

Health impacts of PFAS contamination

- 2.1 The PFAS Sub-committee of the 45th Parliament investigated the adequacy of the Government's health advice on the potential health impacts of PFAS contamination on staff and residents in and around defence bases. An underpinning concern among medical experts, advocates and community groups at that time was that the Government's health advice underplayed the potential risks of high PFAS ingestion and exposure, as indicated in some overseas studies.¹
- 2.2 The Department of Health, while supporting a review of existing health advice, suggested that 'very long term studies with large numbers' would be needed to confirm clinical results.² It commissioned the National Centre for Epidemiology and Population Health at the Australian National University (ANU) to conduct meta-analysis of existing research and assess the potential health effects of PFAS exposure in the local context in an epidemiological study.³ The data will provide evidence for longitudinal analysis of the possible health impacts of PFAS.⁴
- 2.3 This chapter provides an update on work being done under the study, with some contextual discussion of the initiation of the project, its goals and progress to date.

1 Evidence to Inquiry into management of PFAS contamination in and around Defence bases (hereafter, Inquiry into PFAS contamination around Defence bases), PFAS Professor Brendan Murphy, Chief Medical Officer, Department of Health, *Committee Hansard*, Canberra, 14 September 2018, pp. 38, 39.

2 Professor Murphy, Department of Health, Inquiry into PFAS contamination around Defence bases, *Committee Hansard*, Canberra, 14 September 2018, pp. 38, 39.

3 Australian Government, *Submission 64*, JSCFADT, Inquiry into PFAS contamination around Defence bases, p. 15.

4 Professor Murphy, Department of Health, Inquiry into PFAS contamination around Defence bases, *Committee Hansard*, Canberra, 14 September 2018, p. 39.

About the PFAS Health Study

- 2.4 The PFAS Health Study is an epidemiological study which will investigate whether disease rates are higher in three communities exposed to PFAS through environmental contamination compared with communities with a background exposure to PFAS.⁵
- 2.5 The study involves evaluation of blood sampling from people who have lived or worked in the areas surrounding RAAF Base Williamtown, the Army Aviation Centre Oakey and the RAAF Base Tindal.⁶ It utilises blood gathered by the Government in a free testing program for people with possible exposure to PFAS at/or near the Investigation Areas.⁷
- 2.6 The Study has five main components which are being progressed in two phases. Each component of the study aims to inform the following components:
- *Phase I* – a **Systematic literature review** of 221 separate scientific publications on the health effects of PFAS prior to February 2017. The review report was released in May 2018. It supported the association between two PFAS chemicals and elevated blood cholesterol with limited evidence on a range of other factors. Study protocols were also developed for evaluation phase II.

 - *Phase II* – a **Health impact evaluation** examines whether rates of diseases, including cancers, potentially associated with PFAS exposure are higher among people who have lived in the investigation areas, compared to the general population. This phase utilises the blood samples taken from the Government’s Voluntary Blood Testing program for PFAS supplemented by additional sampling, a survey and data analysis.⁸

5 Australian National University (ANU), FAQs PFAS Health Study webpage, PFAS Health Study Fact Sheet rsph.anu.edu.au/files/ANU-per-and-poly-fluoroalkyl-substances-health-study-fact-sheet.pdf viewed 6 December 2019.

6 See Department of Health, Per- and Poly-Fluoroalkyl Substances (PFAS) – An Epidemiological Study www1.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas-epi-study.htm viewed 5 December 2019.

7 On permission by the donor. Department of Health, Voluntary Blood Testing Program www1.health.gov.au/internet/main/publishing.nsf/Content/ohp-pfas-blood-testing.htm viewed 5 December 2019.

8 Information at ANU, Research School of Population Health, ANU College of Health and Medicine, PFAS Health Study rsph.anu.edu.au/research/projects/pfas-health-study#action-tabs-link--tabs-0-footer-2 viewed 6 December 2019.

- 2.7 There are four components in Phase II of the study:
- *Component 1* – the *Focus group study* heard concerns from individuals living around Williamstown, Oakey and Katherine in relation to exposure to PFAS and their health.⁹
 - *Components 2 and 3* – a *Cross-sectional survey* and *Blood serum study* are to be undertaken in combination.
 - ⇒ The cross-sectional survey will investigate the exposure and risk factors for high serum PFAS levels (including factors such as age, sex, location and duration of residence in the area, water source used) and any common symptoms, signs and diagnosed illnesses in investigation areas associated with high serum PFAS levels.¹⁰
 - ⇒ The Blood Serum study will define the serum concentrations of PFAS in people living in PFAS Investigation and Management Areas and compare the levels to those of people in uncontaminated areas.¹¹
 - *Component 4* – the *Data linkage study* will examine whether sex-specific age-adjusted rates of diseases potentially associated with PFAS are higher among people who have lived in the PFAS Investigation and Management Areas, compared to those living outside in the general Australian population.¹²

Phase 1—project initiation and literature view

- 2.8 As noted previously, the ANU PFAS Health Study was commissioned by the Department of Health to provide evidence for longitudinal analysis of the possible health impacts of PFAS.
- 2.9 Professor Brendan Murphy, the Chief Medical Officer of Department of Health, told the PFAS Sub-committee of the JSCFADT last parliament:

To get conclusive evidence of health impacts, if there are any, will take a very long time – and because of the bioaccumulation, I think, very long-term studies with large numbers. If there were very obvious health impacts they would have been detected by

9 The PFAS Focus Group Study Report was released in March 2019, see a link to the report at rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-3 viewed 6 December 2019.

10 ANU PFAS Health Study, viewed 6 December 2019.

11 Research protocols for the study are at: rsph.anu.edu.au/files/ANU-per-and-poly-fluoroalkyl-substances-health-study-cross-sectional-survey-blood-serum-study-protocol.pdf viewed 5 December 2019.

12 ANU PFAS Health Study, viewed 6 December 2019.

now. So any health impacts that may be clearly proven will take large studies over a long period of time.

Because the data is weak and inconsistent, we need more data and we need longer follow-up. That's why the ANU study is going to be very important.¹³

- 2.10 Asked about the ANU's brief for the project during the present inquiry, Professor Martyn Kirk, Principal Investigator for the Health Study, advised that the development of the project methodology was an iterative process:

In part we were approached by the federal Department of Health because we'd had experience in similar environmental issues [ACT asbestos – Mr Fluffy investigation]. In the first phase... we put together a detailed protocol of how we would approach this problem and that's been published on our website. The way that this is working is very similar to what we have proposed. We've obviously made changes along the way in response to things that we realised weren't going to work or we needed to do differently. We're currently in the process of developing detailed analysis plans for some of the data because it is actually far more complicated than even we realised, as it always is.¹⁴

- 2.11 Community input was also encouraged, with the project model further refined with the aid of a community consultation panel. Professor Kirk added:

We tried to publish all of our methods on the website, and we've been out to community to convey that to them – although it's hard for community members to necessarily engage with study methods, which can be quite dense, but we appreciate their input. We also have a community consultation panel with between two to three people from each community, and they've been incredibly helpful to us just testing what we're doing and telling us whether it makes sense to them.¹⁵

13 Professor Murphy, Department of Health, Inquiry into PFAS contamination around Defence bases, *Committee Hansard*, Canberra, 14 September 2018, pp. 38, 39.

14 Professor Martyn Kirk, Principal Investigator, PFAS Health Study, National Centre for Epidemiology and Population Health, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 6.

15 Professor Kirk, PFAS Health Study, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

Questions about the study protocols

- 2.12 The Sub-committee asked about the PFAS Health Study's Literature review of 221 overseas studies which had informed the study protocols. Members asked questions about the validation of the data, its screening for bias and, more fundamentally, whether assertions that there are 'no proven links' between high PFAS exposure and health impacts could still be considered sound.¹⁶
- 2.13 In regard to the validity of the last claim, Professor Kirk stated:
- I don't think people use that kind of language as much anymore. They might've initially. I see people going the other way as well, which is really saying that there is irrefutable evidence, and I don't believe that either. We tend to think in terms of: there's sufficient evidence for elevated PFAS and elevated cholesterol. That means that there are more studies that show that there's an association than there are that don't. They're of reasonable quality in terms of bias, and then there's a handful more with limited evidence.¹⁷
- 2.14 However, it was also the case that research on PFAS was now being produced in a volume that Professor Kirk described as 'astounding'. He noted that since the Health Study's Systematic review, 70 to 100 studies of good quality were being published on PFAS related impacts each year. There were 1 800 investigations of sites being undertaken in the United States and PFAS was now a 'big issue' in European Union and other countries.¹⁸
- 2.15 In this context, community concerns about bias in evidence used in the Systematic literature review are relevant. A member reported fears that evidence reviewed in the first phase was not impartial, and especially where studies were sponsored by the chemical industry.¹⁹
- 2.16 Professor Kirk affirmed that in public health, it is matter of 'utmost importance...that investigators don't have conflicts of interests or, if they do, they're at least declared'. He went on to explain that in the literature review each study was rated by risk of bias at low, medium or high, based

16 Deputy Chair Ms Meryl Swanson MP, Chair Dr John McVeigh MP, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 3, 7.

17 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

18 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

19 Ms Swanson MP, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 3.

on scoring against a variety of different components. One of these was funding source.²⁰

- 2.17 Professor Kirk confirmed that studies that were conducted on behalf of, or funded by, industry were ‘marked as having at least a moderate risk of bias’. However, he also noted that many other studies that were not industry funded were also risk rated for bias:

In our conclusions we noted where the majority of studies were moderate to high risk of bias. But there’s not only bias from a source of funding; there’s also bias in the way they conducted the study, and whether the conclusions were robust. Sometimes you’ve got to do studies even though the risk of bias is reasonably high. Even we suffer from that as well. We’ll do studies from time to time where it’s not as neat as we would like or as methodologically rigorous, and so we have inherent bias in our studies. A good example is, if we’re only surveying one type of person, then we get a certain type of response, compared to if we survey the whole community and do it randomly.²¹

- 2.18 He concluded that research work in Australia was on track and comparable with that done overseas, and that we are all ‘grappling’ with the problem of PFAS.²²

Phase II—progress and review

- 2.19 The PFAS Health Study site posts monthly progress reports on its website. 2019 milestones for Phase II of the study are documented as follows:
- In March 2019 the *PFAS Focus Groups Study Report* was released.²³
 - In May 2019 Research Protocols and Project plans for Components 2 and 3, the Cross-section survey and Blood serum study, and Component 4, the Data linkage study, were completed and submitted to the Department of Health, and a survey company contracted.

20 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 3.

21 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 3–4.

22 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

23 For report results see PFAS Health Study Report Tab at: rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-3 viewed 6 December 2019.

- In July 2019 the Social Research Centre worked with the study team to create final versions of the Cross-sectional survey questionnaire, Data Linkage Study Protocols and Project Plan were approved by Health, and four Ethics applications lodged.
 - In October 2019 invitations to participate in the online survey were sent to Voluntary Blood Testing Program participants²⁴ and to community members who had contacted the Study team. Data analysis plans were drafted for Components 2, 3 and 4 of Phase II.
 - An online invitation to those who have lived or worked in the subject communities to take part in the cross-sectional analysis phase was also posted on the ANU PFAS Health Study site. Participants outside of study areas were invited to request access to the survey.²⁵
- 2.20 The ANU has advised that the results of the study components are to be released sequentially. Blood serum study results are to be available in mid 2020, and the data-linkage study results expected by the end of that year.²⁶

Component 1—the PFAS focus groups study

- 2.21 The first component of Phase II of the PFAS Health Study was a series of focus group discussions undertaken between January and August 2018 in Oakey, Williamtown, and Katherine. Further consultations were undertaken in Williamtown, Oakey and Katherine in November and December 2018, and then May 2019, respectively.²⁷
- 2.22 The PFAS Health Study site advises:
- The main aim of this study was to understand participants' views and experiences of PFAS contamination in their local area, with a focus on participants' health concerns. Focus group discussions facilitate discussion of public knowledge, underlying attitudes, perceptions and opinions and are well suited to exploring a range of views on community topics.²⁸

24 Those blood survey participants who had agreed to take part in the study and had not requested a paper copy.

25 ANU PFAS Health Study, Instructions for participating in the survey at Survey Help rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-5 viewed 12 December 2019.

26 Professor Kirk, PFAS Health Study, ANU, Inquiry into PFAS contamination around Defence bases, 14 September 2018, pp. 14, 16.

27 PFAS Health Study, Study updates rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-4 viewed 6 December 2019.

28 PFAS Health Study Focus Groups Study rsph.anu.edu.au/research/projects/pfas-health-study#acton-tabs-link--tabs-0-footer-3 viewed 6 December 2019.

- 2.23 At the hearing, Professor Kirk commented on the importance of starting in the community with the focus group work to maximise communication, and listening to, diverse groups:

We did four discussions in Oakey, four discussions in Williamstown and four discussions in Katherine. They amounted to about 111 people, overall. In each of those communities we had one specific focus group for Defence Force personnel and their families, if they wanted to come along to that. We also conducted a further three focus groups in Aboriginal communities in Kalano, Rockhole and Binjari. They were larger, and they had different feedback.²⁹

- 2.24 At the community meetings, the main topics of discussion were physical and mental health concerns, environmental issues and PFAS blood testing, financial concerns, community trust and cohesion, local conditions and exposure pathways, and the way forward.³⁰ A summary in the Focus Group report stated:

Participants voiced concerns related to their health and PFAS exposure. Children were considered more vulnerable due to their young age and exposure from growing up in affected areas. Participants were particularly concerned about the onset of cancers and the deterioration of existing health conditions. Another major concern for many participants was the stress and anxiety related to the duration of the PFAS contamination and uncertainty with respect to the long-term impact on health, specifically for their children. In addition to the above concerns, Aboriginal participants were also worried about the health of their children, contamination of river foods and bush tucker, and the overall impacts on country.³¹

- 2.25 It was notable that the ways in which information was conveyed to different groups was important. A poster produced by the PFAS Study group for Aboriginal communities in Katherine, for example, is in *Appendix B*.

29 Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 4

30 PFAS Health Study Focus Groups Study, viewed 9 December 2019.

31 C Banwell, T Housen, K Smurthwaite, S Trevenar, L Walker, K Todd, M Rosas [2Ngaigu-Mulu Aboriginal Corporation, Katherine, NT, Australia], M Kirk, *The PFAS Health Study, Component One: Oakey, Williamstown and Katherine Focus Groups Study*, National Centre for Epidemiology and Population Health, Research School of Population Health, ANU, Report Prepared for the Department of Health, February 2019, p. 6.

- 2.26 In answer to questioning by a Sub-committee member, Professor Kirk confirmed that the overwhelming commonality in the experience of different cohorts in the study was the ‘quite immense...depth of feeling and the sense of anxiety’ that was afflicting them.³²
- 2.27 Dr Miranda Harris, Public Health Medicine Registrar, ANU, explained how the focus group findings had informed the methodology in the next phase of review, the cross-sectional survey:
- The findings from the focus group demonstrated that mental health is an important outcome to be looking at. We have included mental health scales or measures of wellbeing and mental health in our survey that will measure distress and anxiety in particular. We’ll also be looking at other health concerns that the community has about exposure to PFAS, as well as concerns that participants have about others’ health and concerns about other issues, including finances, stigma and uncertainty about the future.³³

Components 2 and 3—Cross-sectional survey and blood serum study

- 2.28 Components 2 and 3 advance the ANU’s analysis of the toxicity of PFAS in humans and its possible impacts on their health.
- 2.29 The research protocol for this study phase states:
- The primary goal of this component of the study will be to measure blood serum concentrations of PFAS in people who have ever lived or worked in the PFAS Investigation and Management Areas of Williamtown, Oakey and Katherine, and compare them to those in an otherwise similar non-exposed, comparison population. In addition, the study will identify the population characteristics and exposure-related factors and characterise the health concerns and health outcomes of people who have ever lived or worked in PFAS Investigation and Management Areas, compare them to an appropriate comparison population and relate them to individually measured blood PFAS concentrations.³⁴

32 Senator Mehreen Faruqi to Professor Kirk, PFAS Health Study, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 2.

33 Dr Miranda Harris, Public Health Medicine Registrar, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 4.

34 Goals in M Kirk, K Todd, B Armstrong et al, *The PFAS Health Study Cross-sectional Survey and Blood Serum Study Research Protocol*, ANU, Report Prepared for the Department of Health, 20 March 2019, p. 15.

2.30 The study rationale provides the medical context for this assessment:

There have been a range of proposed mechanisms for possible adverse health effects of PFAS, many of which relate to endocrine disruption potentially affecting male and female reproduction and thyroid function. Human health research into PFAS has focused on: reduced foetal growth and development, decreased fertility and reproductive hormone levels, increased cholesterol levels, immunological effects and cancer.³⁵

2.31 The study summary further detailed the research methodology:

...three comparison towns will be selected and people will be randomly selected to complete the survey and provide a blood sample for PFAS. Invitations to participate in the survey and blood testing will be sent out through the Medicare database in mid-2019 in the comparison towns. All blood samples in the Study will be tested for PFAS, cholesterol and uric acid. The study is aiming to include 3000 people overall; 500 from each of the three affected towns and 1500 from the comparison communities.³⁶

2.32 As noted, invitations have now been sent out to participants and notification of the survey and blood study launched online. At hearings, Dr Harris highlighted the broader aims of the Cross-sectional survey:

In the survey that we have sent out to the affected communities we do ask about 32 self-reported health conditions – 10 of which are cancer. We also ask questions using a number of validated scales around mental health to measure levels of distress and anxiety. We're also looking at other concerns that the community might have around stigma, uncertainty and health-seeking behaviours.³⁷

2.33 Dr Harris said the survey would also seek to assess the mental health and wellbeing of participants by inviting information about 'health-seeking behaviours' such as visits to the GP or counsellor and whether awareness of PFAS in the area had affected levels of smoking or alcohol consumption.³⁸ Research questions underpinning the Survey are also at *Appendix B*.

35 M Kirk, K Todd, B Armstrong et al, *The PFAS Health Study Cross-sectional Survey and Blood Serum Study Research Protocol*, ANU, Report Prepared for the Department of Health, 20 March 2019, pp. 10-11, quote at p. 10.

36 ANU, *The PFAS Health Study: Cross Sectional Survey and Blood Serum Study* – [Study Summary] rsph.anu.edu.au/files/ANU-per-and-poly-fluoroalkyl-substances-health-study-cross-sectional-survey-blood-serum-study-summary.pdf viewed 9 December 2019.

37 Dr Miranda Harris, Public Health Medicine Registrar, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

38 Dr Harris, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 4.

Component 4—Data linkage study

2.34 The data linkage study is the final component and culmination of the PFAS Health Study, and was described by Professor Kirk as ‘probably the most important [study phase]’, noting too that ‘it’s also very difficult’.³⁹

2.35 Planned for release at the end of 2020, the study will bring together information about individuals across multiple datasets to determine whether ‘adverse health outcomes potentially linked with PFAS exposure are more common among people who have lived in areas contaminated with PFAS compared to those who have never lived in those areas’.⁴⁰

2.36 Professor Kirk was asked whether the study might identify PFAS-related immune deficiency as a catalyst to a range of health disorders or diseases, a concern expressed by people in affected communities.⁴¹ He noted that health studies normally seek to identify clusters of similar disease to identify similar causes, however:

I think the data linkage study will allow us to look at cancer in people who have lived in those areas versus in people who have never lived in those areas. And that is going to be quite different to, maybe, what has been done before, because they’ve been using broad areas – so it might be postcode level – whereas we are actually going to be looking down at areas that are within an investigation and management design. I think that gives us the best possibility. But there’s still a lot to be learnt, and we recognise the concern of the community. We’ve heard it ourselves.⁴²

2.37 Professor Kirk suggested that the PFAS data-linkage study would also be distinguished from other studies in its tracking of a transient population. It would do this by drawing on historical Medicare data and other ‘routinely collected’ data gathered by hospitals or for Government services.⁴³ He advised:

The Australian Institute of Health and Welfare is linking the data for us, and that involves a number of different datasets but the main national ones are the cancer one [the Australian Cancer Database] and the Australian Early Development Census. And there’s another separate one which is looking at perinatal outcomes. Every state and territory has a database where they

39 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 2.

40 ANU, ‘Phase II – Data Linkage Study’, PFAS Health Study, viewed 9 December 2019.

41 Ms Swanson MP to Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 2–3.

42 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 3.

43 With results only available to researchers.

record the outcomes and circumstances of births in their jurisdiction, and we're linking that to addresses, so we can look at people who've lived in those areas versus those that didn't.⁴⁴

- 2.38 The Sub-committee noted that this work may also dovetail with other Federal government funded calls for research into PFAS and health issued earlier this year, and with targeted research done by State governments such as work carried out by the NSW Government on particular cancers around Williamtown.⁴⁵

Effectiveness as a longitudinal assessment

- 2.39 As noted above, the PFAS Health Study has been commissioned by the Australian Government to produce data that will provide evidence for longitudinal analysis of the possible health impacts of PFAS.⁴⁶
- 2.40 The Sub-committee wanted to establish whether the information being collated locally in the study would provide an adequate body of evidence for this purpose. A first focus in this regard was the size of the blood sample used in the study. This was based on that taken initially under the Government's Voluntary Blood Testing Program (VBTP), and the current arrangements to expand that sample, whereby the donor would pay to be tested.⁴⁷
- 2.41 Dr Harris advised that there were around two and half thousand blood samples being used in the current study (under agreement by donors), which was the anticipated number. She also noted that free blood testing had been extended to June this year to increase the sample. Professor Kirk further suggested that the data-linkage component would expand on this evidence base, as it is drawing on Medicare evidence back to 1984.⁴⁸
- 2.42 A member also raised the possibility of having a second tranche of free blood testing to further verify results and, longer term, to assess the effectiveness of remediation measures.⁴⁹
- 2.43 Professor Kirk noted that blood testing is expensive, up to \$500 per test. Dr Harris pointed out that due to the persistence of PFAS chemicals in the

44 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 3.

45 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 5, 6.

46 Professor Murphy, Department of Health, Inquiry into PFAS contamination around Defence bases, *Committee Hansard*, Canberra, 14 September 2018, p. 39.

47 Senator Faruqi, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 5.

48 Dr Harris and Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 5.

49 Ms Swanson MP, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 8.

blood – from two to nine years to halve the levels depending on the chemical, due consideration would be needed on the time frame. Noting these factors – including cost, specificity of the chemicals and half-life variability, they considered that extended blood testing would be a policy decision for Government.⁵⁰

2.44 Professor Kirk could see however some potential utility in extended testing for those people with elevated PFAS blood concentrations, noting:

... There have been studies overseas where they've done this. A good example is in Sweden. They've used multiple time points. As I said, we haven't really looked at it, but, if we were to, we would go and have a look at the time frames others have used.⁵¹

2.45 Finally, in answer to questions, Professor Kirk also considered the value of a longitudinal assessment of the mental health issues revealed in the study so far.⁵² With longer term impacts not currently being considered, he highlighted the value of the current survey work as 'a snapshot of what mental health is like in each of these three communities at this point in time'. This demonstrates the variation and shows that the feelings and experiences of people in communities change over time.⁵³

2.46 The Sub-committee also noted the overall value of the study in its focus in the final phase, as mentioned in the previous section, on the tracking and comparing results of a transient population across the range of total health outcomes. This work, Professors Kirk recalled, reflected the methodology he and Dr Harris had developed for the Mr Fluffy asbestos problem in the Australian Capital Territory:

We did a study looking at mesothelioma in the ACT, and you don't find any association with living in a Mr Fluffy home, but, when you actually look at people who've moved out of the ACT back to wherever they came from – it's a highly transient population – they might get diagnosed with mesothelioma in Adelaide, and we need to be able to link that back to the time that they spent in Canberra. So that's exactly what we're going to do with the data linkage study. It does take a while, but it's worth taking the effort to try and do it well.⁵⁴

50 Dr Harris, and Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 8.

51 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 8.

52 Senator Faruqi, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 5.

53 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 8.

54 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 6.

Clarity on the health question

- 2.47 In its review, the Sub-committee also canvassed with the PFAS Health Study experts their views on questions which have preoccupied affected communities since the impacts of PFAS contamination were made public.
- 2.48 As indicated by Professor Kirk, research into the potential health impacts of PFAS has burgeoned after the conclusion of the PFAS Health Study's Systematic literature review, which looked at publications prior to early 2017.
- 2.49 Since the release of the JSCFADT's 2018 inquiry report, which had recommended a review and refinement of health advice on PFAS, international standards for PFAS intake safety levels, exposure levels and bans on production have been underway.⁵⁵
- 2.50 In December 2018, for example, the European Food Safety Authority (EFSA) announced major reductions in tolerable weekly intakes (TWI) for PFOS and PFOA.⁵⁶ A second draft opinion on the further possible risks to human health from PFAS (other than PFOS and PFOA) would be released following public consultation and frameworks developed for assessing combined exposure to multiple chemicals in the food chain by December 2019.⁵⁷
- 2.51 Soon after Food Standards Australia New Zealand (FSANZ) judged the results to be 'provisional' pending further review, and stating:
- FSANZ supports current at-site risk management measures by other Commonwealth, state and territory jurisdictions to manage and reduce potential dietary exposure from these chemicals, rather than setting maximum levels (MLs) in the Food Standards Code.⁵⁸
- 2.52 The Sub-committee wanted to clarify for affected communities this advice, noting some confusion around the relationship between PFAS exposure,

55 See Chemicalwatch, *Global Risk and Regulation news*, 'Efsa panel lowers tolerable intakes for PFOS and PFOA', 20 December 2019 chemicalwatch.com/72934/efsa-panel-lowers-tolerable-intakes-for-pfos-and-pfoa viewed 12 December 2019.

56 For PFOS to 13 nano grams per kilo (ng/kg) body weight (bw), and for PFOA to 6 ng/kg bw. The previous standard was 150ng/day for PFOS and 1500 ng/day for PFOA. See 'Contaminants update: first of two opinions on PFAS in food', 13 December 2018 www.efsa.europa.eu/en/press/news/181213 and *Scientific Opinion* at EFSA Journal, efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2018.5194, viewed 5 December 2019.

57 Formerly September 2019, viewed 5 December 2019.

58 Food Standards ANZ, Perfluorinated compounds, December 2018. www.foodstandards.gov.au/consumer/chemicals/Pages/Perfluorinated-compounds.aspx viewed 12 December 2019.

prohibitions on produce and water intake, and reassurances on the limited proven health impacts of PFAS.⁵⁹

2.53 Professor Kirk explained the current rationale from a health perspective:

The recommendation is to limit exposure to PFAS, and it really is around two things: uncertainty around their health effects, and, secondly, their persistence in the body. They are unusual, in that they have a long half-life. They're very inert in the environment. And so that's where the concerns arise. From what I've seen in the literature, where people end up with the greatest amount of PFAS in their bodies, it's usually where there's been drinking-water contamination, as opposed to foodstuffs and soils and things like that. That said, the advice is to limit excessive exposure, and, if you're consuming something every day, it makes sense that you should limit that. But there's a background of PFAS in people's homes just through the consumer use of these products.⁶⁰

2.54 In regard to views that the health impact was clear and supported by overseas research, Professor Kirk cautioned (based on experience during the Systematic literature review) that 'the [PFAS] health literature it is incredibly confusing, even for the initiated'.⁶¹

2.55 At the end of its literature review, the PFAS Health Study had concluded that the majority of studies didn't provide sufficient evidence of a PFAS related health effect, however, there were several studies that did:

There was sufficient evidence of a positive association of PFOA and PFOS for cholesterol – elevated cholesterol if there was elevated PFOA or PFOS. And then there was a range of different health outcomes where there was more limited evidence – there might have been fewer studies but they still found an association. They included increased uric acid; decreased glomerular filtration rate, which is a marker of kidney disease; chronic kidney disease; kidney cancer; and testicular cancer. And there were two which related to an association with lowered vaccine response to diphtheria and also rubella. That said, where there is limited evidence, there is certainly a need for more studies to understand whether they actually are true health effects.⁶²

2.56 Professor Kirk indicated that, against this background, he would not pre-empt the findings of his current review. The PFAS Health Study

59 Senator Faruqi, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 5.

60 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, pp. 5-6.

61 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 1.

62 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 1.

would seek evidence on the health effects using a ‘couple of different study designs’ with controls determined by ‘government and communities’ together, in the context of other risk assessments and ongoing international reviews.⁶³

Conclusion

- 2.57 In discussion with the PFAS Health Study experts the Sub-committee wished among other things to gauge whether Australia’s focus on remediation in the context of current understandings of health impacts is appropriate, and fair, to PFAS affected communities.
- 2.58 The current review established that, in Professor Kirk’s opinion, Australia’s position is commensurate with the international experience – ‘we are grappling’, like other countries, with the problem of PFAS.⁶⁴
- 2.59 The focus of the Sub-committee’s inquiry is on Defence’s remediation of PFAS related impacts in the environment. It appears that affected community members could remain confused and worried about apparent contradictions in the health advice they receive, the stringent controls on land use and the cautionary advice on many other aspects which affect their quality of life. Meanwhile, as discussed in the next chapter, there are positive results being achieved in remediation while frameworks for environmental regulation of PFAS are being reformed in response to new information.
- 2.60 The PFAS Health Study Focus Group studies have documented the mental health impacts in different PFAS affected communities.⁶⁵ The report also noted discrete differences of need within community groups, by area and demographics. Residents in Katherine, for example, had strong attachment with their river, with Aboriginal people very worried about PFAS impacts on water quality, on bush tucker, hunting and fishing.⁶⁶ The ways in which information was conveyed to different groups were thus important, as indicated in the poster reproduced in *Appendix B*.
- 2.61 In addition to the observations here, the Sub-committee investigated with the study experts whether measures such as a second tranche of blood

63 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 6.

64 Professor Kirk, ANU, *Proof Committee Hansard*, Canberra, 25 November 2019, p. 7.

65 C Banwell, T Housen, K Smurthwaite, S Trevenar, L Walker, K Todd, M Rosas [2Ngaigu-Mulu Aboriginal Corporation, Katherine, NT, Australia], M Kirk, *The PFAS Health Study, Component One: Oakey, Williamtown and Katherine Focus Groups Study*, ANU, Report Prepared for the Department of Health, February 2019, p. 6.

66 *The PFAS Health Study, Component One*, February 2019 p. 19.

testing, proposed in the previous JSCFADT PFAS contamination review, may lend a greater sense of security to individuals tested under the Government's Voluntary blood testing program or by paid testing.

- 2.62 The Sub-committee noted, however, Professor Kirk and Dr Harris's advice that this may not prove useful for longitudinal analysis unless the research methodology is carefully designed. An example in Sweden was mentioned.
- 2.63 Matters raised in this chapter will be examined further with responsible Government departments, authorities and experts in the coming year. In particular, the Committee will seek further clarification on the relationship between health advice, food safety and environmental impacts to address apparent concern and confusion in the community.

