



The PFAS Health Study

Presentation to the Oakey Community

23 February 2017

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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

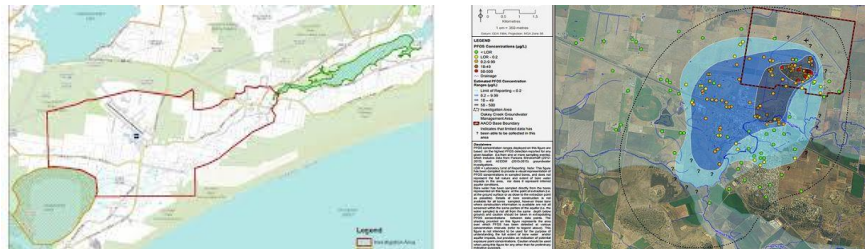
Oakey has been identified as being contaminated due to **Defence Force firefighting activities** on nearby bases

The PFAS Health Study

Currently, the health effects of PFAS exposure
are **unclear**

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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

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

Presentation to the Oakey Community

21 February 2017

Emeritus Professor Bruce Armstrong
School of Public Health
University of Sydney

What is Epidemiology?

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

“upon”
epidemiology
“study”
“people”

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;

WHO

Who has developed the disease?

?

WHAT

What disease is occurring most?

?

WHEN

When did people start developing the disease?

?

WHERE

Where do people live that have the disease?

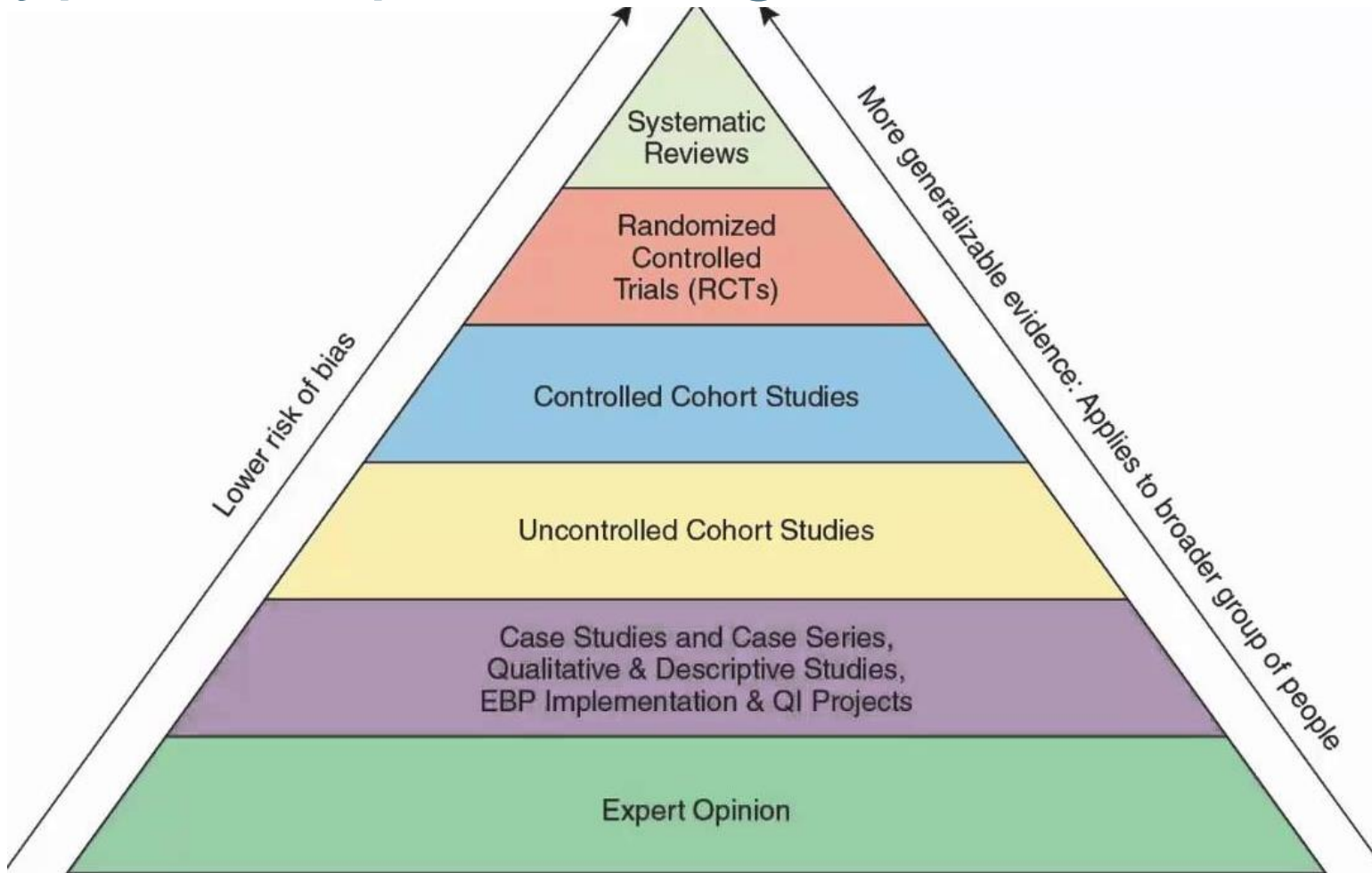
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WHY

Why is the disease occurring?

?

Types of Epidemiological Studies



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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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Professor Robyn Lucas

National Centre for Epidemiology & Population Health

Research School of Population Health

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?

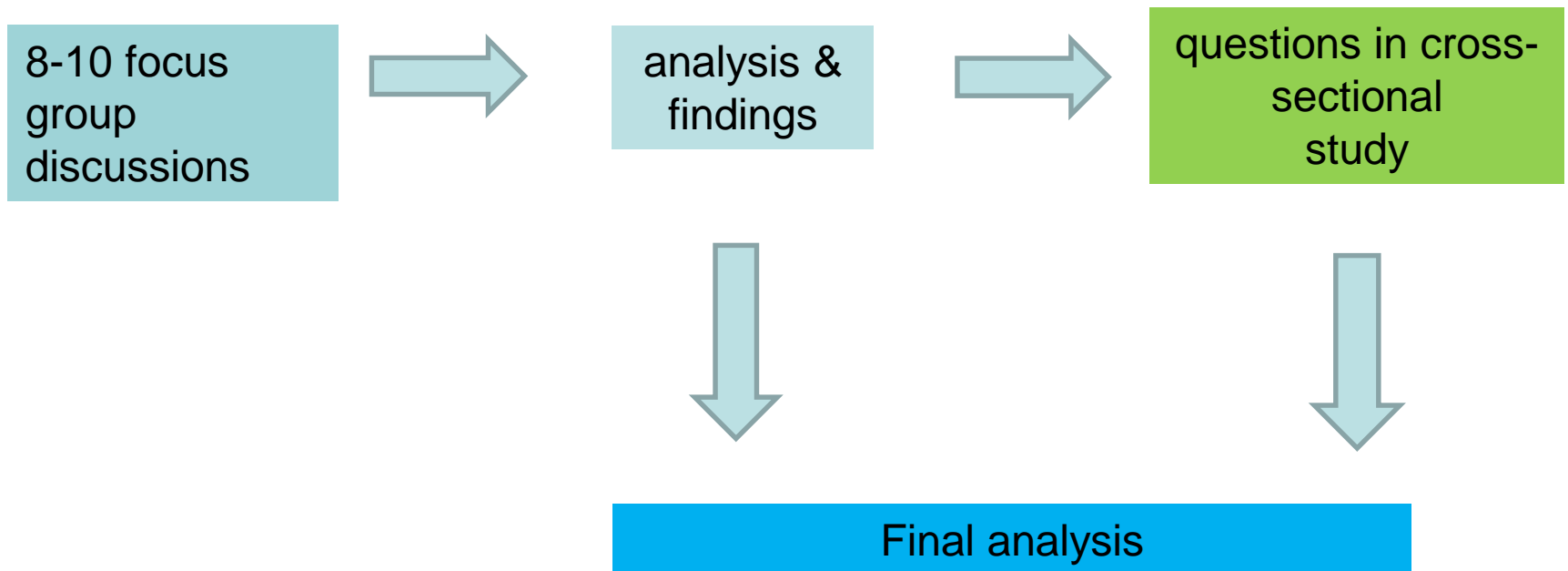
Phase II Research Questions

- 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

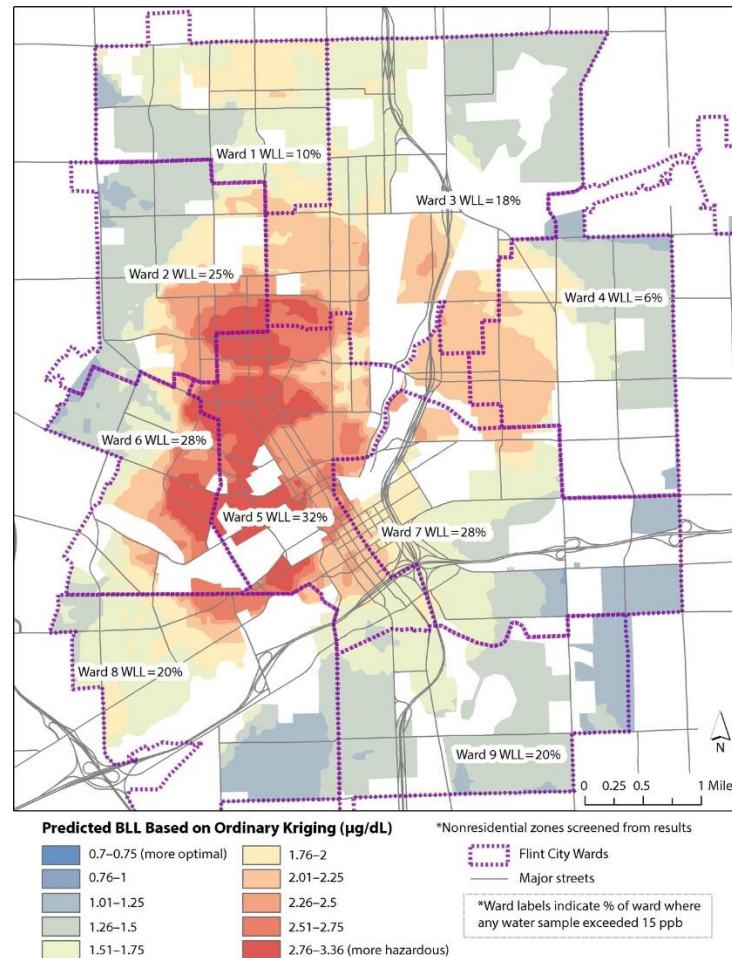
Component 1: Focus Groups



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



Hanna-Attisha M, LaChance J, Sadler RC, Champney Schnepf A. Elevated Blood Lead Levels in Children Associated With the Flint Drinking Water Crisis: A Spatial Analysis of Risk and Public Health Response. *Am J Public Health*. 2016 Feb;106(2):283-90. doi: 10.2105/AJPH.2015.303003.

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

Activity	Start	End
Protocol development	December 2016	April 2017
Component 1. Focus groups	July 2017	December 2017
Component 2. Blood serum study	December 2016	July 2018
Component 3. Cross-sectional survey	March 2018	October 2018
Component 4. Data linkage study	March 2018	April 2019

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.