). There is a need to include an explanation of why reduction of further exposure is recommended with reference to the precautionary principle and current uncertainty about potential health effects across a wide range of body systems.

Advice also needs to be provided clearly to the public, affected communities and relevant occupational groups such as firefighters that exposures above recommended levels do not necessarily equate to harm or disease. AFOEM proposes including a statement outlining that although there is little available evidence that PFAS is associated with the development of specific diseases, the potential long-term effects, including health and environmental effects, are not currently known due to the extremely long elimination half-lives of PFAS from the body which justify the reduction in use and exposure to these chemicals. It should also be emphasised that the current body of scientific evidence is based on generally low quality studies; another factor contributing to uncertainty about human health effects.

Another gap AFOEM has identified is the lack of specific guidance on PFAS aimed at medical practitioners, having only been able to find pre and post blood monitoring advice on the Department of Health website for the ANU epidemiological investigation.^{xv}

Legislation

In July 2016, the Queensland Department of Environment and Heritage Protection introduced a policy to ban the use of firefighting foams containing PFOS and PFOA.^{xvi} Earlier this year, South Australia banned PFAS following public consultation on a draft amendment to the Environment Protection (Water Quality) Policy 2015 which shows strong support for the proposed ban. As stated on the South Australia EPA website, ‘the amendments make South Australia the first state to ban the use of potentially hazardous fluorinated firefighting foams through legislation.’^{xvii} On the other hand, the NSW Minister for the Environment, Ms Gabrielle Upton, was recently asked when New South Wales would ban these chemicals and she responded that ‘this Government cannot ban PFAS. The responsibility for that lies directly at the feet of the Federal Government and the things it has done.’

These examples demonstrate that there are inconsistencies between State/Territory and Commonwealth responsibilities and legislation with regard to banning these firefighting foams and that there is also confusion over which jurisdiction has responsibility for these issues. This sends ‘mixed messages’ with regard to potential toxicity when one jurisdiction takes action to protect the public from exposure whilst the Commonwealth within that same jurisdiction allows potential ongoing exposure on Defence bases which fall under Commonwealth land.

Although there is information on the NICNAS website relating to the significant reduction in the importation of PFAS, there is no information relating to why Australia has not followed international efforts in banning PFAS nor information or justification as to the reason why some PFAS compounds are still permitted.

A ban on firefighting foam containing PFOA and PFOS, including at Defence bases, should be implemented nationally so that inconsistencies between States/Territories and the Commonwealth are removed. As part of this process, any remaining PFAS material will need to be safely destroyed and contaminated sites will need to be managed according to best practice in the investigation and management of PFAS contamination and waste management in accordance with the guiding principles set out in the PFAS NEMP.^{xix}

PFAS NEMP Guiding Principles: ^{xx}

- 1) “a focus on protection of the environment and, as a precaution, protection of human health
- 2) consideration of the principles established by the Intergovernmental Agreement on the Environment in all decision-making, include:
 - a) the precautionary principle
 - b) intergenerational equity
 - c) conservation of biological diversity and ecological integrity
 - d) improved valuation, pricing and incentive mechanisms
- 3) regulatory actions and decisions are risk-based, informed by scientific evidence, focused on the identification of PFAS exposure pathways, and meet national and international obligations
- 4) quantitative PFAS assessment is to be based on appropriate analytical methods and standards, with the required quality assurance control
- 5) consistency across jurisdictions, supported by the Plan, with consideration of accountability for pollution, and management actions
- 6) coordinated and cooperative action on cross-boundary issues, including within catchments
- 7) consideration of legislative and policy frameworks across jurisdictions and at the national and international level for chemical and contaminated sites management
- 8) integration within existing national guidelines
- 9) where existing principles, guidelines, approaches or management options do not adequately foresee or address an identified environment risk, responses are to be guided by available scientific approaches, the precautionary principle and the understanding that action may be required to reduce risk.
- 10) consideration of sustainability, including environmental, economic and social factors, when assessing the benefits and effects of management options, acknowledging the limited management options for PFAS currently available in Australia.”

Exposure and contamination monitoring

AFOEM supports the monitoring of drinking water, soil and food around sites where PFAS contamination is a concern. Such monitoring of environmental media can assist in population risk assessments and compliance with environmental guidelines or standards. The results of such environmental monitoring can also assist with risk communication for concerned communities.

Based on current evidence, AFOEM does not support routine population-based health monitoring or screening for any of the outcomes identified in the findings of the Government’s Expert Health Panel. The main focus should be on reducing human exposure to below guideline levels. This is consistent with the precautionary principle outlined above.

Where individuals are concerned about their health from PFAS exposure, assessment should be undertaken by medical practitioners with relevant training and credentials who can take a full exposure history, undertake a diagnostic workup, identify all relevant risk factors for the identified condition and give appropriate and holistic advice about prevention and management of that condition, which may include restriction on further PFAS exposure. One example is the finding of some evidence for increased cholesterol levels in PFAS exposed people. If increased cholesterol is found in someone concerned about PFAS exposure, general health measures to reduce cholesterol to acceptable levels, as well as giving appropriate advice about avoiding further PFAS exposure in line with the precautionary principle. A similar approach is indicated for other changes where there is some evidence of an association with PFAS exposure, such as low immunity, elevated uric acid levels or changes in thyroid function.

Concluding remarks

AFOEM wishes to thank the Senate Standing Committee on Foreign Affairs, Defence and Trade for the opportunity to contribute its expert advice to this inquiry into the management of per- and polyfluoroalkyl substances (PFAS) contamination in and around Defence bases.

This submission has highlighted the following issues that need the Federal Government’s urgent attention:

- The Federal Government's current health advice should be updated to refer to the identified possible health effects outlined in the findings of the Expert Health Panel and the conclusions of international agencies. It should also reflect the Department of Health's final health based guidance values^{xxi} for use in site investigations and human health risk assessments and apply the precautionary principle in relation to human exposure.
- The relevant advice on PFAS found across sources and websites needs to be consolidated. In addition, a list of frequently asked questions (FAQs) for the varying stakeholders (i.e. affected communities, relevant occupational groups such as firefighters, medical practitioners and the general public) to cover the range of issues presented by PFAS should be developed as well as clear advice to all stakeholders that exposures above recommended levels do not necessarily equate to harm or disease. AFOEM recommends including a statement outlining that although there is little available evidence that PFAS is associated with the development of specific diseases, the potential long-term effects, including health and environmental effects, are not currently known due to the extremely long elimination half-lives of PFAS from the body which justify the reduction in use and exposure to these chemicals. This advice should also emphasise that the current body of scientific evidence is based on generally low quality studies; another factor contributing to uncertainty about human health effects.
- AFOEM calls for a ban on firefighting foam containing PFOA and PFOS, including at Defence bases, to be implemented nationally so that inconsistencies between States/Territories and the Commonwealth are removed. As part of this process, any remaining PFAS material will need to be safely destroyed and contaminated sites will need to be managed according to best practice in the investigation and management of PFAS contamination and waste management in accordance with the guiding principles set out in the PFAS NEMP.^{xxii}
- AFOEM supports the monitoring of drinking water, soil and food around sites where PFAS contamination is a concern. Such monitoring of environmental media can assist in population risk assessments and compliance with environmental guidelines or standards. The results of such environmental monitoring can also assist with risk communication for concerned communities.
- Based on current evidence, AFOEM does not support routine population-based health monitoring or screening for any of the outcomes identified in the findings of the Government's Expert Health Panel on PFAS. The main focus should be on reducing human exposure to below guideline levels. This is consistent with the precautionary principle outlined above.
- Where individuals are concerned about their health from PFAS exposure, assessment should be undertaken by medical practitioners with relevant training and credentials who can take a full exposure history, undertake a diagnostic workup, identify all relevant risk factors for the identified condition and give appropriate and holistic advice about prevention and management of that condition, which may include restriction on further PFAS exposure.

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