What is Public Health?

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Amanda Robinson
Nurse Manager - NBMLHD

Acknowledgement of Country

The Nepean Blue Mountains Local Health District acknowledges the traditional custodians of the lands and waterways within its boundaries including the Darug, the Gundungurra and the Wiradjuri people. We acknowledge and pay respects to Elders past and present. We extend that respect to our local Aboriginal community and staff. We celebrate their strength and enduring connection to culture.

Artwork: ‘We All Share the Same Water’ by Leanne Watson, Shay Tobin and Leanne Tobin

Contents

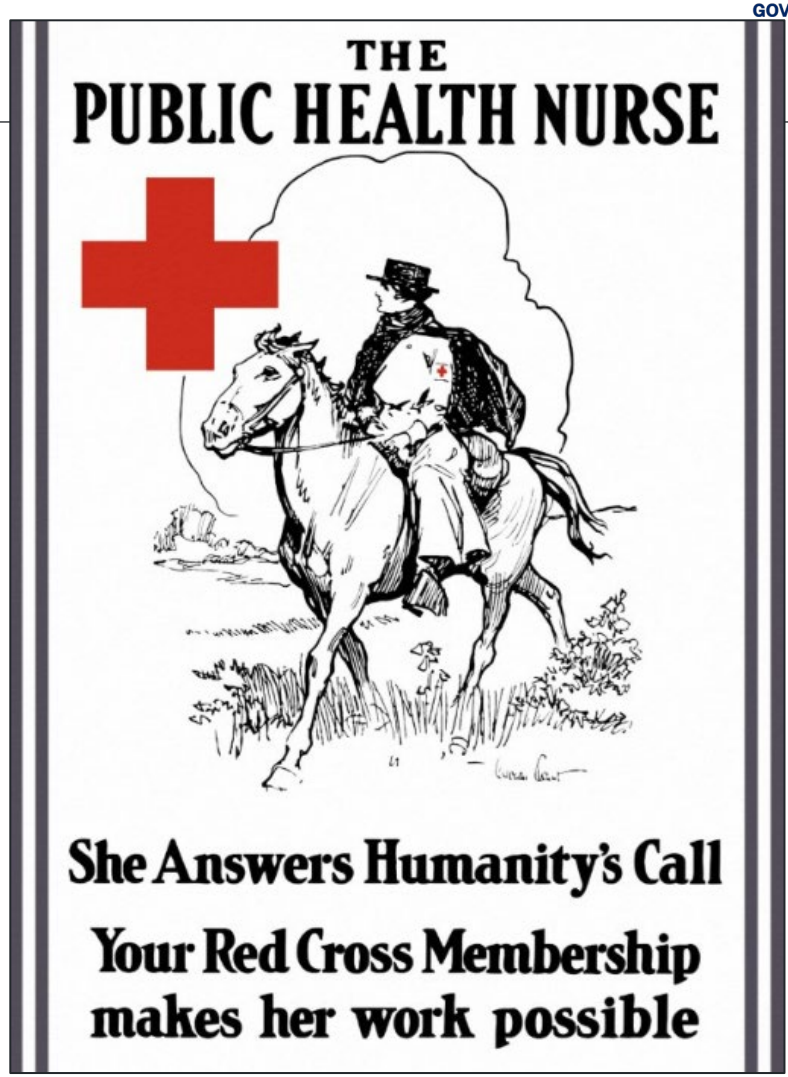
Source: The Australian Prevention Partnership Centre

Learning Outcomes

1. Describe the mission/ role of public health
2. Identify a notifiable or vaccine preventable disease or describe where the list may be found
3. List the components of a public health unit

The Role of Public Health

- Promote, protect and improve public health,
- Control risks to public health,
- Promote the control of infectious diseases,
- Prevent the spread of infectious diseases,
- Recognise the role of local government in protecting public health, and
- Monitor diseases and conditions affecting public health.



Source: Red Cross National Nurses Week - From the archive May 13, 2015

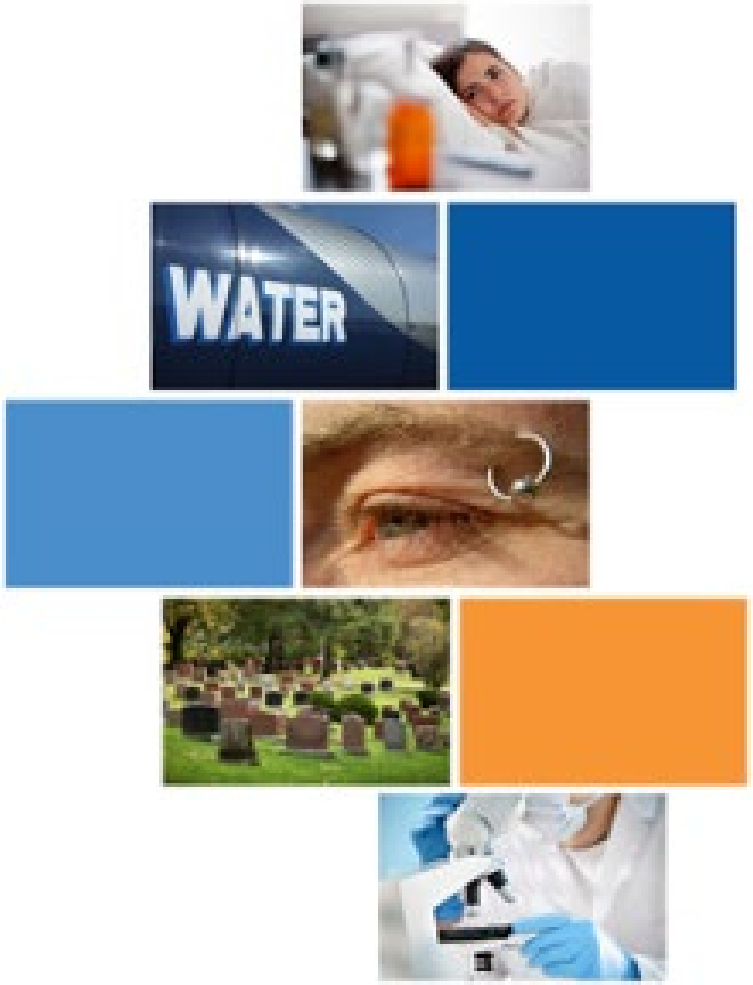
Legislation and Regulation

Legislation:

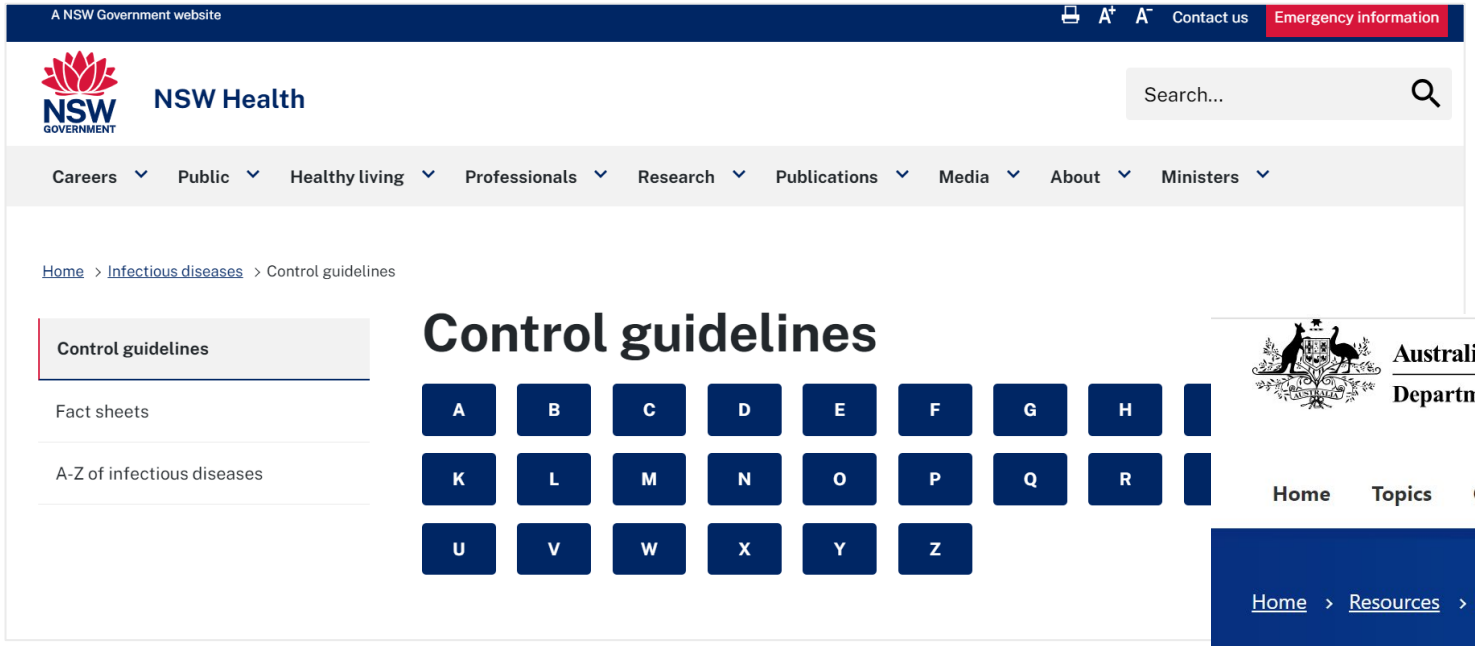
- *Public Health Act 2010* (NSW)
- *Biosecurity Act 2015* (NSW)
- *Public Health (Tobacco) Act 2008* (NSW)
- *Smoke-Free Environment Act 2000* (NSW)

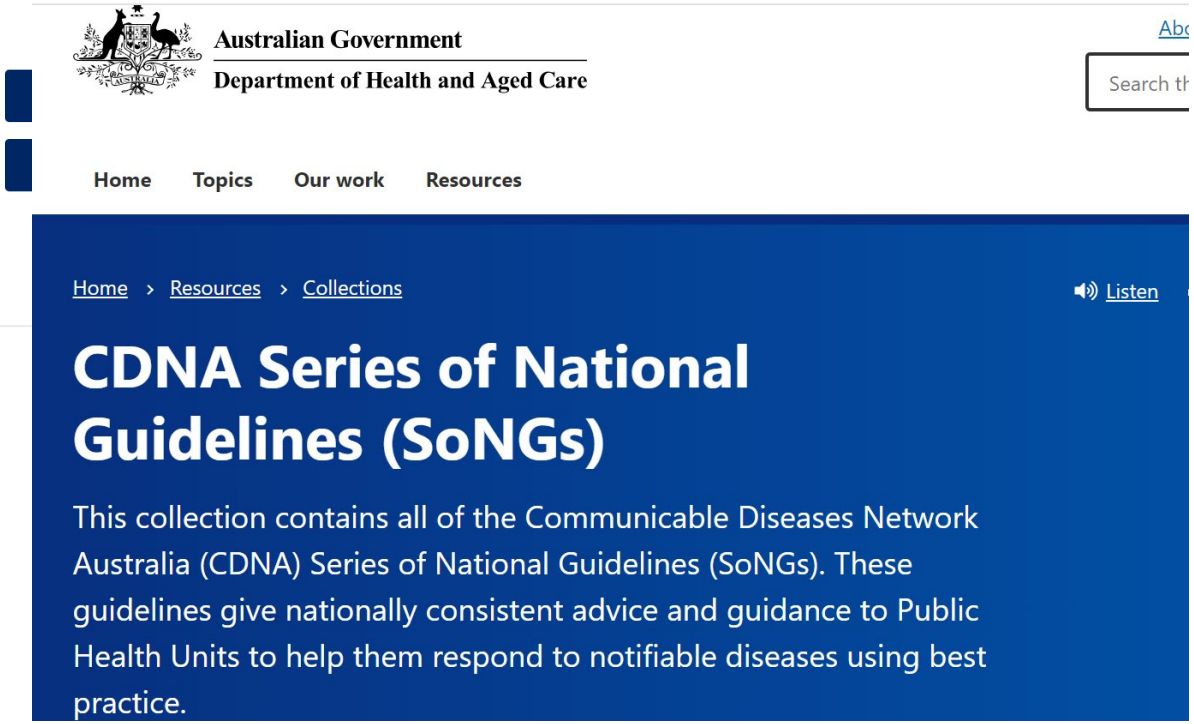
Regulations:

- *Biosecurity Regulation 2017* (NSW)
- *Public Health (Tobacco) 2012 and 2022* (NSW)
- *Smoke Free Environment Regulation 2016* (NSW)
- *Public Health Regulation 2012 and 2022* (NSW)



NSW Health Control Guidelines





What's a notifiable condition?

The *Public Health Act 2010* (NSW) Schedule 1 and 2

Acute viral hepatitis	Brucellosis	Cholera	Donovanosis	Hypothyroidism in a child under the age of one year	Leptospirosis	Middle East respiratory syndrome coronavirus	Poliomyelitis	Salmonella infections	Thalassaemia major	Acute rheumatic fever
Adverse events following immunisation	Campylobacter	Congenital malformation	Giardiasis	Influenza	Listeriosis	Monkeypox (Mpox)	Psittacosis	Severe Acute Respiratory Syndrome	Tuberculosis	Rheumatic heart disease in a person under 35 years of age
Anthrax	Cancer	COVID-19	Gonorrhoea	Invasive group A streptococcal disease	Lymphogranuloma venereum	Mumps	Q fever	STEC/VTEC	Tularaemia	Foodborne illness in 2 or more related cases
Arboviral infections	Candida auris infection and colonisation	Creutzfeldt - Jakob disease (CJD) and variant CJD	Haemophilus influenzae type b	Invasive pneumococcal infection	Lyssavirus	Paratyphoid	Rabies	Shigellosis	Typhoid	Gastroenteritis among people of any age in an institution
Asbestosis	CPE infection and colonisation	Cryptosporidiosis	Hendra virus infection	Lead in blood (>= 5µg/dL)	Malaria	Pertussis (whooping cough)	Respiratory syncytial virus (RSV)	SIDS	Typhus (epidemic)	Silicosis
Avian influenza in humans	Chancroid	Cystic fibrosis	Hepatitis A/B/C/D/E	Legionella infections	Measles	Phenylketo - nuria	Rotavirus	Smallpox	Viral haemorrhagic fevers	
Botulism	Chlamydia	Diphtheria	HIV infection	Leprosy	Meningococcal infections	Plague	Rubella	Syphilis	Yellow fever	

Pink squares: notifiable by medical practitioners

Blue Squares: notifiable by labs

Green squares: notifiable by both medical and labs

Who is in the public health unit?

Immunisation

Source: phil.cdc.org

*"*Population -wide immunisation programs are one of the most effective and cost -efficient public health measures to prevent disease, preventing 3.5 to 5 million deaths globally each year. *"*

~ NSW Immunisation Strategy 2024-2028

Immunisation provides
Advice to the public, HCW, schools and CCC
Cold chain management/ breach
Catch up schedules
Community outreach programs
NSW school vaccination program
Adverse Events Following Immunisation (AEFI)
Rabies/ lyssavirus PEP
New VAN assessment
Yellow Fever accreditation

Environmental Health

Source: phil.cdc.org

"Addresses the physical, chemical and biological factors external to a person and the related factors that can potentially affect health. It is targeted towards preventing disease and creating health -supportive environments" ~ NSW Health Environmental Health Branch

Environmental Health deals with
Drinking water
Recreational water use
Sewage management
Public swimming pools
Skin penetration industries
Funeral industries - exhumations
Mosquito vector management
Air quality/ Heat waves
Waste management
Tobacco sales and smoke free zones

Epidemiology

Source: phil.cdc.org

"Epidemiology is the study of how diseases occur in different groups of people and why. "

~ Centre for Disease Control and Prevention

Epidemiologists do:
Outbreak investigation
Conduct surveillance on infectious diseases
Analysis of routine and non -routinely collected data
Identify potential causes of outbreaks
Provide evaluation of programs/ public policy
Partner with stakeholders to perform research
Providing statistical data for publication on NSW and national websites
Health intelligence and horizon scanning

Communicable Disease

Source: phil.cdc.org

"We work with experts organisations and other agencies to protect Australia against disease outbreaks. We work to reduce the spread of communicable diseases and their impact on society, including their financial costs."

~ Department of Health and Ageing

Communicable disease team …
Provide advice to the public, HCW, schools and CCC
Outbreak management/ advice to CCC/ RACF
Contribute to local and state -wide research
Interview cases of communicable disease
Provide advice to contacts
Organise post -exposure prophylaxis for contacts
Investigate reports from the community RE communicable diseases
Linking data from other agencies that may signal emerging threats

Case Study - Leptospirosis in Berry Pickers

Source: https://unsplash.com/@sneha_snaps

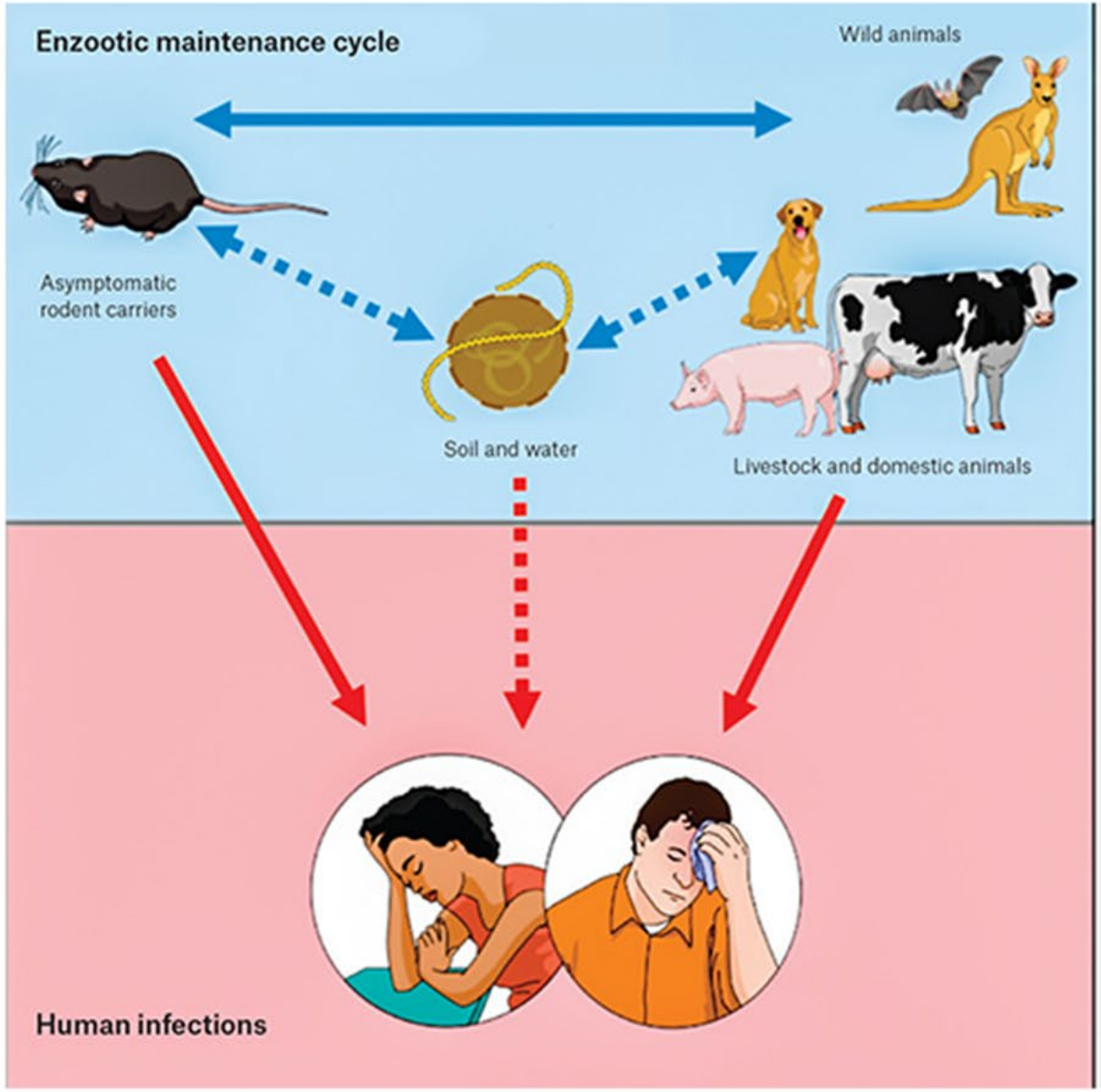
https://unsplash.com/@geertjecaliguire

https://www.wildfooduk.com/wild-plants/wild-raspberry/

What is leptospirosis?

- Bacterial disease that affects both humans and animals.
- **Primary reservoir -** mammals (rodents are the most likely human source), contaminated soils/ water
- **Transmission-** breaks in skin, mucosal exposure, ingestion of contaminated water/soils or inhalation of excretions
- **Incubation period -** 2-30 days (usually 5 -14 days)
- Majority of cases are asymptomatic or mild symptoms but ~10% will develop severe disease
    - Symptoms may include fevers and chills, headache, myalgia, vomiting and diarrhoea.
    - May last for 9 -14 days
    - Acute phase ⇨ Immune phase

Transmission pathways and risk factors for leptospirosis



Indirect vs direct transmission to humans

Direct transmission occurs through contact with an infected animal.

Indirect transmission occurs through contact with contaminated urine, water or soil.

Risk factors

Demographics

- Male gender
- Young adults

Behaviour

- Occupational exposure (eg dairy/cane/ banana farmers, abattoir workers)
- Recreational exposure (eg swimming in freshwater, rafting)
- International travel and ecotourism in the tropics

Environmental drivers

- Tropical and subtropical climate
- High rainfall and flooding
- Poor sanitisation (eg urban slums in developing countries)

Source: Lau, C. Leptospirosis: An important zoonosis acquired through work, play and travel.

North Coast NSW - 2018

- April - May 2018 – local GPs identify a cluster of patients with fevers of unknown origin
- Standard investigations identified no pathogens - including lepto
- May 2018- Emergency Department reports increasing numbers presenting with fevers
- Initial interviews identified the patients were all from raspberry pickers from the same mixed -berry farm.

Berry Farm - inspection

- Subtropical setting employing over 2000 people.
- Environmental health team went out to inspect the farm on 2 occasions.
  - Initial impression: a large well run farm with teams and roles well set up
  - Staff had PPE but were using only cotton gloves for picking
  - Drinking water was tankered in
- Evidence of rodent activity on the farm- testing of mice
- Thorny raspberry canes used rather than thornless cultivated varieties
- Risk assessment and control measures recommended

What was making the berry pickers sick?

- Contaminated water?
- Eating the berries?
- Mud/ Dam water used for irrigation?
- Scratches for raspberry canes?
- Animals on the farm?

- Who was at risk?
- Particular teams?
- Why not other people on the farm?

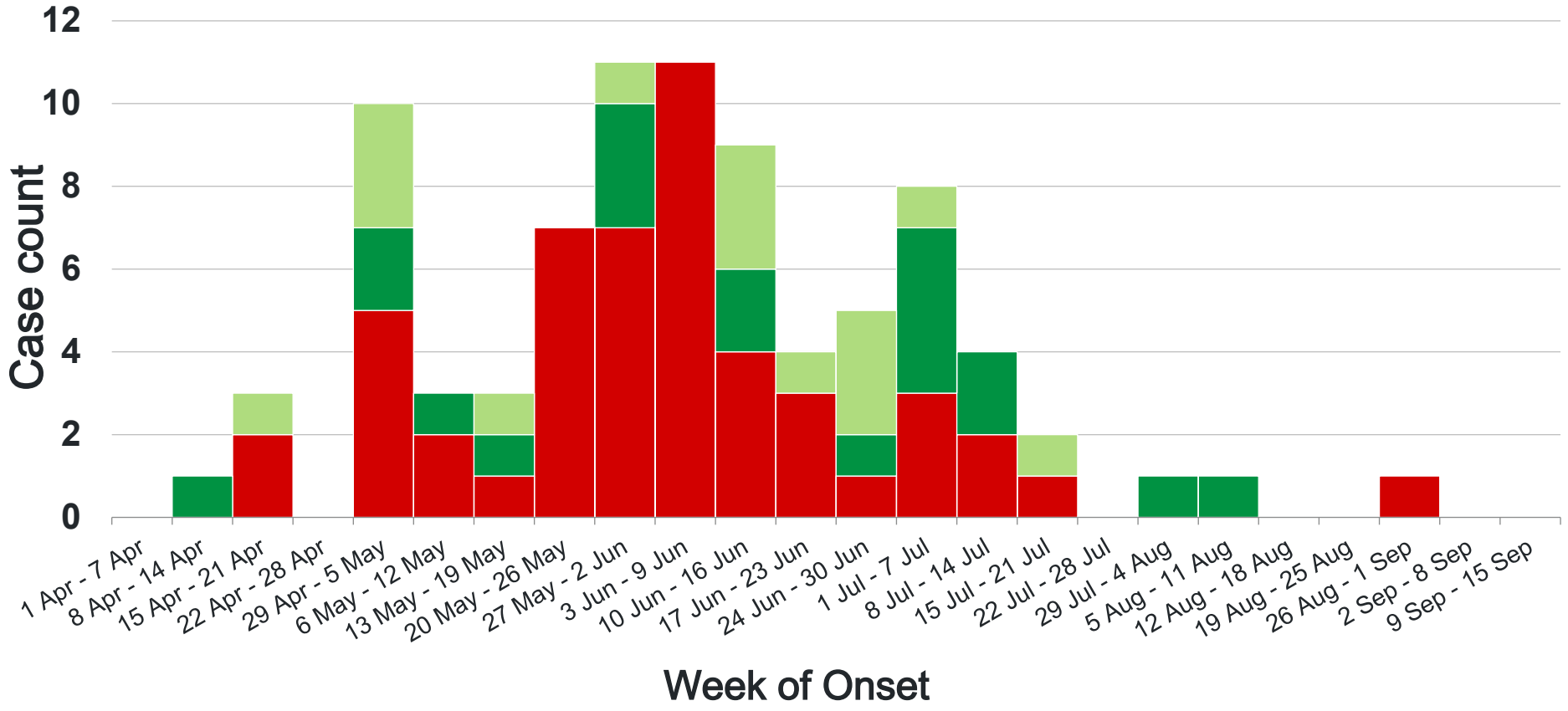
- Maps overlaying teams, cases and graphs of rainfall were created to assist the investigation

Epi Study

- Assistance was requested from Ministry of Health
- 15 public health staff doctors and nurses were sent to the Berry Farm
- Interviews of both well and unwell pickers to examine risk factors between groups.
  - Difficulty in finding workers who had moved on since the start of the outbreak
- Clinic set up in town to take blood for testing AND give prophylactic antibiotics.

Case numbers

50 Confirmed | 19 Probable | 15 Possible



Environmental health study

- Teams rotated through different fields every day - No clustering of cases was observed
- Raspberry plants were grown on trellises in covered but open sided tunnels
- Workers wore cotton gloves with fingers cut off to assist with picking
- Water was transported by tanker and stored in sealed containers - no clear opportunities for contamination were observed.
- Farm bordered on native woodlands as well as other farms
- Evidence of rodent activity in sheds and fields
- Above usual rainfall in March but before and after March, rainfall was less than usual.
- Mice tested positive for Leptospira arborea

Epi study results (1)

Multivariate model

Cases	(%)	Controls	(%)	Variable	Adj OR*	95% CI	p value**
39/67	*(58)*	53/69	*(77)*	**Any glove use**	**0.3**	0.1-0.8	0.01
0.54		1		**Median years employed**	**0.8**	0.6-0.9	0.02
10/67	*(15)*	2/69	*(3)*	**Rodent sighting**	**7.1**	1.3-38.9	0.02
32/66	*(48)*	18/65	*(28)*	**Interpreter required**	**4.0**	1.6-9.9	0.003

*Adjusted for all other variables in model (n=120) **Wald test p value

Epi study results (2)

Crude association only

Cases	(%)	Controls	(%)	Variable	Crude OR	95% CI	p value*
15/67	(22)	26/69	(38)	**Scratches:** Never	1		
11/67	(16)	11/69	(16)	Rarely	1.7	0.6-5.0	0.3
13/67	(19)	14/69	(20)	Often	1.6	0.6-4.3	0.3
28/67	(42)	18/69	(26)	**Always**	**2.7**	1.1-6.4	0.03
25/55	(45)	17/68	(25)	**Mud contact**	**2.5**	1.2-5.4	0.02
61/67	(91)	54/69	(78)	**Drinks water from trailer**	**2.8**	1.0-7.8	0.045
65/67	(97)	60/69	(87)	**Raspberry picking**	**4.9**	1.0-23.5	0.048

*Wald test p value

Epi study results (3)

NO association

Cases	*(%)*	Controls	*(%)*	Variable	Crude OR	95% CI	p value*
29/67	*(43)*	31/69	*(45)*	**Any berry eating**	**0.9**	0.5-1.8	0.9
23/64	*(36)*	17/69	*(25)*	**Irrigation water contact**	**1.7**	0.8-3.63	0.2
58/58	*(100)*	69/69	*(100)*	**Handwashing**	†		

*Wald test p value †Odds ratio undefined due to 0 values.

Public health measures and conclusion

- Public Heath measures recommended:
  - PPE use, including impervious gloves
  - Hand hygiene
  - Avoid contact with mud

- The combination of these measures plus antibiotic prophylaxis may have stopped the outbreak.

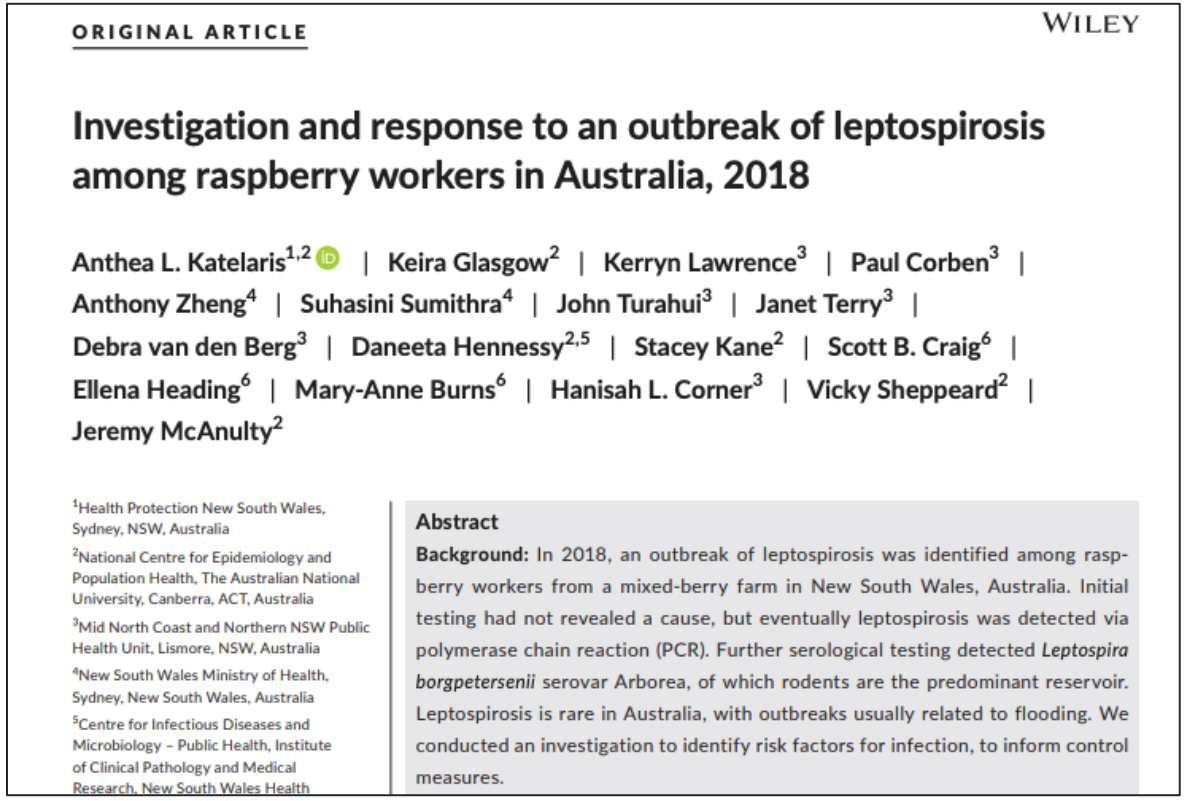
Conclusion:

- Not clear why this happened here and now
- May be rainfall, may be changing land use?
- This outbreak contributed to a global understanding of the risk factors associated with leptospirosis infection amongst berry pickers.

Thank you

NBM PHU Communicable Disease Team

Dr Anthea Katelaris for her generosity in providing me with her insight into the outbreak



ORIGINAL ARTICLE

WILEY

Investigation and response to an outbreak of leptospirosis among raspberry workers in Australia, 2018

Anthea L. Katelaris[1,2] | Keira Glasgow[2] | Kerryn Lawrence[3] | Paul Corben[3] | Anthony Zheng[4] | Suhasini Sumithra[4] | John Turahui[3] | Janet Terry[3] | Debra van den Berg[3] | Daneeta Hennessy[2,5] | Stacey Kane[2] | Scott B. Craig[6] | Ellena Heading[6] | Mary-Anne Burns[6] | Hanisah L. Corner[3] | Vicky Sheppeard[2] | Jeremy McAnulty[2]

[1]Health Protection New South Wales, Sydney, NSW, Australia

[2]National Centre for Epidemiology and Population Health, The Australian National University, Canberra, ACT, Australia

[3]Mid North Coast and Northern NSW Public Health Unit, Lismore, NSW, Australia

[4]New South Wales Ministry of Health, Sydney, New South Wales, Australia

[5]Centre for Infectious Diseases and Microbiology – Public Health, Institute of Clinical Pathology and Medical Research, New South Wales Health

Abstract

Background: In 2018, an outbreak of leptospirosis was identified among raspberry workers from a mixed-berry farm in New South Wales, Australia. Initial testing had not revealed a cause, but eventually leptospirosis was detected via polymerase chain reaction (PCR). Further serological testing detected *Leptospira borgpetersenii* serovar Arborea, of which rodents are the predominant reservoir. Leptospirosis is rare in Australia, with outbreaks usually related to flooding. We conducted an investigation to identify risk factors for infection, to inform control measures.

Questions?

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