

# Changing the narrative in Indigenous kidney health: undertaking strengths-based analysis using linked data

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**WCE**

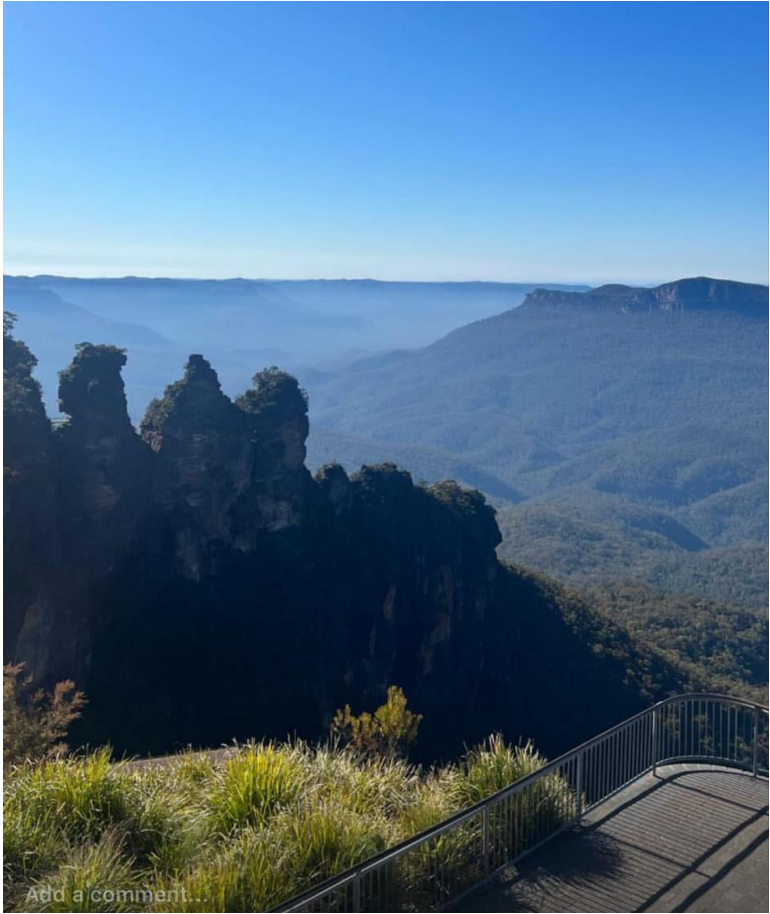
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# Acknowledgement of Country



Kurna Yarta, City of Adelaide, South Australia

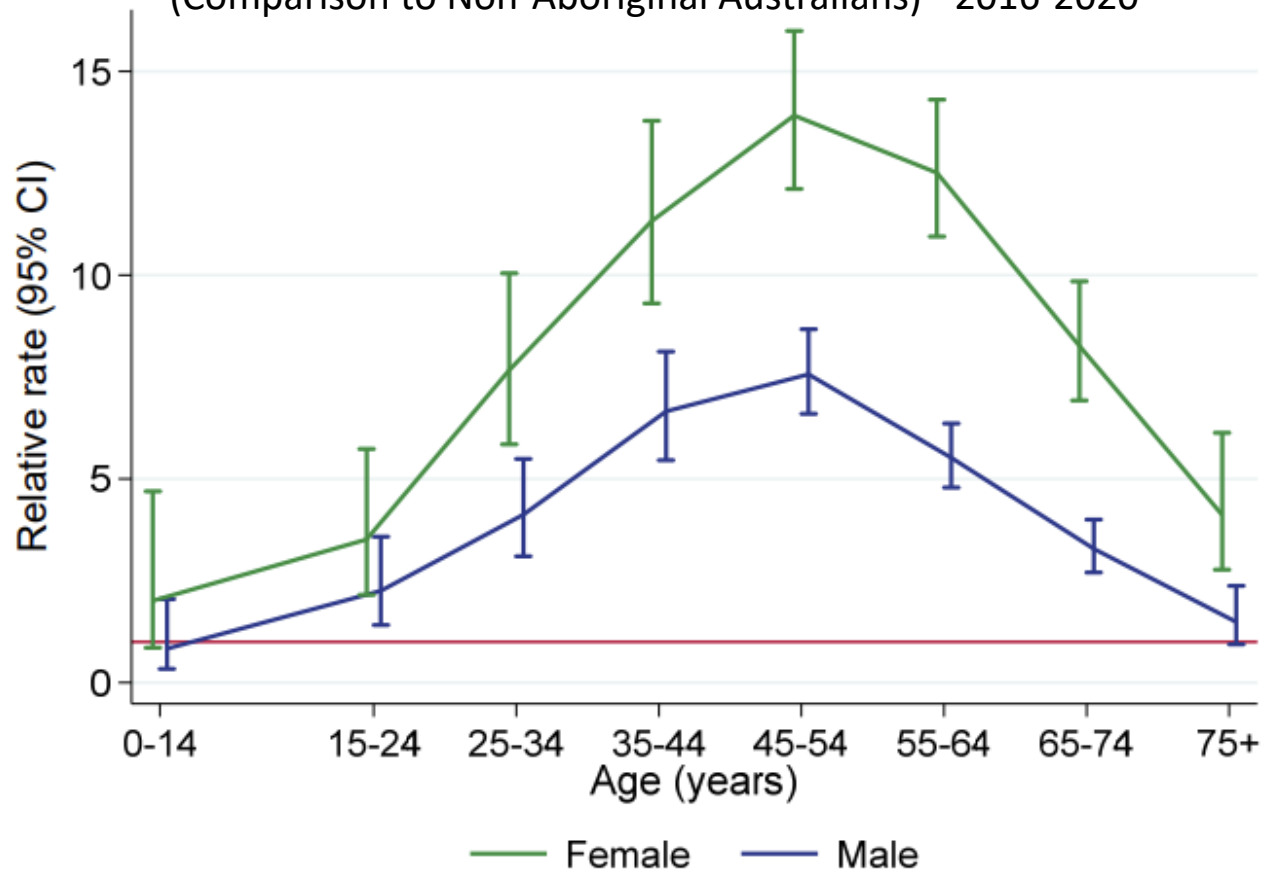


Three Sisters, Gundungurra and Darug land, Blue Mountains National Park, NSW

# Background



**Figure 1** - Relative Incidence Rate of Treated Kidney Failure for Aboriginal Patients by Gender (Comparison to Non-Aboriginal Australians) - 2016-2020



Source: ANZDATA Annual Report 2021

Missing longitudinal, population-based studies for Aboriginal and non-Aboriginal children in Australia to understand the trajectory of chronic kidney disease and to inform strategies to prevent its progression.

# The ARDAC Story



**16-month-old Aboriginal baby** presented with kidney failure [received **kidney transplant**]

Early 2000s



Aboriginal Health Education Officer – **Ms Rita Williams** initiated the ARDAC study



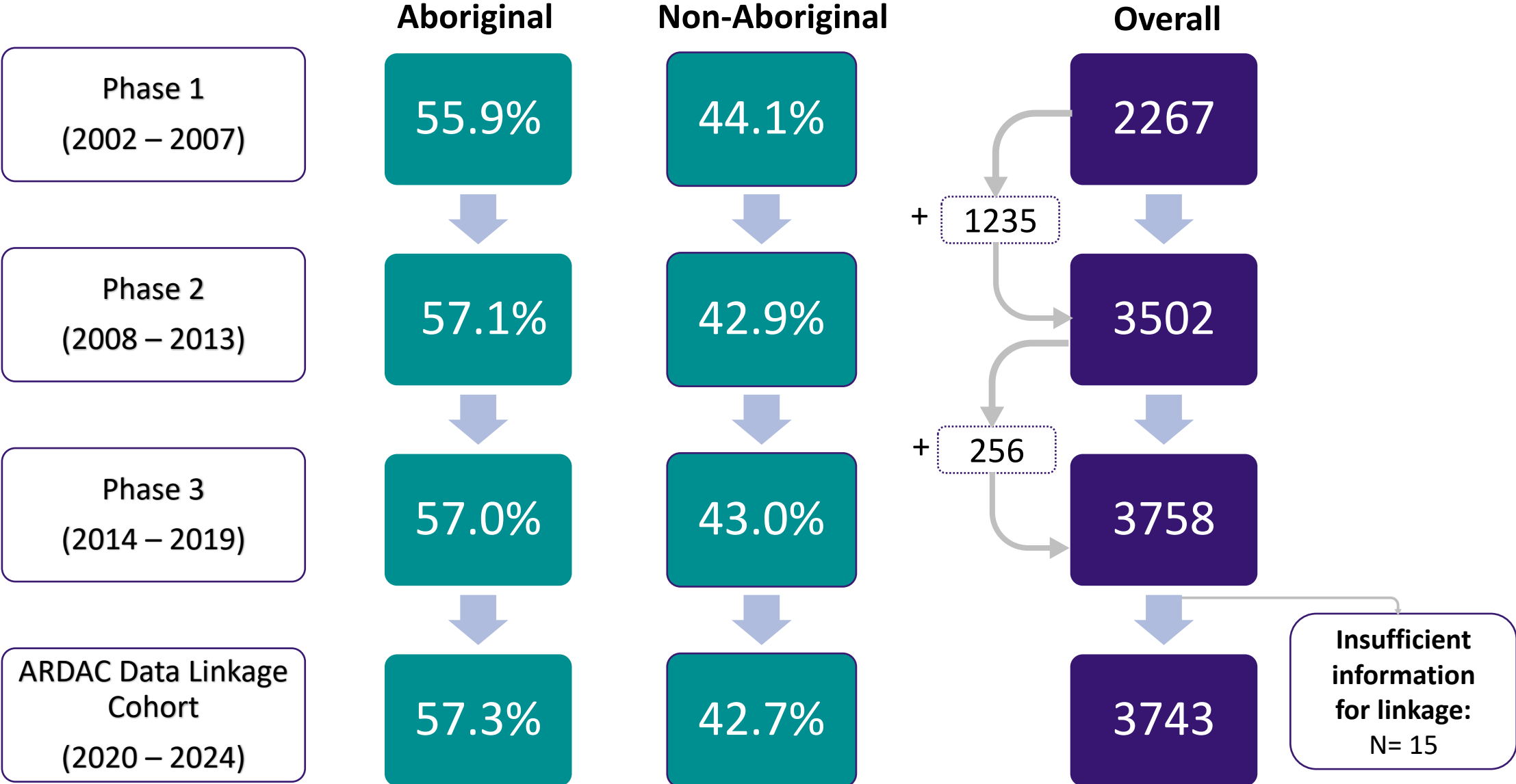
In 2002



Previous findings from ARDAC suggest kidney health may be **preventable in childhood**

2002 onwards

# Cohort Flow

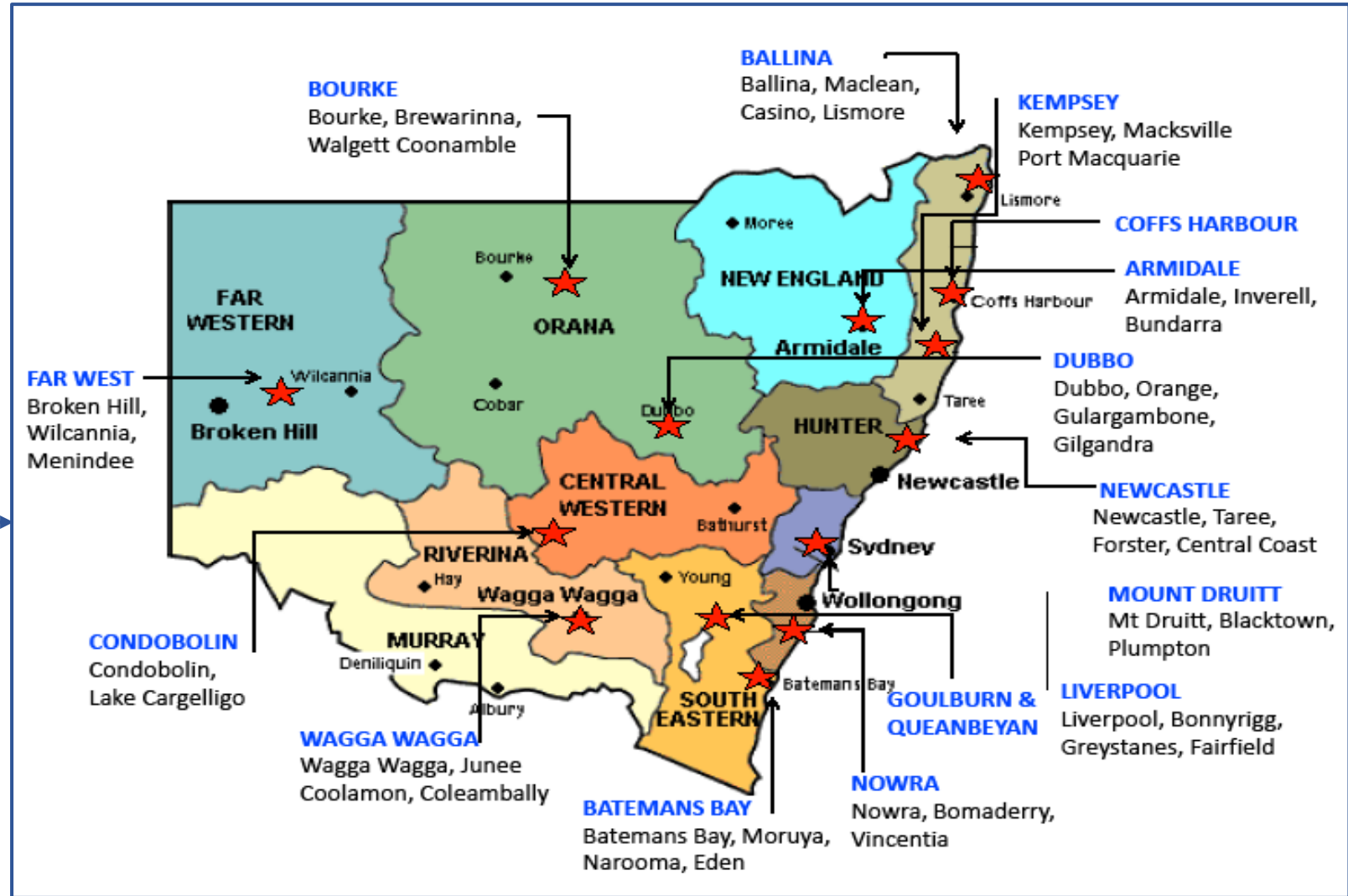


# AIMS

- To estimate the cumulative incidence of chronic kidney disease (CKD) among young Aboriginal people.
- To understand risk factors for development over time.

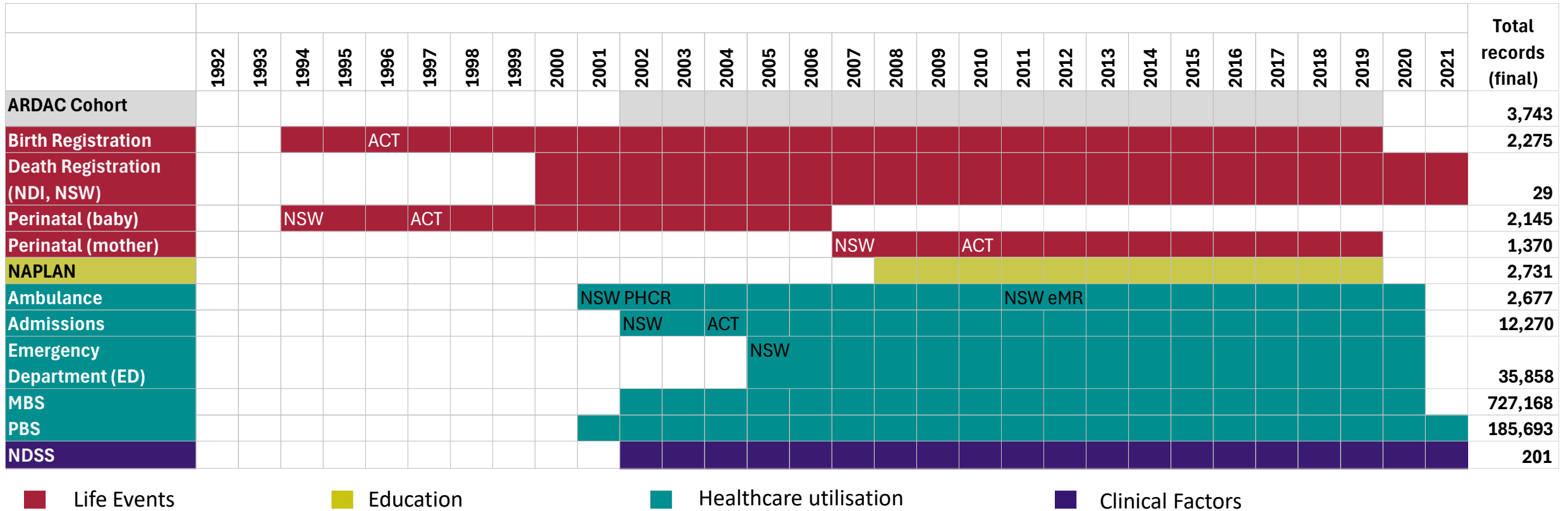


# Participating communities



- The ARDAC study is based in New South Wales, Australia
- Over 60 participating communities

# Data Linkage



- ARDAC biomedical cohort follow up time: 14.5 years
- Data Linkage follow up time: 27 years



# CKD Case Definition

At least ONE of the following criteria:

- An uACR Measurement of  $> 3.4\text{mg}/\text{mmol}$  **PLUS** prescribed a CKD related medication
- Primary or secondary diagnosis for CKD within NSW & ACT hospitals
- Accessed a CKD-related Medicare service
- Self-report in the ARDAC sociodemographic survey
- Main or other cause of death as 'CKD'



# Baseline characteristics

Characteristic	Non-Aboriginal (n = 1593)	Aboriginal (n = 2150)
Female	781 (49%)	1067 (50%)
Age, median (IQR)	10.8 (8.5 – 13.3)	11.0 (8.2 – 13.6)
SES [IRSAD]*, mean (SD)	933 (55)	921 (59)
Major cities	339 (21%)	343 (16%)
Remote/very remote living*	82 (5.1%)	337 (16%)
Obese*	186 (12%)	357 (17%)
Birthweight [grams], mean (SD)	3349 (578)	3212 (627)
Gestational age [weeks], mean (SD)	39.2 (1.70)	39.0 (2.09)

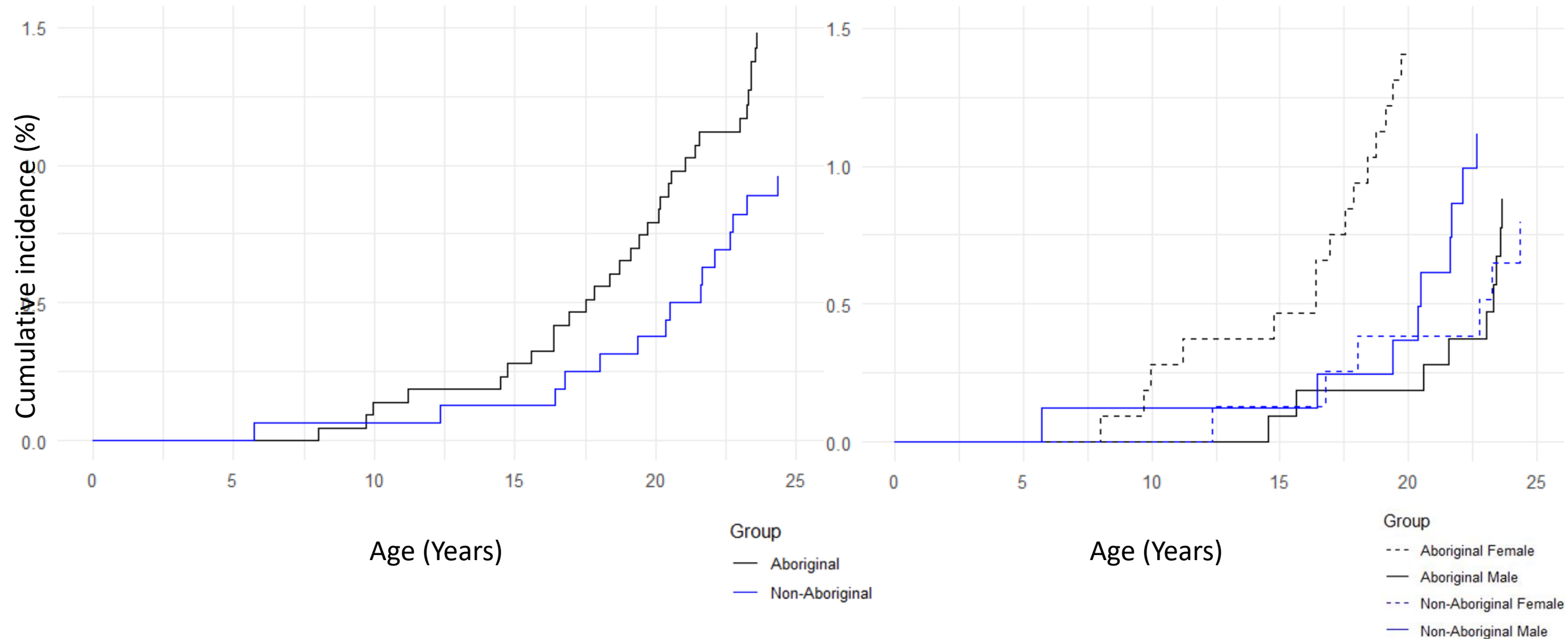
\* **Obesity** – Based on CDC cut-offs and percentiles

\* **Remoteness** – Based on 2011 Rural, Remote and Metropolitan Area

\* **IRSAD** – Index of Relative Socio-economic Advantage and Disadvantage

# Cumulative Incidence of CKD for Aboriginal and non-Aboriginal young people

CKD, N = 52 (1.4%)



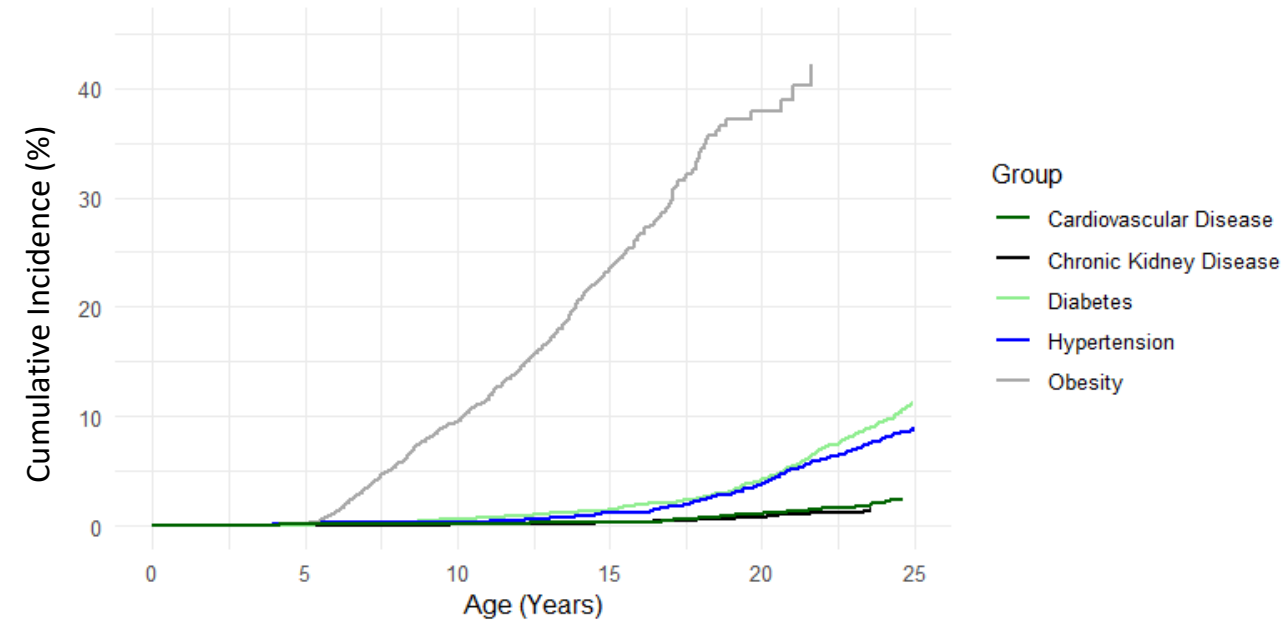
- The cumulative incidence from age 10 years is consistently higher at all ages for Aboriginal young peoples
- Young Aboriginal females have a higher cumulative incidence across all groups

# Sociodemographic Risk Factors for Chronic Kidney Disease

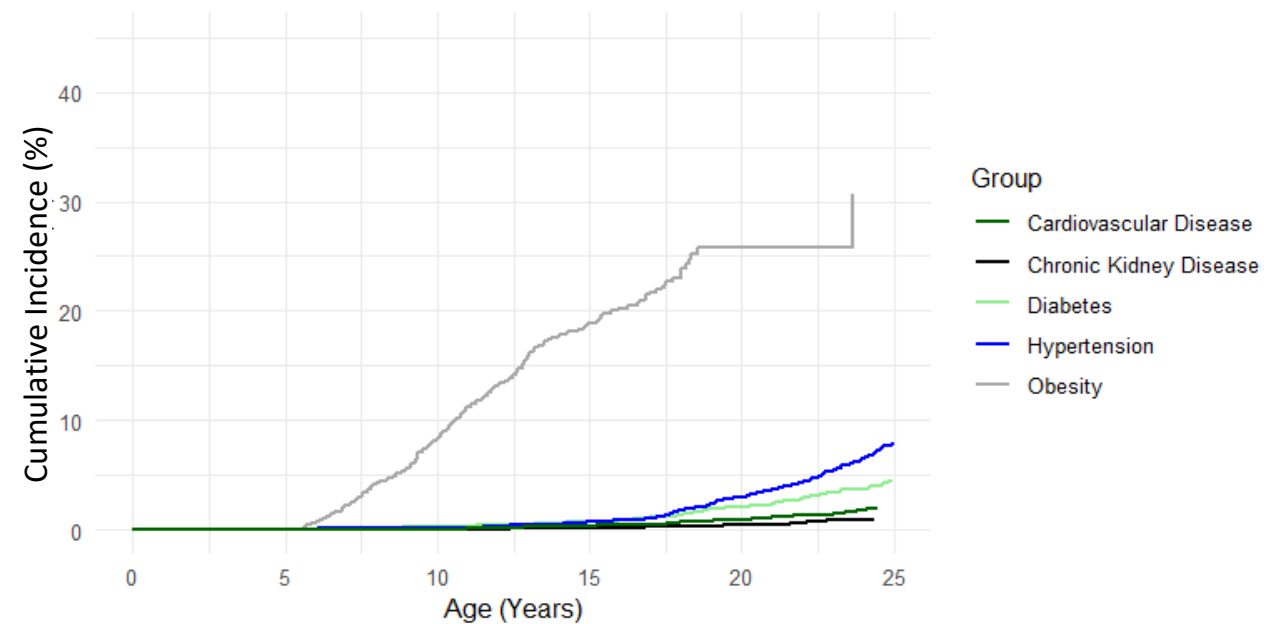
	Adjusted Hazard Ratio	95% CI		P-value
		Lower	Upper	
Non-Aboriginal [ref]	1.00			
Aboriginal	1.47	0.81	2.69	0.21
Male [ref]	1.00			
Female	1.51	0.87	2.63	0.14
SES (Per 10 units of IRSAD Scale)	0.99	0.99	1.01	0.75
Major cities [ref]	1.00			
Inner regional	2.22	0.76	6.53	0.14
<b>Outer Regional</b>	<b>3.67</b>	<b>1.18</b>	<b>11.4</b>	<b>0.02</b>
<b>Remote/Very Remote</b>	<b>3.57</b>	<b>1.04</b>	<b>12.3</b>	<b>0.04</b>
No obesity prior to CKD [Ref]	1.00			
<b>Obesity prior to CKD</b>	<b>1.92</b>	<b>1.08</b>	<b>3.41</b>	<b>0.02</b>

# Cumulative Incidence of Associated Risk Factors and CKD

Aboriginal young people



non-Aboriginal young people



- The cumulative incidence of associated risk factors – Cardiovascular disease, diabetes, hypertension and obesity are all higher than CKD for both Aboriginal and non-Aboriginal young people
- The cumulative incidence of these associated risk factors is slightly elevated in Aboriginal young people

\* **Obesity** – Based on CDC cut-offs and percentiles

\* **Diabetes and CVD** – Created using various data sources

\* **Hypertension** – Creating using SBP/DBP values measured at biomedical screenings

# Conclusions

- **ARDAC study fills the missing biomedical data for CKD** - Young Aboriginal peoples have an increased risk of CKD
- **Importance of tailored interventions** - The cumulative incidence is higher in young Aboriginal females
- **Modifiable risk factors** - Obesity increases the risk of CKD by nearly 2 times
- Risk factors for CKD such as diabetes, obesity, hypertension and CVD are elevated in the early years in young Aboriginal peoples.
- Importance of earlier screening and increased funding for communities.

# Acknowledgements

## ARDAC Investigators

- Prof Jonathan Craig\*
- Prof Allison Jaure
- A/Prof Michelle Dickson
- Prof Armando Teixeira-Pinto\*
- Prof David Lyle
- Prof Germaine Wong
- Prof Natasha Nassar
- A/Prof Jacqueline Stephens\*
- Dr Kylie Ann-Mallitt \*

## ARDAC Research Team

- Dr Eleonora Dal Grande
- Ms Victoria Sinka
- Dr Siah Kim

## ARDAC Advisory Committee

## ARDAC Study Participants

\*PhD Supervisors

Visit our website:

<https://www.ardac.org.au/>



**Ms. Rita Williams**

Aboriginal Health Education Officer,  
Children's Hospital at Westmead



## Travel Grants:

- Flinders University Research Student Travel Grant
- PHAA SA Award
- HDA Travel Grant



# CKD Specific ICD-10 Codes (Used for Deaths and Hospital Admissions)

CKD Stage	ICD-10 Description	ICD-10 Codes
<b>Stages 1-4</b>	Chronic kidney failure	N18
	Chronic kidney disease, stage 1	N18.1
	Chronic kidney disease, stage 2 (mild)	N18.2
	Chronic kidney disease, stage 3	N18.3
	Chronic kidney disease, stage 4 (severe)	N18.4
	Hypertensive chronic kidney disease with Stage 1 through 4 chronic kidney disease, or unspecified chronic kidney disease	I12.9
	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease	I13.0
	Hypertensive heart and chronic kidney disease without heart failure	I13.1
	Hypertensive heart and chronic kidney disease with heart failure and with stage 4 chronic kidney disease, or end stage kidney disease	I13.2
<b>Stage 5</b>	Chronic kidney disease, stage 5	N18.5
	End-stage renal disease	N18.6
	Hypertensive chronic kidney disease with stage 5 chronic kidney disease or end stage kidney disease	I12.0
<b>Stage 5 Regular dialysis</b>	Preparatory care for dialysis	Z49.0
	Haemodialysis	Z49.1
	Peritoneal dialysis	Z49.2
	Kidney transplant and dialysis status	Z94.0, Z99.2
	Complications related to dialysis and kidney transplant	T82.4, T86.1



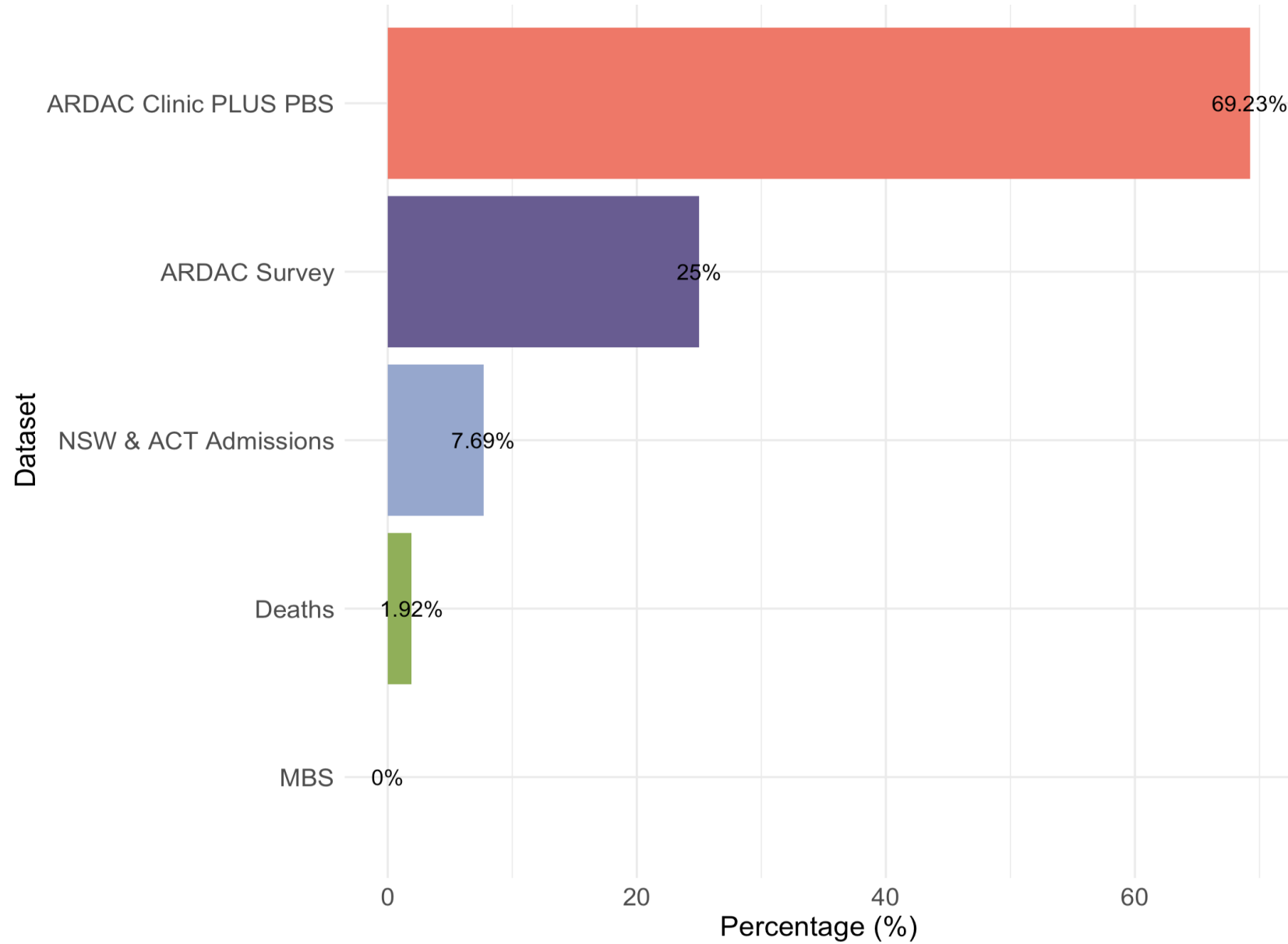
# CKD Specific ICD-10 Codes

MBS Number	Category	Group	Subgroup	Description
<b>13100-13110</b>	3	T1 – Miscellaneous therapeutic produces	2 – Dialysis	SUPERVISION IN HOSPITAL by a medical specialist of haemodialysis, haemofiltration, haemoperfusion or peritoneal dialysis, including all professional attendances, where the total attendance time on the patient by the supervising medical specialist exceeds 45 minutes in 1 day
<b>36503</b>	3	T08 – Surgical Operations	5-UROLOGICAL	RENAL TRANSPLANT (not being a service to which item 36506 or 36509 applies)
<b>36543</b>	3	T08 – Surgical Operations	5-UROLOGICAL	Nephrolithotomy or pyelolithotomy, or both, extended, for one or more renal stones, including one or more of nephrostomy, pyelostomy, pedicle control with or without freezing, calyorrhaphy or pyeloplasty
<b>36506</b>	3	T08 – Surgical Operations	5-UROLOGICAL	RENAL TRANSPLANT, performed by vascular surgeon and urologist operating together vascular anastomosis including aftercare
<b>36509</b>	3	T08 – Surgical Operations	5-UROLOGICAL	RENAL TRANSPLANT, performed by vascular surgeon and urologist operating together ureterovesical anastomosis including aftercare
<b>66671</b>	6	P2 – Chemical		Quantitation of serum aluminium in a patient in a renal dialysis program - each test

# CKD Specific Medications

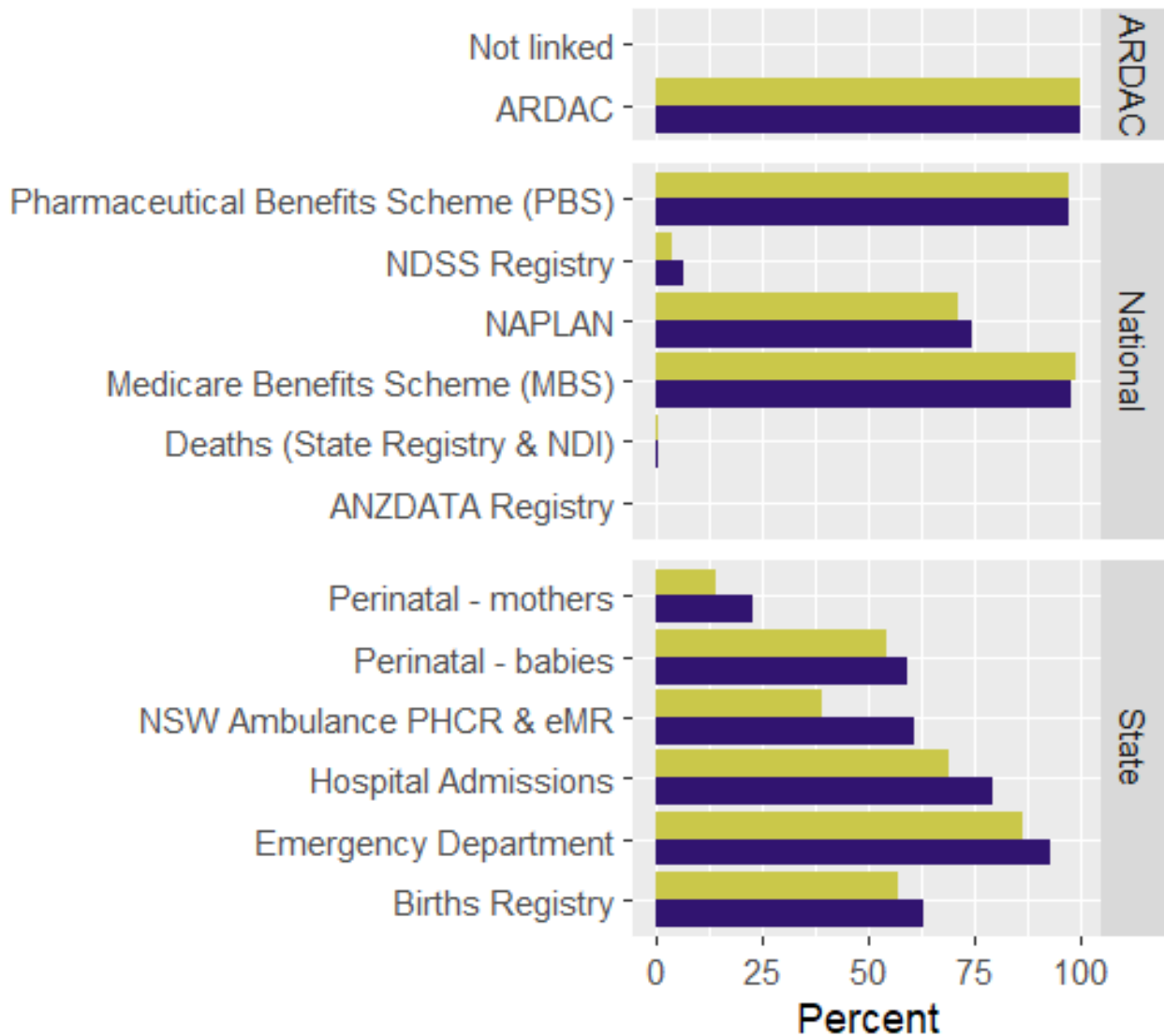
Code	Code & Prescriber	Description
<b>Angiotensin converting enzyme (ACE) Inhibitors or Angiotensin Receptor Blockers (ARBs)</b>		
<b>C09A</b>		ACE Inhibitors, plain
<b>C09B</b>		ACE Inhibitors, combinations
<b>C09BA</b>		ACE inhibitors and diuretics: Enalapril + Hydrochlorothiazide Fosinopril + Hydrochlorothiazide Perindopril + Indapamide Quinapril + Hydrochlorothiazide
<b>C09C</b>		Angiotensin II Receptor Blockers (ARBs), plain
<b>C09D</b>		Angiotensin II Receptor Blockers (ARBs), combinations
<b>Non-loop diuretics and loop diuretics</b>		
<b>C03AA</b>	1484D	Thiazides, plain
<b>C03CA</b>		Sulfonamides, plain Furosemide (Frusemide)
<b>Beta blockers</b>		
<b>C07AB</b>	1081X, 2243C	Atenolol
	8732N, 8733P, 8734Q, 8735R	Metoprolol succinate
	1324Q, 1325R	Metoprolol tartrate
<b>Calcium Channel Blockers</b>		
<b>C08C</b>		Selective calcium channel blockers with mainly vascular effects
<b>C08D</b>		Selective calcium channel blockers with direct cardiac effects

# CKD % in each dataset (n = 52)



# Nation

Dataset



Aboriginal

Aboriginal

Non-Aboriginal



# Risk Factors for Chronic Kidney Disease [Univariate]

Chronic Kidney Disease, N = 52

	Adjusted Hazard Ratio	95% CI		P-value
		Lower	Upper	
Non-Aboriginal [ref]	1.00			
Aboriginal	1.72	0.96	3.11	0.07
Male [ref]	1.00			
Female	1.51	0.87	2.63	0.14
SES (Per 10 units of IRSAD Scale)	0.99	0.99	1.00	0.17
Major cities [ref]	1.00			
Inner regional	2.18	0.76	6.21	0.15
<b>Outer Regional</b>	3.77	1.23	11.6	0.02
<b>Remote/Very Remote</b>	4.17	1.28	13.6	0.02
No obesity prior to CKD [Ref]	1.00			
<b>Obesity prior to CKD</b>	1.93	1.09	3.41	0.02

# Strengths and limitations

- **Strengths**

- Investigator-advisory committee nexus
- Large proportion of young Aboriginal peoples in our cohort
- Follow-up time increased from 14.5 to 27 years due to data linkage

- **Limitations**

- Lack of eGFR data (most recent papers use eGFR) as younger cohort
- Lack of data linkage studies on CKD in young people to validate the definition