The PFAS Health Study

Presentation to the Oakey Community

23 February 2017

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Research School of Population Health
Plan For Today

• The PFAS Health Study
  • 10 + 10 minutes

• An introduction to epidemiology
  • 10 + 10 minutes

• Phase II – The Epidemiological Study
  • 10 + 10 minutes

• Open discussion
PFAS Contamination in Oakey

In Australia, some communities have been exposed to higher concentrations of PFASs due to the contamination of ground water and environments from these chemicals.

Oakey has been identified as being contaminated due to Defence Force firefighting activities on nearby bases.
The PFAS Health Study

Currently, the health effects of PFAS exposure are unclear.

For this reason, the Department of Health has contracted ANU to lead a team examining the exposure and potential health effects of PFASs in Williamstown and Oakey.
The Research Team

Associate Professor
Martyn Kirk
ANU

Dr Rosemary Korda
ANU

Professor Robyn Lucas
ANU

Professor Catherine D’Este
ANU

Applied Epidemiology
Geospatial Epidemiology
Cancer Epidemiology
Environmental Diseases
Chemical Toxicology
Biostatistics
Clinical Toxicology

Professor Archie Clements
ANU
Emeritus Professor
Bruce Armstrong
University of Sydney

Professor Jochen Mueller
University of Queensland

Professor Alison Jones
University of Wollongong

Ms Susan Trevenar
ANU
Ms Kayla Smurthwaite
ANU
Phase I – Study Development

• Provide advice to Department
  • Blood testing program
  • Arrange storage of specimens

• Systematic review
  • Examine health outcomes of PFAS
  • Targets for epidemiological study

• Develop a study protocol
  • Phase II

• Consultation
  • Individuals
  • Community
Phase 1 Systematic Review
What is a systematic review

• A systematic review summarises the results of previously conducted studies

• It aims to critically analyse the methods used as well as the findings in the available research

• This review will highlight health outcomes linked to PFAS exposure
Phase 1 Systematic Review
Update on the systematic review on PFAS and health outcomes

• We identified more than 7,000 studies related to PFAS’s
• From those 7,000 studies there are approximately 200 papers that we will analyse
Phase 1 Systematic Review Update on the systematic review on PFAS and health outcomes

• It is important to note that while some studies have indicated there is a link between PFAS exposure and health outcomes, not all studies do.

• The analysis of the papers is underway and should be finalised in April 2017.
Community Reference Group

- To provide the ANU research team with a **direct**, and **open link** with the residents of Williamstown and Oakey
- To support the **development** of the **epidemiological study** through engaging with each of the communities
- To create an effective **feedback system** for communication between the ANU research team and local residents
- To identify and raise any **community concerns** regarding the epidemiological study
- To recognise any **additional information** that needs to be provided to the community
Summary

• Study incorporates blood testing program
• Phase 1 currently underway
• Examining health outcomes
• Community consultation vital
• Developing epidemiological study
Contacting the ANU Research Team

Our Email:
pfas.health.study@anu.edu.au

Our Website:
www.nceph.anu.edu.au/research/projects
  - PFAS: An Epidemiological Study
An Introduction to Epidemiology

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21 February 2017
What is Epidemiology?

Epidemiology is the study of disease distribution and frequency in a population.

Epidemiology also investigates the relationship between exposure and health outcomes, which is a key part of the ANU epidemiological study.
What are Epidemiological Studies?

Epidemiological studies ask these core questions:

<table>
<thead>
<tr>
<th>WHO</th>
<th>WHAT</th>
<th>WHEN</th>
<th>WHERE</th>
<th>WHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who has developed the disease?</td>
<td>What disease is occurring most?</td>
<td>When did people start developing the disease?</td>
<td>Where do people live that have the disease?</td>
<td>Why is the disease occurring?</td>
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</tbody>
</table>
Types of Epidemiological Studies

- Systematic Reviews
- Randomized Controlled Trials (RCTs)
- Controlled Cohort Studies
- Uncontrolled Cohort Studies
- Case Studies and Case Series, Qualitative & Descriptive Studies, EBP Implementation & QI Projects
- Expert Opinion
What Can an Epidemiological Study Tell Us?

- If people with higher exposure are more likely to have a disease
- If people living or working in a specific place are more likely to have higher exposure levels or are more likely to develop a disease
- If there is an association between other factors and the development of a disease, including lifestyle choices and demographic characteristics

- The biological relationship between exposure and the development of a disease
- If individuals will develop other diseases in the future as a result of their exposure
The PFAS Health Study

Through the ANU epidemiological study we are investigating the health effects associated with exposure to PFAS.

EXPOSURE  →  HEALTH OUTCOME

What is the concentration of PFASs in residents’ blood?
Is this concentration consistent in the population?
Are there any health conditions or diseases associated with high blood concentrations of PFAS?

The study will investigate the possible health outcomes related to PFAS exposure, as to date there have been no epidemiological studies with clear results.
Possible Health Effects of PFAS Exposure

- High cholesterol
- Pregnancy-induced hypertension & preeclampsia
- Thyroid disease
- Testicular and kidney cancer
- Reproductive (male and female) and prenatal effects (including fetal growth)
- Immunological effects (including effects on vaccination and ulcerative colitis)
Cause vs Association

If an association is found between PFAS exposure and a specific health outcome, it **DOES NOT** mean that exposure to PFAS caused the condition.

An association would mean that there is an increased probability of developing a condition with increased exposure to PFAS.
Phase II – The Epidemiological Study

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Phase II Research Questions

• What concerns do individuals living in the vicinity of Williamtown and Oakey have in relation to exposure to PFAS and their health?

• What are the serum concentrations (mean and range) of PFAS in Williamtown and Oakey residents and how do these levels compare to those of people residing in non-contaminated communities?

• What sociodemographic (e.g. age, sex, location) and other factors (e.g. duration of residence in the area, water source) are associated with high serum PFAS within the Williamtown and Oakey communities?
Phase II Research Questions

• Are age-sex adjusted rates of PFAS candidate diseases higher among people who have lived in Williamtown and Oakey than in the general Australian population? Candidate diseases include those that are reported to be linked, or possibly linked, to PFAS in humans in published studies.

• Are rates of adverse perinatal outcomes higher among children born to mothers who have lived in Williamtown and Oakey than in the general Australian population?
Four Component Studies

1. Focus groups of residents
2. Blood Serum Study
3. Cross-sectional survey of residents
4. Data linkage study examining incidence of disease in residents
Component 1: Focus Groups

8-10 focus group discussions → analysis & findings → questions in cross-sectional study → Final analysis
Component 2: Blood serum study

• Serum concentration levels of PFAS in residents in Investigation Areas will be compared to levels in people living in non-contaminated communities

• A geospatial analysis will report environmental risk factors and identify clusters of high PFAS concentrations
Example: Blood Lead & Water Supply

Component 3: Cross-sectional survey

• Informed by focus groups
• Generate information for understanding
  • Health-related concerns
  • Perceptions of psychological distress
  • Likely exposure
• Exposure questions
  • Reference Department of Defence Water Use Surveys
  • C-8 Community Follow-up Study, Baseline Questionnaire, 2008
Component 4: Data linkage study

- Medicare data will be used to identify the study population
- Health outcomes will be collated from the Australian Cancer Database, Admitted Patient Data Collections and National Perinatal Data Collection
- The National Death Index will also be used to identify deaths for censoring
## Timing Of The Study

<table>
<thead>
<tr>
<th>Activity</th>
<th>Start</th>
<th>End</th>
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<tbody>
<tr>
<td>Protocol development</td>
<td>December 2016</td>
<td>April 2017</td>
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<tr>
<td>Component 1. Focus groups</td>
<td>July 2017</td>
<td>December 2017</td>
</tr>
<tr>
<td>Component 2. Blood serum study</td>
<td>December 2016</td>
<td>July 2018</td>
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<tr>
<td>Component 3. Cross-sectional survey</td>
<td>March 2018</td>
<td>October 2018</td>
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<tr>
<td>Component 4. Data linkage study</td>
<td>March 2018</td>
<td>April 2019</td>
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Communications

• Community and other stakeholders - in discussion with Department of Health
  • Reports
  • Presentations

• Scientific community (peer-review)
  • Journal articles
  • Conferences
Conclusions

The study will provide important information on possible health effects of domestic exposure to PFAS’s in past, recent and current residents of Investigation Areas.