

## Submission to the PFAS Sub-committee of the Joint Standing Committee on Foreign Affairs, Defence and Trade

*Dr Kylie Morphett, School of Public Health, Faculty of Medicine, University of Queensland.*

*Associate Professor Kelly Fielding, School of Communications and Arts, University of Queensland.*

*Associate Professor Anne Roiko, School of Medicine-Environmental Health, Griffith University.*

Thank you for the opportunity to make a submission to the PFAS Sub-committee. In 2017 we were awarded seed funding from the Queensland Alliance of Environmental Health Sciences (QAEHS) at the University of Queensland to conduct a research project evaluating the public's risk perceptions about PFAS. In this submission we describe our findings, and make a number of recommendations about risk communication about PFAS.

### **Background of the research**

There is very little research worldwide on how risk communications about PFAS are understood by the public or affected stakeholders. One of the key difficulties in communicating with the public and affected stakeholders about PFAS is scientific uncertainty about the health effects of exposure. Research on other controversial scientific topics has shown the public want to be informed about scientific uncertainty and that acknowledging uncertainty can increase the credibility of experts (Budescu, Broomell, & Por, 2009; Frewer et al., 2003; Frewer et al., 2002). In Australia, state and commonwealth government communication materials aimed at the public and affected communities have emphasised scientific uncertainty about the health effects of PFAS, but it is unknown how these communications might affect public concerns. In addition, there are many communications other than official government communications that the population is exposed to. In particular, the media can play a significant role in how emerging environmental contaminants are perceived (Ashe, 2013).

### **Aims of the research**

The aims of our research were to 1) examine the ways that health risks associated with PFAS exposure have been communicated to the public in Australia, 2) determine public awareness and knowledge about PFAS, and 3) identify factors that may influence concerns about PFAS in the general public.

To explore how the media have been reporting on PFAS we analysed the content of Australian news media articles about PFAS from 2010 to 2017. To address Aims 2 and 3 we completed an online survey of 1031 adult Queensland residents.

It is important to acknowledge that the survey research investigated knowledge and concerns of the *general public in Qld*. This research does not cover the experiences and concerns of communities which have higher levels of PFAS exposure, such as those located near Defence bases or airports, or those who have experienced occupational exposure. Research with

affected communities will require very different research methods involving significant community engagement and input. Also, these are preliminary and primarily descriptive findings that have not yet been accepted for publication in academic journals.

## **Research findings**

### **1. Australian media content about PFAS**

We conducted a content analysis of Australian news stories about PFAS to better understand how PFAS and their health risks were described in the media. As there was a focus on Queensland for this project, we included news media articles that mentioned areas where there were concerns at the time. These were:

- 1) Contamination of soil and groundwater in Oakey
- 2) A spill of PFAS at the Brisbane Airport in 2017, which resulted in raised levels of PFAS in the Brisbane River, and
- 3) Reports about PFAS levels surrounding the Gold Coast Airport.

Articles were identified using the Factiva database. Articles were included if: they were in textual format; published in English, from an Australian source; discussed PFAS in relation to Oakey, the Brisbane River or the Gold Coast Airport; and were published between 1 January 2010 and 30 November 2017. Articles from specialist magazines were excluded. In total, 411 articles were identified.

Findings showed there has been significant media coverage about PFAS, with most coverage from 2016 onwards. The articles were relatively evenly distributed across local (33%), state (42%), and national (26%) media sources.

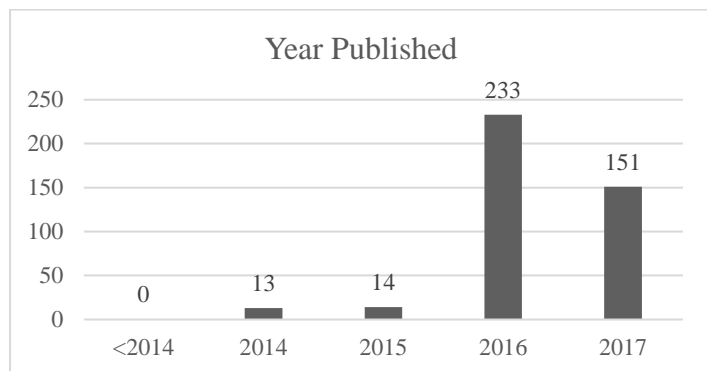


Figure 1. Number of media articles about PFAS contamination identified in QLD.

Of the 411 articles identified, the content of a random sample of 50% (n=212, stratified by the source of the article -regional, state or national) was analysed.

It is important to know who the media is interviewing and quoting in their articles. Figure 3 shows that the most common source cited in articles were politicians, followed by community members, spokespeople for the Department of Defence, and lawyers. There were very few media articles that interviewed or included quotes from scientists or health/medical practitioners.

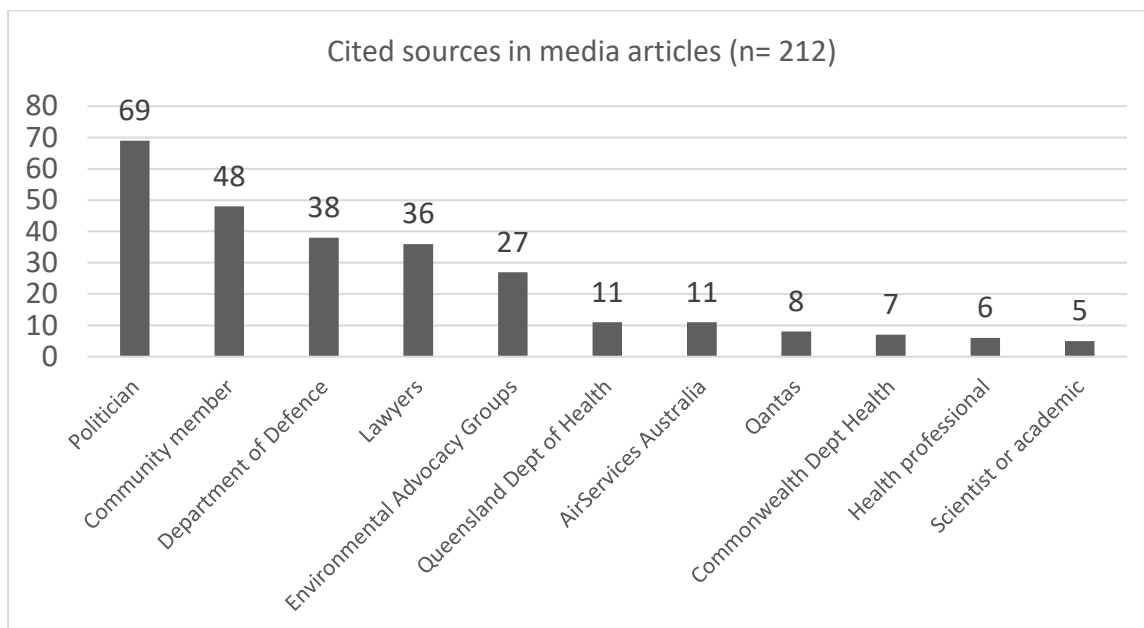


Figure 2. Frequency of cited sources in media articles

A word cloud was created that illustrates the most commonly used words across print media stories about PFAS, with “toxic”, “chemicals” and “firefighting foam” the most commonly used words.



Figure 4 – Frequent words used in media descriptions of PFAS (2010-2017). Note: larger text indicates higher frequency.

Much of the media coverage around the health effects of PFAS focused on what levels of PFAS had been found in the environment or the blood serum of those from communities or occupational groups where exposure may have occurred, and whether this level was acceptable or safe. **There was a variety of ways that elevated levels of PFAS in the**

**environment were described.** For example, levels in waterways around the Gold Coast airport were described variously by authorities as “higher than normal”, “higher than usual”, “consistently low”, “low level toxic contamination” “and “traces” of PFAS. A representative of an advocacy group was cited as saying that “The levels at the Gold Coast airport were some of the highest I have ever seen.” A local authority statement read that levels of PFAS were at “higher levels but still below guidelines for recreational use.”

**Numerical information about PFAS levels was rarely presented**, with descriptive words such as those above generally being used. As can be seen in these examples some media stories simply stated the levels were “low” while others compared the level to an official reference value. Sometimes this was labelled e.g., “guidelines for recreational use” but at other times it was presented as a comparison with an assumed “normal” or “safe” level. This variation in how measured levels of PFAS are reported in the media influence how they are interpreted and inconsistencies may cause confusion in the general public and affected communities.

**The health conditions most commonly linked to PFAS in the media were** cancer (40 articles mentioned this), anxiety or other mental health issues (38), reproductive or developmental effects (14), effects on the immune system (9) and higher cholesterol levels (6). Many of the personal stories of those from affected communities conveyed the emotional distress resulting from the scientific uncertainty about the health impacts of PFAS exposure.

## **2. Queenslanders awareness and concerns about PFAS**

A survey of Queenslanders’ awareness and knowledge of PFAS was conducted in 2018. A total of 1031 participants completed the survey. Quotas were set for recruitment so that the sample would match the Queensland population in relation to age and gender.

Survey items included socio-demographic variables including age, gender, education, whether the individual had children living at home, and postcode. Survey questions also included general attitudes about health risks from chemicals, self-reported knowledge about chemicals, trust in government and scientists, and awareness and self-rated knowledge of PFAS. Participants were asked if they were aware of the chemicals known as PFAS (including specific types of PFAS such as PFOA, PFOS). They were also asked if they were aware of the specific areas of concern of Oakey, the Gold Coast Airport, or the Brisbane River/Airport.

There was also an experimental component of the survey, where participants were randomised to receive one of a number of different short descriptions of PFAS. The information was presented as a short slide show with relevant graphics. The messages were based on health education material about PFAS from state and commonwealth sources that was publicly available at the time. In terms of the type of message, participants either received a “basic information” message or one of three types of “enhanced information” messages. The basic information message included brief factual information about what PFAS were and why they were considered a problem. The three enhanced information messages added different types of additional information to the basic information. These types were: 1. a description of the scientific uncertainty around the health effects of PFAS, 2.

a statement that PFAS levels in the general population in Australia were low and declining, and 3. a list of actions the government was undertaking to address PFAS contamination and health concerns. For each of these, the source of information was varied to be from either the “Commonwealth Department of Health” or “Scientists working at Australian universities and internationally.”

All 1031 participants were Queensland residents. Participants’ ages ranged from 18 to 76 years old. One quarter of participants had a university degree. Participants were evenly distributed in relation to gender. Self-reported knowledge of chemicals was low, with 76% of participants reporting their level of general knowledge about chemicals as either ‘None’ or ‘A little’. Just 2% reported “a lot” of knowledge about chemicals.

**Only a quarter (25%) of participants had heard of PFAS, PFOA or PFOS** (See Table 2). Of those who were aware of PFAS, 64% described themselves as having only ‘a little’ knowledge about PFAS. **However, a higher proportion of participants had awareness of specific incidents**, including the use of firefighting foam at the Brisbane airport (47%), Oakey (40%), or the Gold Coast airport (22%), with 57% reporting awareness of one or more of these events. Of those who had heard of one or more of these events, **the most common sources of knowledge were radio or TV News (83%) and print media (41%)**, with 2% having gained knowledge from government information or fact sheets.

Table 1. Awareness of PFAS in Queensland

Survey item		%
Have you heard about chemicals from spilled firefighting foam at the Brisbane Airport entering the Brisbane River in 2016?	Yes	47
	No	53
Have you heard about chemicals from firefighting foam entering the water and soil in the town of Oakey?	Yes	40
	No	60
Have you heard about chemicals from firefighting foam entering the water around the Gold Coast airport?	Yes	22
	No	78
Aware of one or more affected location/s?	Yes	57
	No	43
Have you heard of any of the following chemicals: per and poly-fluoroalkyl substances (PFAS), perfluorooctanoic acid (PFOA) or perfluorooctane sulfonate (PFOS)?	Yes	25
	No	75

After viewing one of the messages about PFAS, participants were asked how concerned they were about their health effects. This was measured on a 1-5 scale with 1 being “no concern” and 5 being “extremely concerned.” Preliminary statistical analysis showed that message source and enhanced information did not have any significant effect on levels of concern about PFAS. The average level of concern across all experimental conditions was 3.11 (SD=1.1).

Participants were given a list of organisations or individuals who might communicate about PFAS, and were asked “How much do you trust each of the following organisations to provide accurate information about the human health risks of PFAS?” They responded on a 5-point scale, with 1 meaning “no trust” and 5 representing “complete trust.” Table 2 shows the percentage of people who had high levels of trust (rated 4 or 5 on the scale) in the organisation or individual to provide information about PFAS.

Table 2 – Trust in organisations to provide information about PFAS and health

<b>Organisation</b>	<b>High levels of trust* (%)</b>
The Australian Medical Association	52.6
The Queensland Department of Health	42.5
The Commonwealth Department of Health	39.2
The Queensland Department of Environment and Heritage	38.2
The Queensland Chief Health Officer	34.1
The United States Environmental Protection Agency (EPA)	25.8
The Department of Defence	23.4
The Queensland Environment Minister	21.1
Local newspapers	15.2
The Courier Mail	13.4

\*Rated as 4 or 5 on a 5 point scale where 1 is no trust and 5 is complete trust.

The most trusted communicators were the Australian Medical Association, the State and Commonwealth Department of Health, and the Queensland Department of Environment and Heritage. Newspapers, the Minister for the Environment, and the Department of Defence were less trusted.

### **3. Further research being conducted by the research team**

All three authors are involved in a larger national collaboration of researchers who are involved in exploring the social impacts of PFAS exposure in Australian communities. This involves Professor Will Rifkin (University of Newcastle), Professor Cathy Banwell (Australian National University), Associate Professor Craig Dalton (University of Newcastle), Dr Kathryn Taylor (University of Newcastle), and Professor Phil Batterham (Australian National University).

Associate Professor Kelly Fielding is an investigator on the NHMRC grant led by Jochen Mueller titled “Assessing effectiveness of PFAS exposure control in exposed communities and firefighters”. The grant will conduct a five-year prospective study of individuals with elevated serum concentrations of PFASs to determine the effectiveness of exposure controls and identify key factors governing successful exposure reduction.

In 2019, Kylie Morphett was awarded a University of Queensland Early Career Researcher Grant titled “Understanding risk perceptions of emerging chemical contaminants.” This project included qualitative interviews that asked 40 members of the general public about their awareness and knowledge of emerging chemicals including PFAS, and asked them to rank the health harms of PFAS alongside other environmental and lifestyle health risks. Participants were also presented with the Government fact sheet based on the PFAS Expert Health Panel findings, its comprehensibility, participant trust in its content, and their understandings of the terminology around scientific uncertainty were evaluated. These results are currently being analysed, so data are not yet available.

Dr Kylie Morphett is an investigator on a current NHMRC grant led by Professor Kevin Thomas titled “Comprehensive characterisation of the PFAS exposome” One aim of this project is to “Effectively engage with and communicate the findings of novel PFAS exposure to relevant stakeholders, including exposed individuals, the general population and public health regulators.” Work is beginning on this aspect of the project and no results are available yet.

### **Conclusions and Recommendations**

- Our research shows that there has been substantial coverage of PFAS in the traditional news media and that this is where most of our participants were getting their information about the issue. It is important to continue to monitor the media in this area in order to understand how government health advice is being translated by the media, and what messages the public is receiving about PFAS.
- The media is an important way for members of affected communities to have their voice heard. With a reduction in the number of regional news sources in Australia, there may be one less avenue for those in affected communities to share their experiences and concerns. It is important that communities that have higher levels of exposure than the general population have avenues for communicating their concerns and wishes.
- Our research showed that Queenslanders thought that the most trusted sources of information about PFAS were the Australian Medical Association, the Queensland and Commonwealth Departments of Health, and the Queensland Department of Environment and Heritage. Including the most trusted organisations and communicators in communications strategies is recommended.
- Scientists working in the area of PFAS were the least likely sources to be quoted in the media. It is unknown if this is because they are not being approached by journalists, or they are approached but decide not to contribute. The development of closer relationships between government officials, journalists and scientists that work in this area would be worthwhile.
- More research on how best to communicate about the risks of PFAS to those most at risk of exposure would be beneficial, especially given increasing funding to science about the health impacts of PFAS. It is important that once these findings about PFAS and health become more conclusive, they can be communicated in ways that are acceptable and understandable. Pilot testing is a key step in the development of effective health communications, and should be conducted where possible, prior to releasing messages about PFAS and health.
- It is important to monitor what health officials in other countries are telling their populations. The media often report on conflicting health advice between countries, and those who conduct an internet search for PFAS and health are very likely to discover the health advice of authorities in other countries, not only those in Australia. It is important that Australian health advice acknowledges and explains any differences in health advice or actions, as conflicting health advice can lead to the development of distrust and anxiety.

- There are an increasing number of communities in Australia that have been exposed to higher levels of PFAS than the general population. We recommend supporting community-based participatory research (CBPR) to enable researchers to work in partnership with these communities to understand their concerns and needs, including communication needs and preferences. This approach has been used effectively in communities overseas that have been exposed to PFAS (Emmett et al., 2009).

## **References**

- Ashe, T. (2013). How the media report scientific risk and uncertainty: A review of the literature. Oxford: University of Oxford,.
- Budescu, D. V., Broomell, S., & Por, H.-H. (2009). Improving communication of uncertainty in the reports of the Intergovernmental Panel on Climate Change. *Psychological Science*, 20(3), 299-308. doi:10.1111/j.1467-9280.2009.02284.x
- Emmett, E. A., Zhang, H., Shofer, F. S., Rodway, N., Desai, C., Freeman, D., & Hufford, M. (2009). Development and successful application of a "Community-First" communication model for community-based environmental health research. *Journal of occupational and environmental medicine*, 51(2), 146-156. doi:10.1097/JOM.0b013e3181965d9b
- Frewer, L., Hunt, S., Brennan, M., Kuznesof, S., Ness, M., & Ritson, C. (2003). The views of scientific experts on how the public conceptualize uncertainty. *Journal of Risk Research*, 6(1), 75-85. doi:10.1080/1366987032000047815
- Frewer, L., Miles, S., Brennan, M., Kuznesof, S., Ness, M., & Ritson, C. (2002). Public preferences for informed choice under conditions of risk uncertainty. *Public Understanding of Science*, 11(4), 363-372. doi:10.1088/0963-6625/11/4/304