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# CHAPTER 1

## Incidence of Kidney Failure with Replacement Therapy

Summarising the number of incident patients with kidney failure with replacement therapy in Australia and New Zealand, the rate per million population and the demographic and clinical characteristics of incident patients

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## SUMMARY AND HIGHLIGHTS

The number of people requiring kidney replacement therapy (KRT) in Australia and New Zealand continues to rise. In both countries, the majority of new KRT patients are aged 65-85 years. This trend is consistent across all states and territories, except in the Northern Territory, where the largest group of new KRT patients are aged 45-65 years. A higher proportion of men start KRT compared to women. In both Australia and New Zealand, the most common co-morbidity among new KRT patients is diabetes mellitus, followed by coronary artery disease and peripheral vascular disease. The leading cause of kidney disease requiring KRT is diabetic kidney disease, with glomerular disease being the second most common cause. The median estimated glomerular filtration rate (eGFR) at the start of KRT has remained stable in Australia but continues to decline in New Zealand. This trend is similar across all states and territories, except in the Northern Territory, where the eGFR at KRT initiation is lower.

## SUGGESTED CITATION

G Irish, C Davies, E Au, S Bateman, J Chen, K Hurst, F Kholmurodova, D Lee, H McCarthy, S McDonald, W Mulley, M Roberts, B Solomon, T Sun, P Clayton. 47th Report, Chapter 1: Incidence of Kidney Failure with Replacement Therapy. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2024. Available at: <http://www.anzdata.org.au>

# INCIDENT PATIENTS

Tables 1.1 and 1.2 show the incidence of kidney failure with replacement therapy by modality, country and state as well as the incidence rates per million population (pmp).

Population estimates for Australia and New Zealand used throughout this chapter for the calculation of incidence per million population were sourced from the Australian Bureau of Statistics (2023)<sup>1</sup> and Stats NZ (2023)<sup>2</sup>. State is based on the state of the treating hospital unless otherwise indicated.\*

\*NSW population estimates exclude residents of the NSW South Eastern region which includes the local government areas of Bega Valley, Eurobodalla, Goulburn Mulwaree, Hilltops, Queanbeyan-Palerang Regional, Snowy Monaro Regional, Upper Lachlan Shire and Yass Valley. ACT population includes residents of the NSW South Eastern region. The population base for the NSW South Eastern region is based on the estimated resident population by local government area from the Australian Bureau of Statistics (2024)<sup>3</sup>.

**Table 1.1**  
**Incidence of Kidney Failure with Replacement Therapy by Modality 2019-2023 (pmp)**

Country	Event	2019	2020	2021	2022	2023
Australia	<b>Total Incident KRT Patients</b>	<b>3284 (130)</b>	<b>3324 (130)</b>	<b>3346 (130)</b>	<b>3428 (132)</b>	<b>3425 (129)</b>
	Pre-emptive Transplant Patients	114 (4)	84 (3)	82 (3)	93 (4)	99 (4)
	Incident KRT Dialysis Patients	3170 (125)	3240 (126)	3264 (127)	3335 (128)	3326 (125)
	Percentage PD	24%	28%	28%	25%	26%
	Percentage Home HD	2%	2%	2%	2%	2%
	Percentage Facility HD	74%	70%	71%	73%	72%
New Zealand	<b>Total Incident KRT Patients</b>	<b>659 (132)</b>	<b>716 (141)</b>	<b>725 (142)</b>	<b>703 (137)</b>	<b>725 (138)</b>
	Pre-emptive Transplant Patients	35 (7)	44 (9)	39 (8)	23 (4)	25 (5)
	Incident KRT Dialysis Patients	624 (125)	672 (132)	686 (134)	680 (133)	700 (134)
	Percentage PD	38%	40%	36%	35%	30%
	Percentage Home HD	2%	3%	2%	3%	2%
	Percentage Facility HD	59%	57%	62%	63%	67%

**Table 1.2**  
**Incidence of Kidney Failure with Replacement Therapy by Modality and Jurisdiction (pmp) 2023**

State	Total Incident KRT Patients	Incident KRT Dialysis Patients	Pre-emptive Transplant Patients
QLD	727 (133)	712 (130)	15 (3)
NSW*	954 (118)	916 (113)	38 (5)
ACT*	61 (86)	59 (83)	2 (3)
VIC	867 (127)	841 (123)	26 (4)
TAS	49 (86)	47 (82)	2 (3)
SA	245 (132)	236 (127)	9 (5)
NT	135 (535)	135 (535)	0 (0)
WA	387 (134)	380 (132)	7 (2)
<b>Australia</b>	<b>3425 (129)</b>	<b>3326 (125)</b>	<b>99 (4)</b>
<b>New Zealand</b>	<b>725 (138)</b>	<b>700 (134)</b>	<b>25 (5)</b>

\*ACT and NSW population estimates adjusted for SE NSW Region.

The total numbers of incident patients per year since kidney replacement therapy commenced in Australia and New Zealand are shown in Figure 1.1. Note the different y axis for each country.

**Figure 1.1**  
**New Patients - Australia and New Zealand**

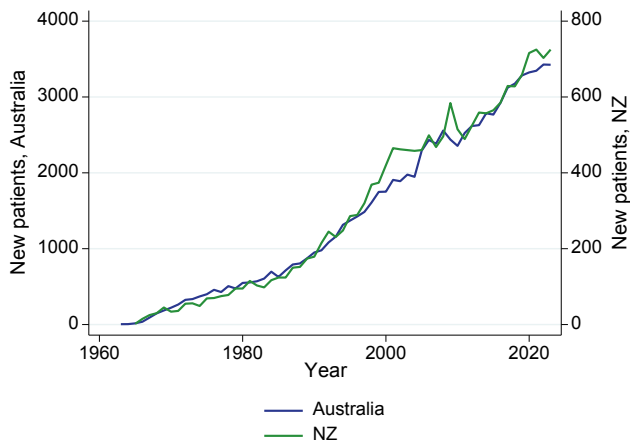
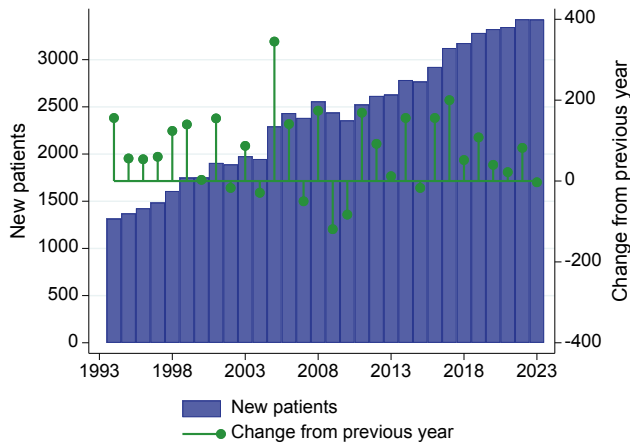


Figure 1.2 presents these data another way, showing the numbers of new patients per year and change in each country compared to the previous year over the last 30 years.

**Figure 1.2.1**  
**New Patients and Change - Australia**



**Figure 1.2.2**  
**New Patients and Change - New Zealand**

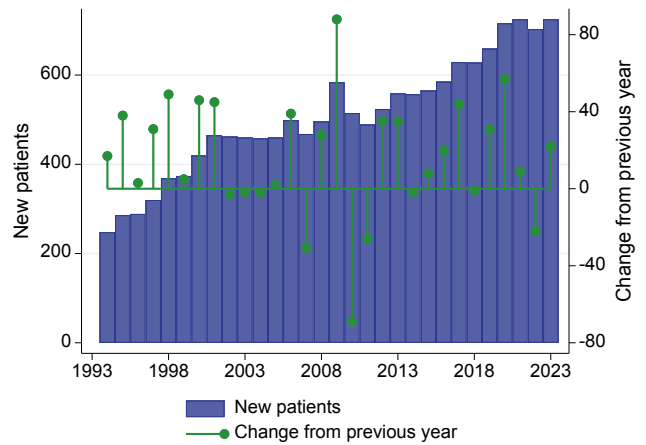


Table 1.3 shows the number of new patients (pmp) by state and country over 2019-2023.

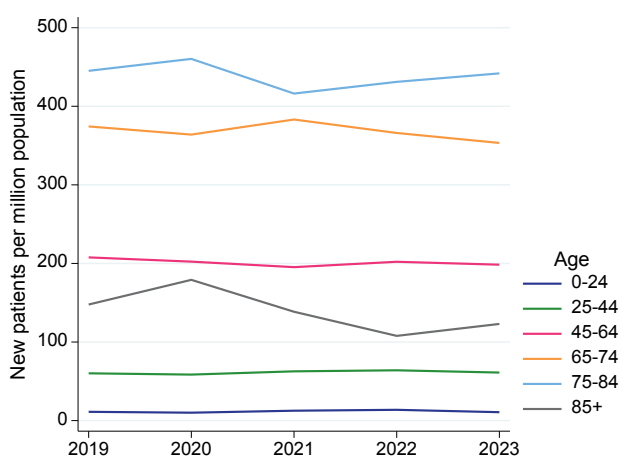
**Table 1.3**  
**Kidney Failure with Replacement Therapy Incidence (pmp) 2019-2023**

State	2019	2020	2021	2022	2023
QLD	681 (134)	680 (132)	707 (136)	668 (126)	727 (133)
NSW*	967 (124)	993 (126)	981 (125)	1024 (129)	954 (118)
ACT*	80 (120)	58 (85)	71 (103)	80 (115)	61 (86)
VIC	757 (116)	834 (126)	800 (122)	809 (122)	867 (127)
TAS	66 (120)	42 (75)	61 (108)	67 (117)	49 (86)
SA	214 (121)	242 (135)	237 (131)	241 (132)	245 (132)
NT	135 (548)	102 (412)	120 (484)	145 (579)	135 (535)
WA	384 (144)	373 (137)	369 (134)	394 (141)	387 (134)
<b>Australia</b>	<b>3284 (130)</b>	<b>3324 (130)</b>	<b>3346 (130)</b>	<b>3428 (132)</b>	<b>3425 (129)</b>
<b>New Zealand</b>	<b>659 (132)</b>	<b>716 (141)</b>	<b>725 (142)</b>	<b>703 (137)</b>	<b>725 (138)</b>

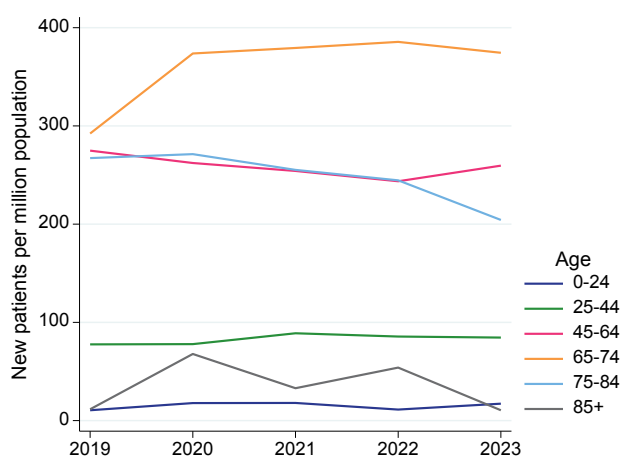
\*ACT and NSW population estimates adjusted for SE NSW Region.

Figure 1.3 shows incidence rates by age group, and Figure 1.4 by age group and state; the bars represent 95% confidence intervals. Note the different y axes for each Country and Australian State and Territory.

**Figure 1.3.1**  
**New Patients - Age Specific Rates - Australia**

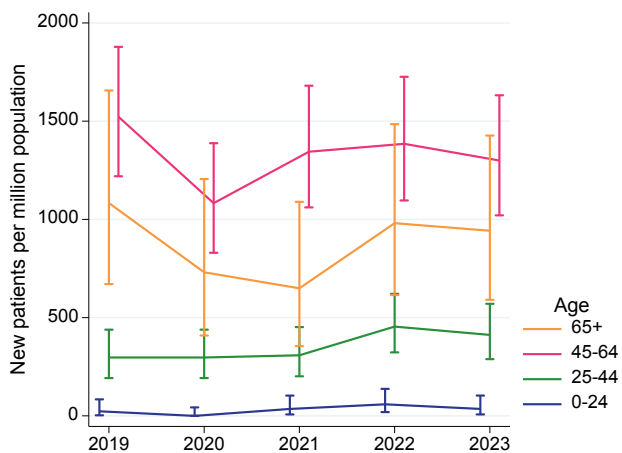


**Figure 1.3.2**  
**New Patients - Age Specific Rates - New Zealand**

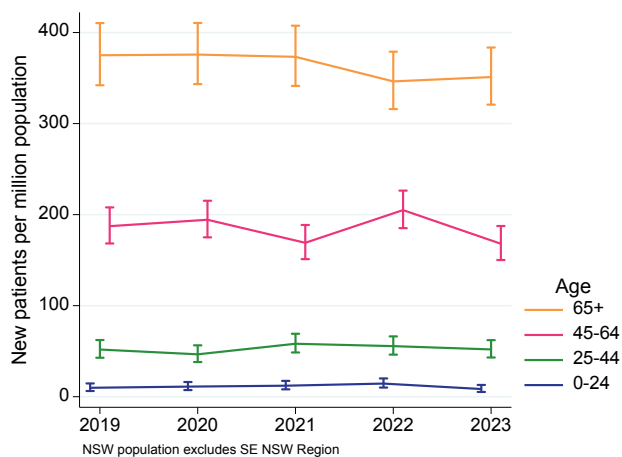


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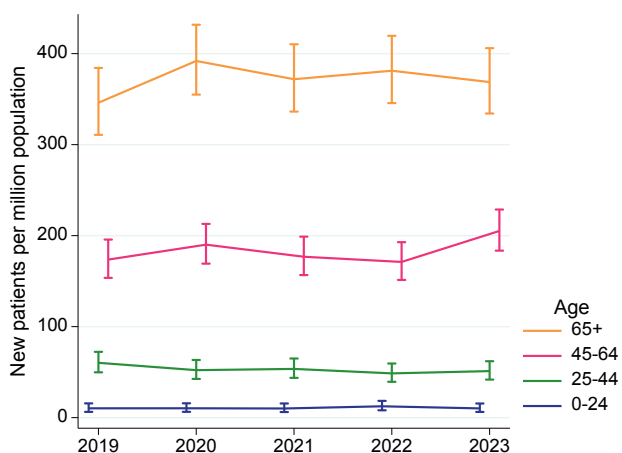
**Figure 1.4.1**  
**New Patients by Age Group - NT**



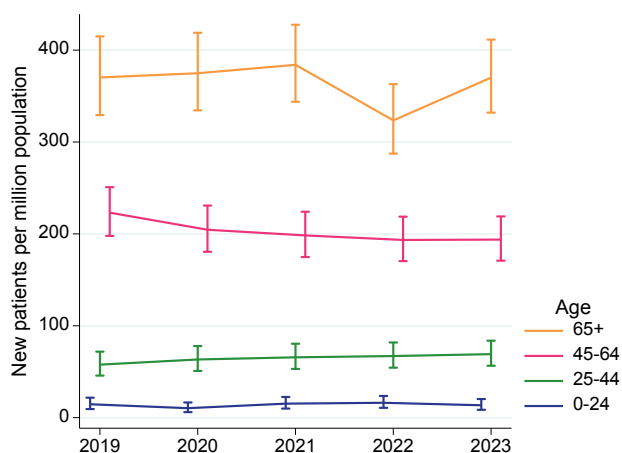
**Figure 1.4.2**  
**New Patients by Age Group - NSW**



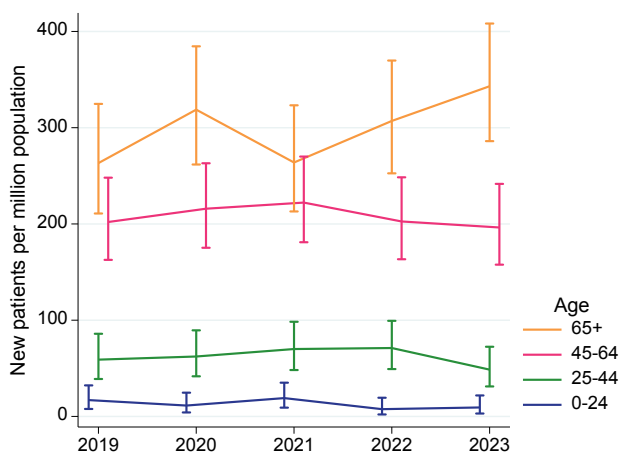
**Figure 1.4.3**  
**New Patients by Age Group - VIC**



**Figure 1.4.4**  
**New Patients by Age Group - QLD**



**Figure 1.4.5**  
**New Patients by Age Group - SA**



**Figure 1.4.6**  
**New Patients by Age Group - WA**

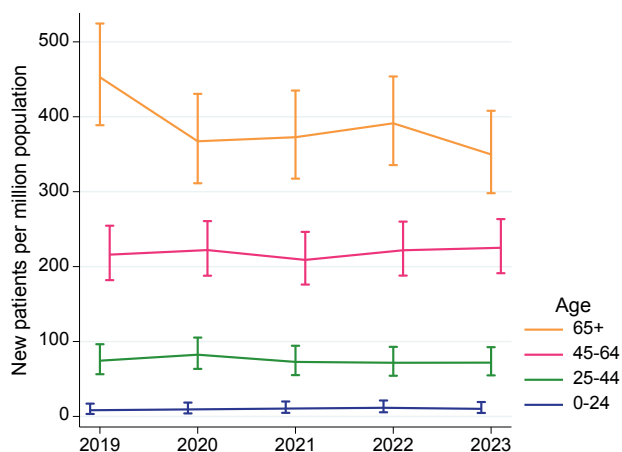


Figure 1.4.7  
New Patients by Age Group - TAS

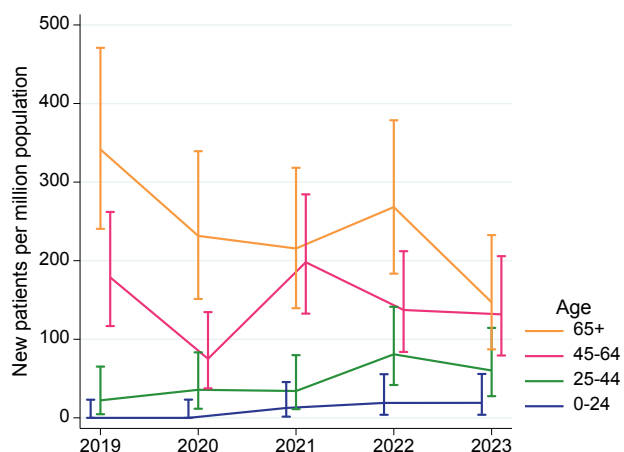
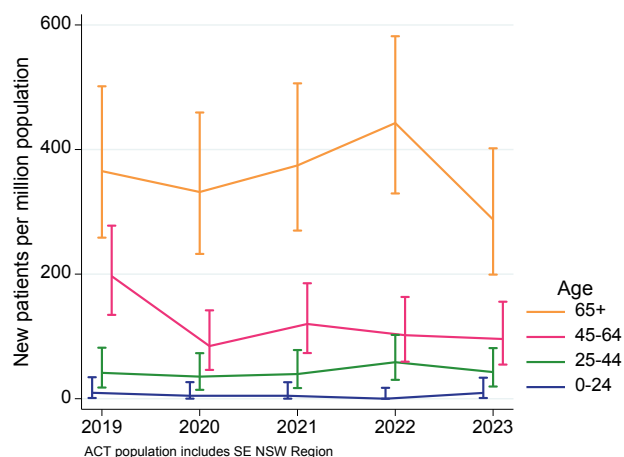


Figure 1.4.8  
New Patients by Age Group - ACT



The rates in older patients are shown in Table 1.4. Table 1.5 further categorises the 2023 data by gender.

Table 1.4  
Incidence (pmp) of Kidney Failure with Replacement Therapy in Older Patients 2019-2023

Country	Age	2019	2020	2021	2022	2023
Australia	60-64	398 (286)	415 (288)	385 (263)	402 (269)	423 (279)
	65-69	407 (331)	428 (339)	450 (351)	437 (335)	465 (350)
	70-74	451 (425)	436 (392)	480 (419)	459 (401)	412 (357)
	75-79	348 (477)	384 (500)	382 (473)	400 (458)	436 (468)
	80-84	201 (399)	212 (402)	181 (332)	220 (389)	233 (400)
	85+	75 (148)	93 (179)	74 (139)	59 (108)	69 (123)
New Zealand	60-64	98 (350)	94 (323)	95 (320)	99 (325)	100 (321)
	65-69	69 (288)	101 (408)	98 (388)	101 (392)	101 (382)
	70-74	60 (298)	71 (334)	81 (370)	83 (378)	81 (365)
	75-79	49 (347)	50 (341)	42 (278)	46 (287)	44 (255)
	80-84	13 (143)	16 (165)	23 (222)	20 (182)	14 (125)
	85+	1 (12)	6 (68)	3 (33)	5 (54)	1 (11)

Table 1.5  
Age and Gender of New Patients 2023

Country	Gender*	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total	Mean	Median
Australia	F	2	12	34	88	139	214	288	339	160	16	1292	57.5	60
	M	11	11	38	86	157	302	459	550	453	44	2111	61.7	64
New Zealand	F	3	0	2	23	26	56	85	64	14	0	273	55.6	58
	M	3	1	8	23	42	62	104	114	46	5	408	58.4	61

\*The number of persons identifying as a gender other than male or female was too small to be reported

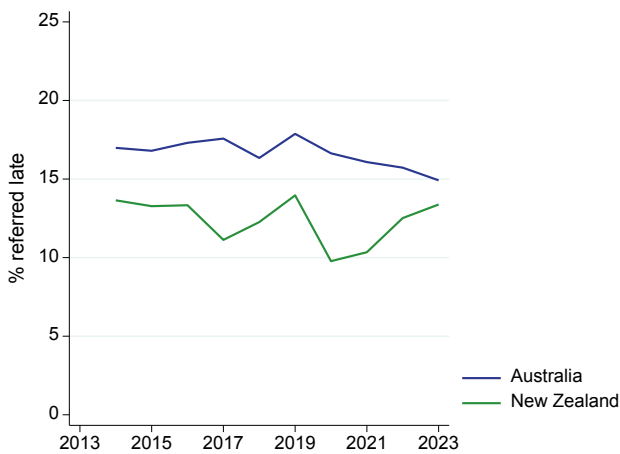


# LATE REFERRAL

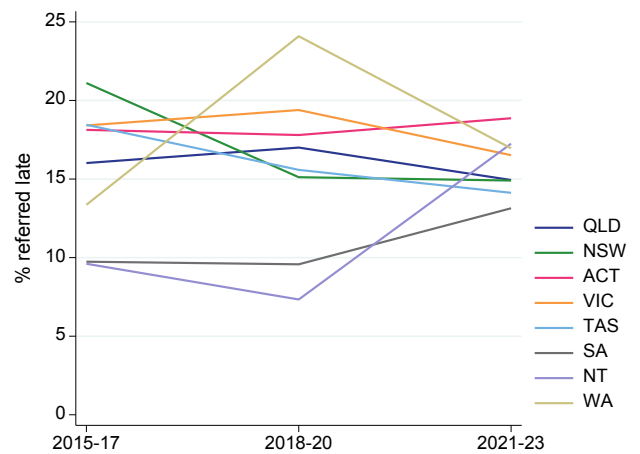
The following figures and tables examine late referral, defined as <3 months between initial review by a nephrologist and KRT start. Figure 1.5 shows the overall proportion of new patients referred late in Australia and New Zealand over the last 10 years. In 2023, among those with referral timing reported, 15% of Australian and 13% of New Zealand new patients were referred late. Figure 1.6 shows the variation in late referral rates across Australian states and Figure 1.7 shows late referral rates by age for Australia and New Zealand.

Tables 1.6 shows late referral rates for new patients over 2019-2023 by primary kidney disease.

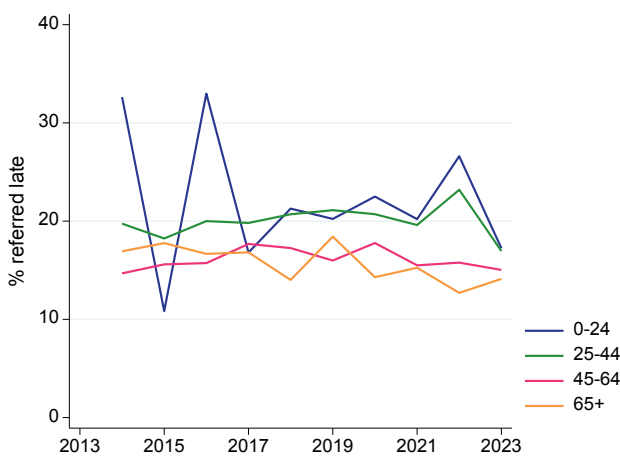
**Figure 1.5**  
**Late Referral Rates - All Incident Patients 2014 - 2023**



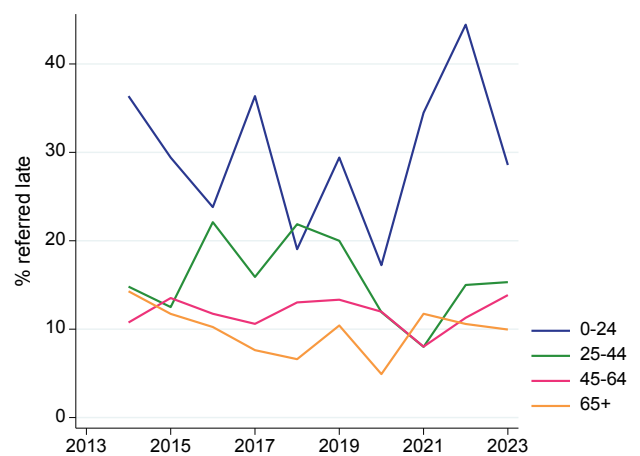
**Figure 1.6**  
**Late Referral Rates by State/Territory - Australia 2015 - 2023**



**Figure 1.7.1**  
**Late Referral Rates by Age - Australia 2014 - 2023**



**Figure 1.7.2**  
**Late Referral Rates by Age - New Zealand 2014 - 2023**



**Table 1.6**  
**Late Referral by Country and Primary Kidney Disease 2019-2023**

Country	Primary kidney disease	Late	Not Late	Not Reported	Total
<b>Australia</b>	Diabetic kidney disease	884 (14%)	5565 (86%)	42 (1%)	<b>6491</b>
	Glomerular disease	500 (16%)	2588 (83%)	31 (1%)	<b>3119</b>
	Hypertension / Renal vascular disease	302 (15%)	1747 (85%)	13 (1%)	<b>2062</b>
	Familial / hereditary kidney diseases	72 (6%)	1101 (93%)	12 (1%)	<b>1185</b>
	Tubulointerstitial disease	208 (16%)	1103 (83%)	10 (1%)	<b>1321</b>
	Other systemic diseases affecting the kidney	180 (39%)	283 (61%)	3 (1%)	<b>466</b>
	Miscellaneous kidney disorders	568 (28%)	1415 (71%)	15 (1%)	<b>1998</b>
	Not reported	14 (8%)	46 (28%)	105 (64%)	<b>165</b>
	<b>Total</b>	<b>2728 (16%)</b>	<b>13848 (82%)</b>	<b>231 (1%)</b>	<b>16807</b>
<b>New Zealand</b>	Diabetic kidney disease	183 (11%)	1542 (89%)	16 (1%)	<b>1741</b>
	Glomerular disease	88 (13%)	589 (87%)	3 (0%)	<b>680</b>
	Hypertension / Renal vascular disease	37 (11%)	293 (88%)	3 (1%)	<b>333</b>
	Familial / hereditary kidney diseases	8 (4%)	189 (96%)	0 (0%)	<b>197</b>
	Tubulointerstitial disease	27 (11%)	214 (88%)	3 (1%)	<b>244</b>
	Other systemic diseases affecting the kidney	25 (38%)	40 (62%)	0 (0%)	<b>65</b>
	Miscellaneous kidney disorders	51 (21%)	195 (79%)	2 (1%)	<b>248</b>
	Not reported	3 (15%)	10 (50%)	7 (35%)	<b>20</b>
	<b>Total</b>	<b>422 (12%)</b>	<b>3072 (87%)</b>	<b>34 (1%)</b>	<b>3528</b>

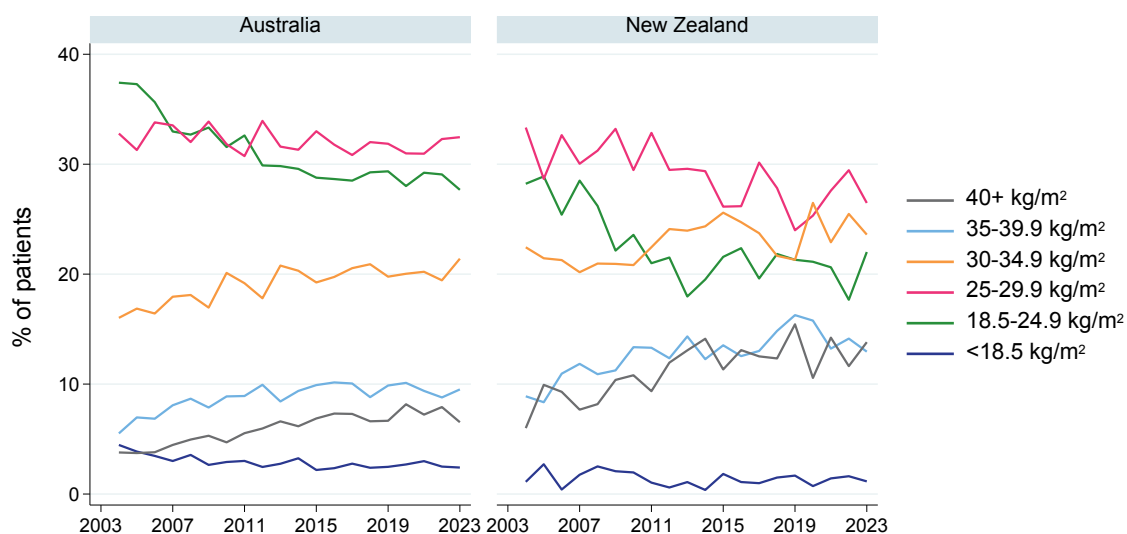
# BODY MASS INDEX

Table 1.7 shows the body mass index (BMI, in kg/m<sup>2</sup>) category at KRT entry of new adult patients in 2023. Trends in the distribution of BMI at KRT entry are shown in Figure 1.8.

**Table 1.7**  
**BMI Category at KRT Entry for Adult Patients 2023**

Country	Category	BMI at KRT Entry
Australia	<18.5	80 (2%)
	18.5-24.9	919 (27%)
	25-29.9	1078 (32%)
	30-34.9	711 (21%)
	35-39.9	316 (9%)
	40+	217 (6%)
	Not reported	69 (2%)
New Zealand	<18.5	8 (1%)
	18.5-24.9	153 (21%)
	25-29.9	184 (26%)
	30-34.9	164 (23%)
	35-39.9	90 (13%)
	40+	96 (13%)
	Not reported	23 (3%)

**Figure 1.8**  
**BMI Category at KRT Entry for Adult Patients**



## CO-MORBIDITIES

Tables 1.8-1.10 show the co-morbidities at KRT entry of new patients in 2023. Trends in the prevalence of these co-morbidities at KRT entry are shown in Figures 1.9-1.10, with the bars representing 95% confidence intervals.

**Table 1.8**  
**Co-morbidities of New Patients 2023**

Country	Status at KRT Entry	Coronary Artery Disease	Peripheral Vascular Disease	Cerebrovascular Disease	Chronic Lung Disease
Australia	No	2234 (65%)	2668 (78%)	3040 (89%)	2894 (84%)
	Suspected	182 (5%)	251 (7%)	63 (2%)	90 (3%)
	Yes	935 (27%)	432 (13%)	251 (7%)	369 (11%)
	Not reported	74 (2%)	74 (2%)	71 (2%)	72 (2%)
New Zealand	No	556 (77%)	653 (90%)	661 (91%)	618 (85%)
	Suspected	44 (6%)	18 (2%)	8 (1%)	23 (3%)
	Yes	117 (16%)	46 (6%)	48 (7%)	76 (10%)
	Not reported	8 (1%)	8 (1%)	8 (1%)	8 (1%)

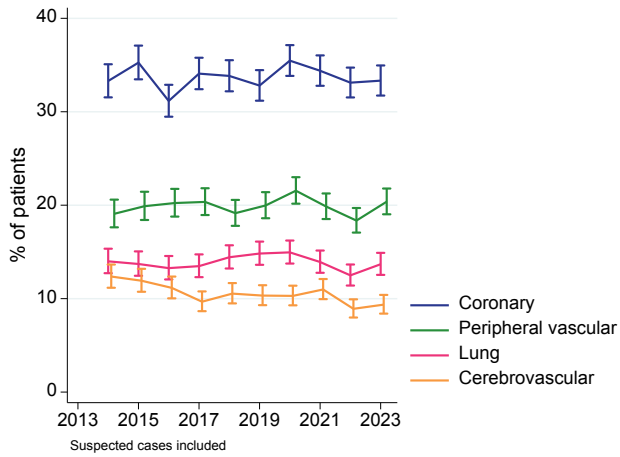
**Table 1.9**  
**Smoking Status of New Patients 2023**

Country	Smoking Status at KRT Entry	n (%)
Australia	Current	394 (12%)
	Former	1149 (34%)
	Never	1821 (53%)
	Not reported	61 (2%)
New Zealand	Current	99 (14%)
	Former	266 (37%)
	Never	348 (48%)
	Not reported	12 (2%)

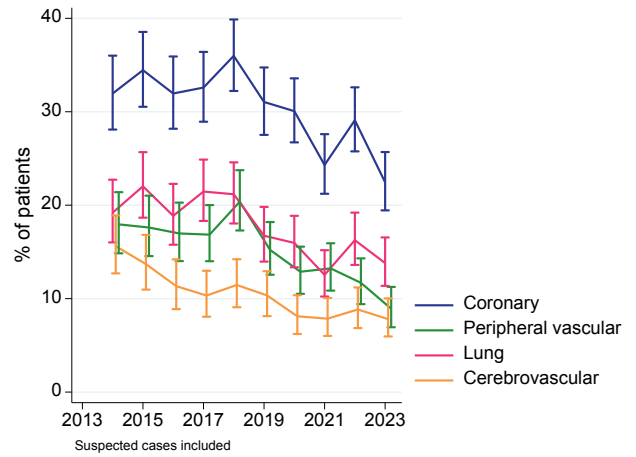
**Table 1.10**  
**Diabetic Status of New Patients 2023**

Country	Diabetic Status at KRT Entry	n (%)
Australia	No	1601 (47%)
	Type 1	190 (6%)
	Type 2	1564 (46%)
	Not reported	70 (2%)
New Zealand	No	275 (38%)
	Type 1	45 (6%)
	Type 2	397 (55%)
	Not reported	8 (1%)

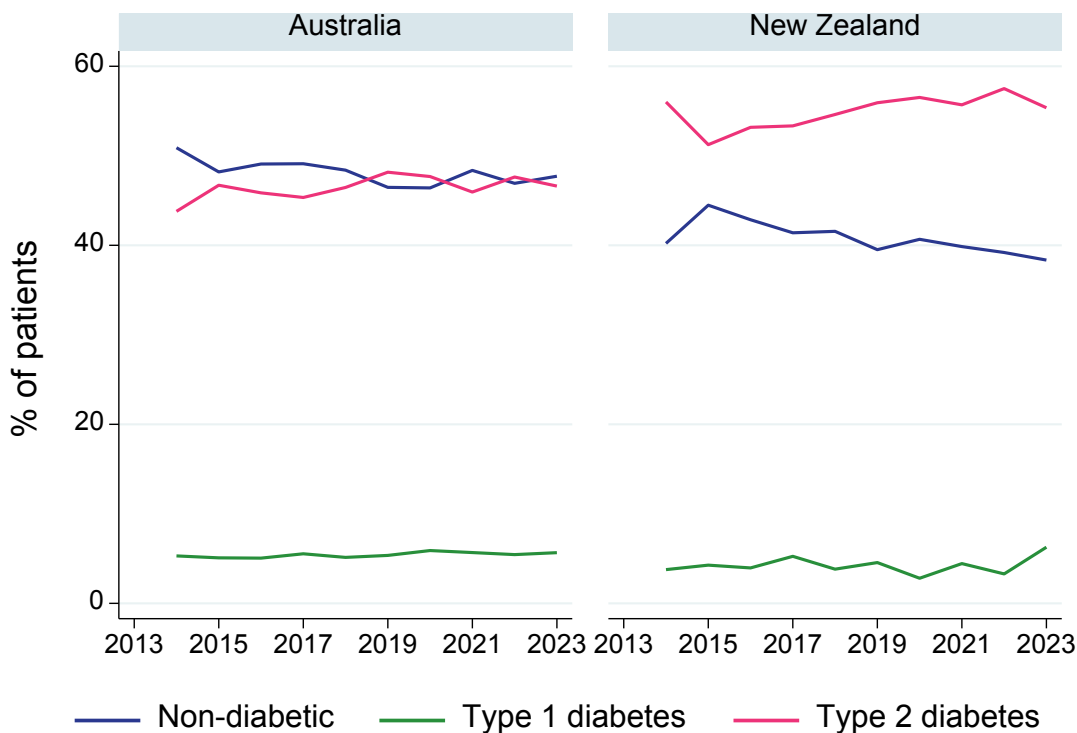
**Figure 1.9.1**  
**Comorbid Conditions at KRT Entry - Australia**



**Figure 1.9.2**  
**Comorbid Conditions at KRT Entry - New Zealand**



**Figure 1.10**  
**Diabetes Status at KRT Entry**



## PRIMARY KIDNEY DISEASE

The primary kidney disease of new patients over 2020-2023 are shown in Table 1.11. From 2022, primary kidney disease was collected according to the updated European Renal Association/ European Dialysis and Transplantation Association categories, with primary diseases reported prior to 2022 mapped to these categories. Details of the type of glomerular disease reported are shown in Table 1.12. Rates of biopsy confirmation of glomerular disease, hypertension/renal vascular disease, diabetic kidney disease and aetiology uncertain/unknown kidney disease are shown in Figure 1.11.

The “Miscellaneous” causes from Table 1.11 are shown in detail in Table 1.13.

**Table 1.11**  
**Primary Kidney Disease of New Patients 2020 - 2023**

Country	Primary kidney disease	2020	2021	2022	2023
Australia	Diabetic kidney disease	1318 (40%)	1274 (38%)	1365 (40%)	1222 (36%)
	Glomerular disease	644 (19%)	606 (18%)	616 (18%)	644 (19%)
	Hypertension / Renal vascular disease	406 (12%)	441 (13%)	387 (11%)	400 (12%)
	Familial / hereditary kidney diseases	212 (6%)	260 (8%)	239 (7%)	251 (7%)
	Tubulointerstitial disease	258 (8%)	280 (8%)	270 (8%)	255 (7%)
	Other systemic diseases affecting the kidney	87 (3%)	108 (3%)	81 (2%)	84 (2%)
	Miscellaneous kidney disorders	377 (11%)	361 (11%)	432 (13%)	504 (15%)
	Not reported	22 (1%)	16 (<1%)	38 (1%)	65 (2%)
	<b>Total</b>	<b>3324</b>	<b>3346</b>	<b>3428</b>	<b>3425</b>
New Zealand	Diabetic kidney disease	347 (48%)	356 (49%)	352 (50%)	358 (49%)
	Glomerular disease	143 (20%)	157 (22%)	133 (19%)	126 (17%)
	Hypertension / Renal vascular disease	70 (10%)	75 (10%)	63 (9%)	62 (9%)
	Familial / hereditary kidney diseases	38 (5%)	35 (5%)	42 (6%)	46 (6%)
	Tubulointerstitial disease	61 (9%)	46 (6%)	44 (6%)	39 (5%)
	Other systemic diseases affecting the kidney	11 (2%)	9 (1%)	15 (2%)	23 (3%)
	Miscellaneous kidney disorders	44 (6%)	42 (6%)	50 (7%)	62 (9%)
	Not reported	2 (<1%)	5 (1%)	4 (1%)	9 (1%)
<b>Total</b>	<b>716</b>	<b>725</b>	<b>703</b>	<b>725</b>	

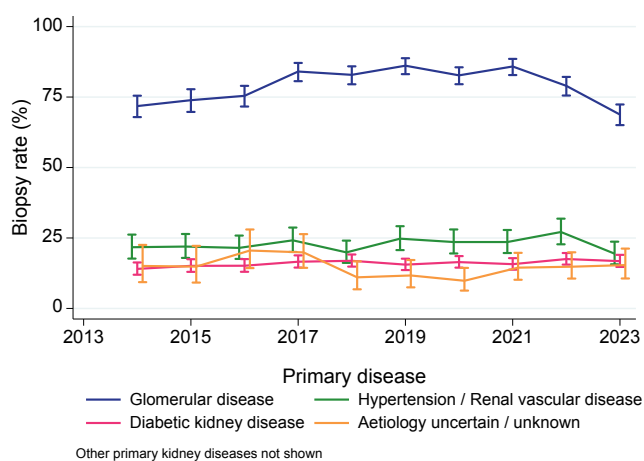
**Table 1.12**  
**Glomerular Disease (GN) as Primary Kidney Disease 2023**

Primary kidney disease	Australia	New Zealand
Adult nephrotic syndrome	12	0
Anti-Glomerular basement membrane (GBM) disease / Goodpasture's syndrome	13	5
Congenital nephrotic syndrome (CNS)	5	0
Congenital nephrotic syndrome (CNS) - Finnish type	1	0
Congenital nephrotic syndrome (CNS) - focal segmental glomerulosclerosis (FSGS)	13	1
Cryoglobulinaemia secondary to hepatitis C	2	1
Familial IgA nephropathy	4	0
Familial focal segmental glomerulosclerosis (FSGS) - autosomal dominant	7	1
Familial focal segmental glomerulosclerosis (FSGS) - autosomal recessive	9	0
Focal and segmental proliferative glomerulonephritis	17	6
Focal segmental glomerulosclerosis (FSGS) secondary to lithium	3	0
Focal segmental glomerulosclerosis (FSGS) secondary to obesity	14	11
Glomerulonephritis	70	14
Glomerulonephritis - secondary to systemic disease	9	4
Granulomatosis with polyangiitis	4	2
Henoch-Schönlein purpura / nephritis	5	1
Idiopathic rapidly progressive (crescentic) glomerulonephritis	8	0
IgA nephropathy	210	32
IgA nephropathy secondary to liver cirrhosis	4	0
IgM - associated nephropathy	3	0
Membranous nephropathy - drug induced	3	0
Membranous nephropathy - idiopathic	21	8
Membranous nephropathy - infection associated	4	0
Membranous nephropathy - malignancy associated	1	0
Mesangial proliferative glomerulonephritis	11	5
Mesangiocapillary glomerulonephritis type 1	4	2
Mesangiocapillary glomerulonephritis type 2 (dense deposit disease)	4	0
Mesangiocapillary glomerulonephritis type 3	0	1
Microscopic polyangiitis	3	0
Minimal change nephropathy	2	1
Nephrotic syndrome of childhood - no trial of steroids	2	2
Polyarteritis nodosa	1	0
Primary focal segmental glomerulosclerosis (FSGS)	87	23
Renal scleroderma / systemic sclerosis	9	0
Systemic lupus erythematosus / nephritis	45	4
Systemic vasculitis - ANCA negative	6	1
Systemic vasculitis - ANCA positive	28	1
<b>Total</b>	<b>644</b>	<b>126</b>

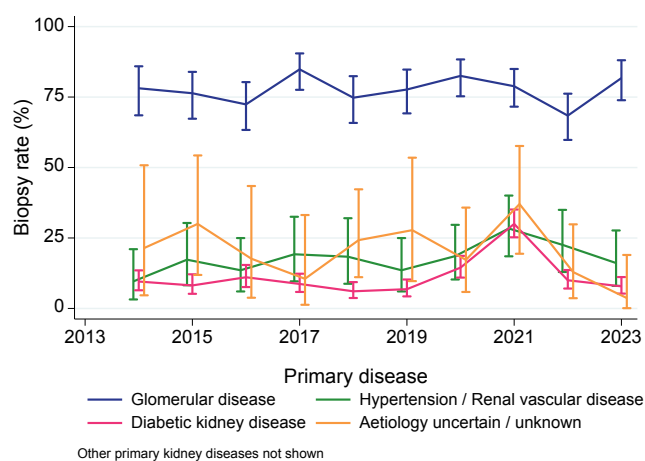
**Table 1.13**  
**Miscellaneous Primary Kidney Diseases 2023**

Primary kidney disease	Australia	New Zealand
Acute cortical necrosis	3	0
Acute kidney injury	59	4
Acute kidney injury due to circulatory failure	2	0
Acute kidney injury due to hypovolaemia	4	0
Acute kidney injury due to nephrotoxicity	7	0
Acute kidney injury due to rhabdomyolysis	6	0
Acute kidney injury due to sepsis	16	2
Acute pyelonephritis	13	1
Chronic kidney disease (CKD) / chronic renal failure (CRF) - aetiology uncertain / unknown	197	27
Chronic kidney disease (CKD) / chronic renal failure (CRF) caused by tumour nephrectomy	17	5
Chronic kidney disease (CKD) / chronic renal failure (CRF) due to traumatic loss of kidney	2	2
Chronic renal failure	96	10
Haematuria and proteinuria	1	0
Infiltration by lymphoma	1	0
Isolated proteinuria	5	1
Kidney tumour	3	0
Renal cell carcinoma	26	2
Renal failure	36	3
Single kidney identified in adulthood	9	5
Wilms tumour	1	0

**Figure 1.11.1**  
**Biopsy Rates - Australia**



**Figure 1.11.2**  
**Biopsy Rates - New Zealand**

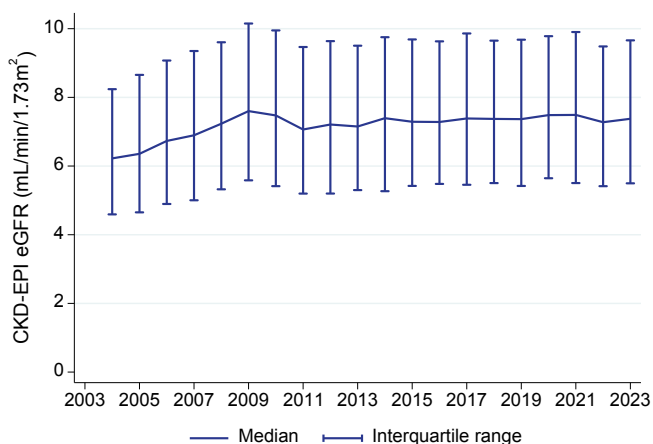




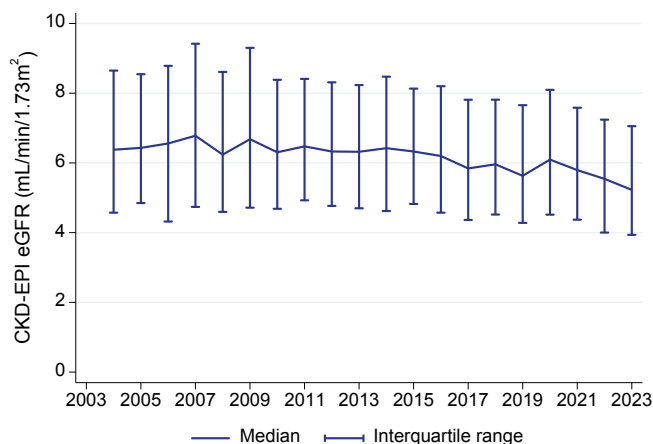
# TIMING OF KIDNEY REPLACEMENT THERAPY START

The median eGFR for adult patients (calculated using the CKD-EPI formula) at KRT start over time is shown in Figure 1.12. In 2023 this was 7.4mL/min/1.73m<sup>2</sup> in Australia and 5.2mL/min/1.73m<sup>2</sup> in New Zealand. The median eGFR for adult patients at KRT start over 2021-2023 by Australian State/Territory is shown in Figure 1.13.

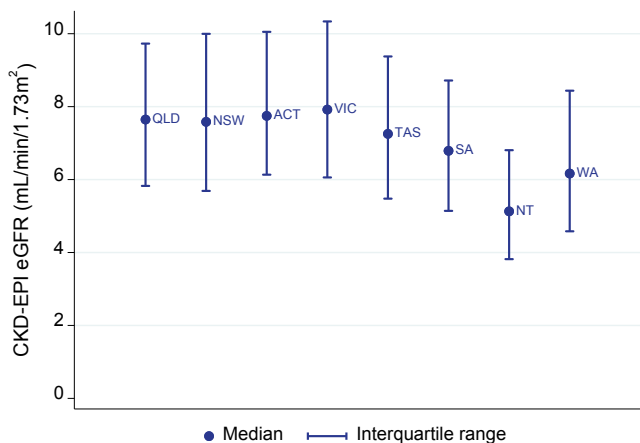
**Figure 1.12.1**  
**eGFR at KRT Start for Adult Patients - Australia**



**Figure 1.12.2**  
**eGFR at KRT Start for Adult Patients - New Zealand**

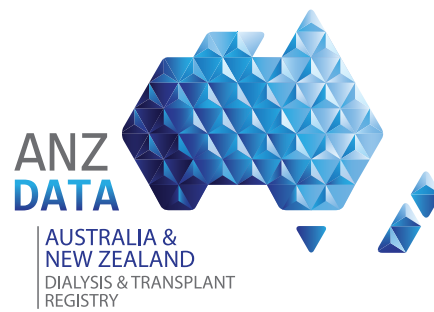


**Figure 1.13**  
**eGFR at KRT Start for Adult Patients - By State/Territory, Australia 2021-2023**



## REFERENCES

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# CHAPTER 1

Incidence of Kidney Failure with  
Replacement Therapy