

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 incident Kidney Replacement Therapy (KRT) patients in Australia continues to rise, continuing the trend seen since the registry began in the 1960s. In New Zealand, the incidence is more unstable. It fluctuates over time, with the incidence of KRT patients decreasing compared to the past two years, though it still represents an overall increase. Most incident patients in both countries start with facility haemodialysis. The age with the greatest number of incident patients continues to be in the elderly, with the highest numbers in those aged 75-84 years in Australia and 65-74 years in New Zealand. These age groups are largely mirrored in the breakdown by states, except for in the Northern Territory, where there are a greater number of those aged 45-64 years. Comorbid conditions for incident KRT patients are common; the most common comorbidities continue to be diabetes mellitus, followed by coronary artery disease in both Australia and New Zealand. This report is the first year ANZDATA has reported on the new Primary Kidney Disease codes based on the European Renal Association/European Dialysis and Transplantation Association codes. Diabetic kidney disease followed by glomerular disease are the most common major cause of primary kidney disease in incident KRT patients.

SUGGESTED CITATION

G Irish, C Davies, E Au, S Bateman, J Chen, K Hurst, D Lee, H McCarthy, S McDonald, W Mulley, M Roberts, T Sun, P Clayton. 46th Report, Chapter 1: Incidence of Kidney Failure with Replacement Therapy. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2023.
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 (2022)¹ and Stats NZ (2022)². 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 (2023)³.

Table 1.1
Incidence of Kidney Failure with Replacement Therapy by Modality 2018-2022 (pmp)

Country	Event	2018	2019	2020	2021	2022
Australia	Total Incident KRT Patients	3178 (127)	3284 (130)	3322 (129)	3336 (130)	3403 (131)
	Pre-emptive Transplant Patients	118 (5)	114 (4)	84 (3)	82 (3)	92 (4)
	Incident KRT Dialysis Patients	3060 (123)	3170 (125)	3238 (126)	3254 (127)	3311 (127)
	Percentage PD	26%	24%	28%	28%	25%
	Percentage Home HD*	2%	2%	2%	2%	2%
	Percentage Facility HD	72%	74%	70%	71%	73%
New Zealand	Total Incident KRT Patients	628 (128)	659 (132)	716 (141)	719 (141)	682 (133)
	Pre-emptive Transplant Patients	39 (8)	35 (7)	44 (9)	39 (8)	23 (4)
	Incident KRT Dialysis Patients	589 (120)	624 (125)	672 (132)	680 (133)	659 (129)
	Percentage PD	39%	38%	40%	36%	35%
	Percentage Home HD*	1%	2%	3%	2%	3%
	Percentage Facility HD	60%	59%	57%	62%	62%

*Includes Community House HD

Table 1.2
Incidence of Kidney Failure with Replacement Therapy by Modality and Jurisdiction (pmp) 2022

State	Total Incident KRT Patients	Incident KRT Dialysis Patients	Pre-emptive Transplant Patients
QLD	652 (123)	643 (121)	9 (2)
NSW*	1019 (129)	982 (124)	37 (5)
ACT*	80 (115)	80 (115)	0 (0)
VIC	810 (122)	786 (119)	24 (4)
TAS	67 (117)	64 (112)	3 (5)
SA	241 (132)	233 (128)	8 (4)
NT	145 (579)	145 (579)	0 (0)
WA	389 (140)	378 (136)	11 (4)
Australia	3403 (131)	3311 (127)	92 (4)
New Zealand	682 (133)	659 (129)	23 (4)

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

The total numbers of incident patients per year in Australia and New Zealand since the first local use of kidney replacement therapy are shown in figure 1.1.

Figure 1.1
New Patients - Australia and New Zealand

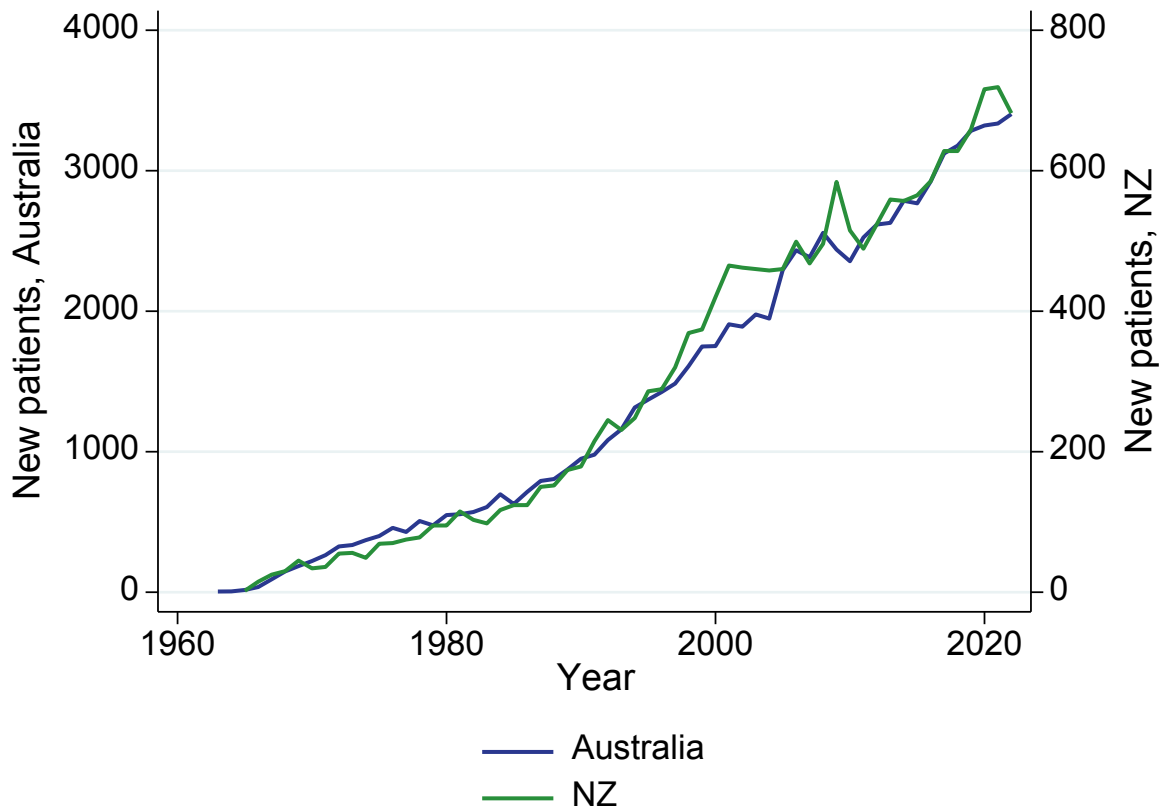


Figure 1.2 presents these data another way, showing the numbers of new patients per year and change in each country compared to the previous year over the last 30 years.

Figure 1.2.1
New Patients and Change - Australia

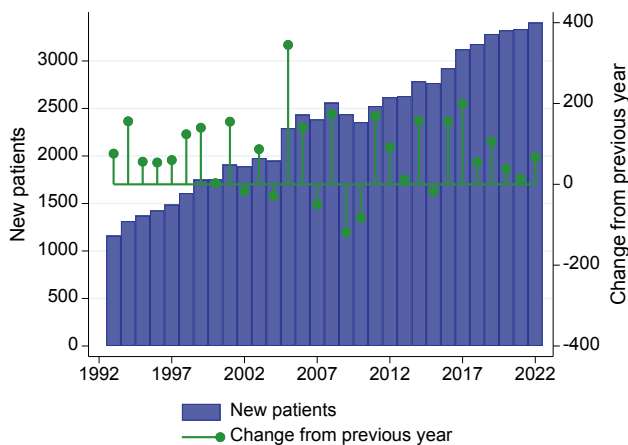


Figure 1.2.2
New Patients and Change - New Zealand

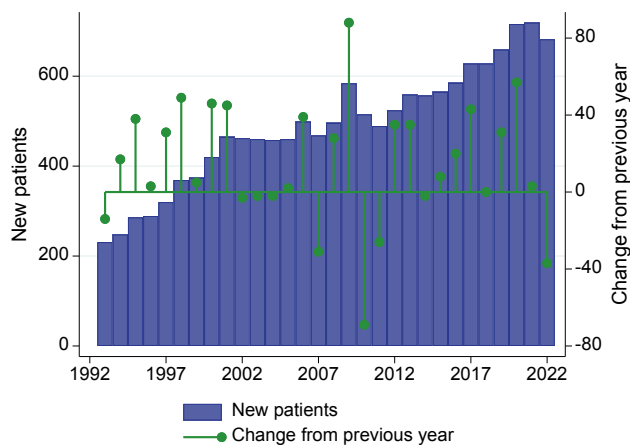


Table 1.3 shows the number of new patients (pmp) by state and country over 2018-2022.

Table 1.3
Kidney Failure with Replacement Therapy Incidence (pmp) 2018-2022

State	2018	2019	2020	2021	2022
QLD	675 (135)	681 (134)	680 (131)	707 (136)	652 (123)
NSW*	925 (120)	967 (124)	993 (126)	976 (124)	1019 (129)
ACT*	53 (80)	80 (119)	58 (84)	71 (103)	80 (115)
VIC	807 (126)	758 (116)	832 (126)	798 (122)	810 (122)
TAS	46 (85)	66 (119)	42 (75)	61 (107)	67 (117)
SA	203 (116)	214 (121)	242 (135)	235 (130)	241 (132)
NT	131 (527)	135 (544)	102 (410)	120 (482)	145 (579)
WA	338 (129)	383 (144)	373 (137)	368 (134)	389 (140)
Australia	3178 (127)	3284 (130)	3322 (129)	3336 (130)	3403 (131)
New Zealand	628 (128)	659 (132)	716 (141)	719 (141)	682 (133)

*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 state.

Figure 1.3.1
New Patients - Age Specific Rates - Australia

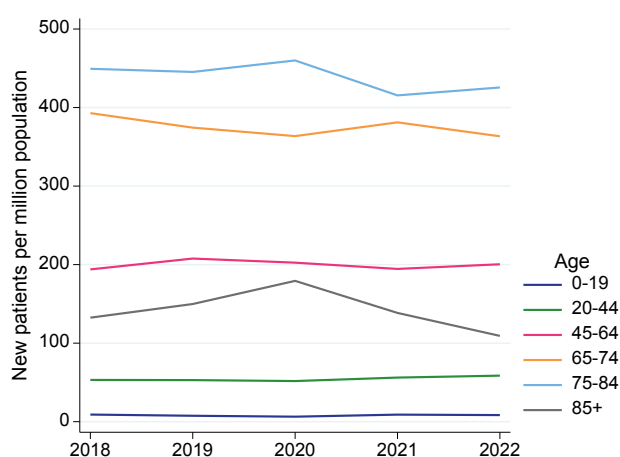


Figure 1.3.2
New Patients - Age Specific Rates - New Zealand

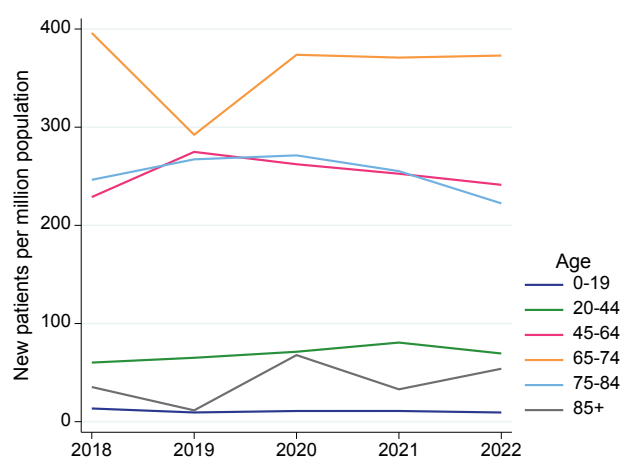


Figure 1.4.1
New Patients by Age Group - NT

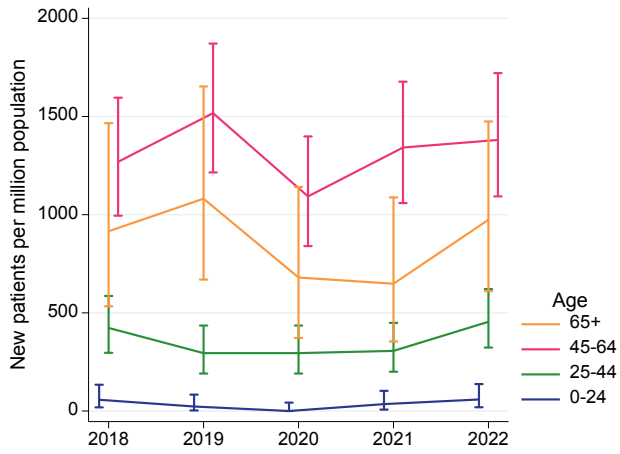


Figure 1.4.2
New Patients by Age Group - NSW

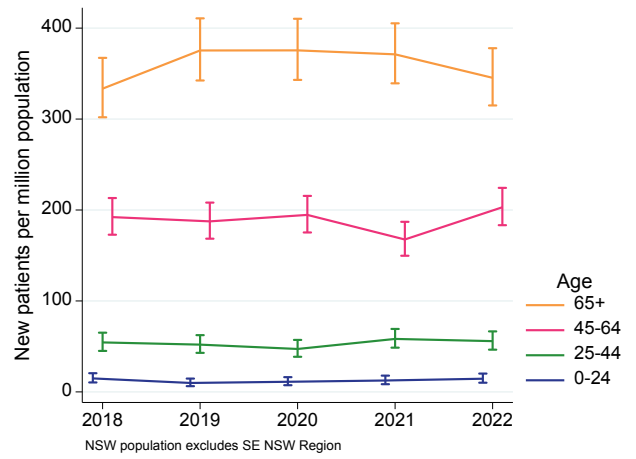


Figure 1.4.3
New Patients by Age Group - VIC

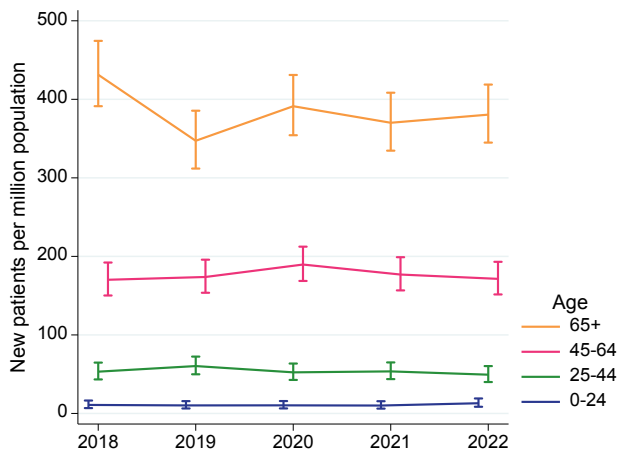


Figure 1.4.4
New Patients by Age Group - QLD

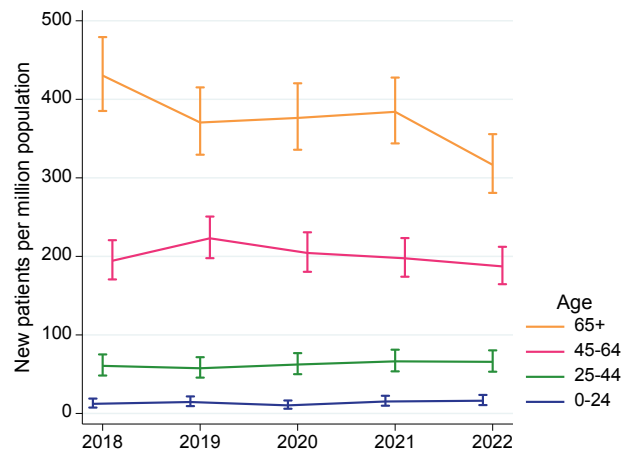


Figure 1.4.5
New Patients by Age Group - SA

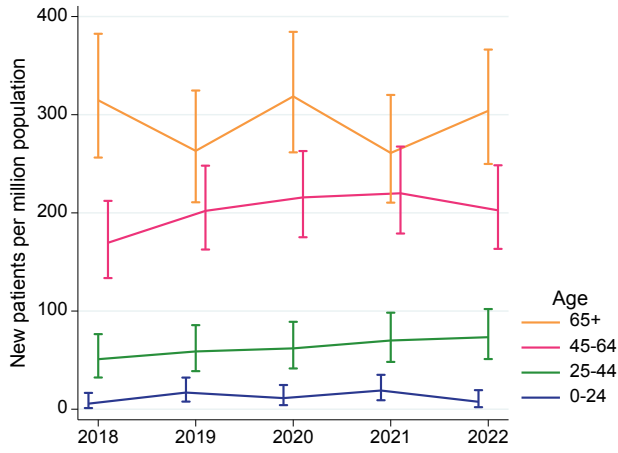


Figure 1.4.6
New Patients by Age Group - WA

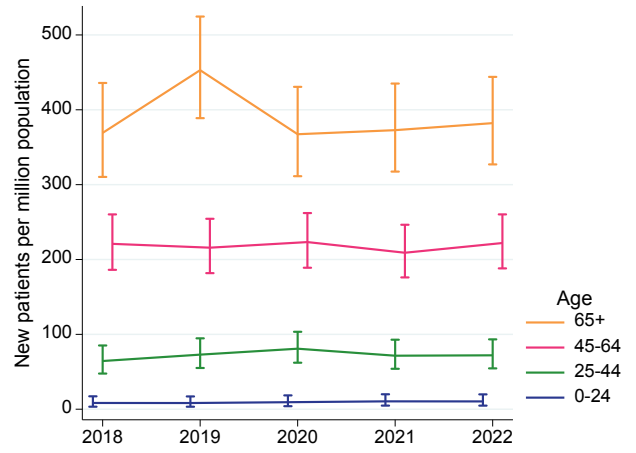


Figure 1.4.7
New Patients by Age Group - TAS

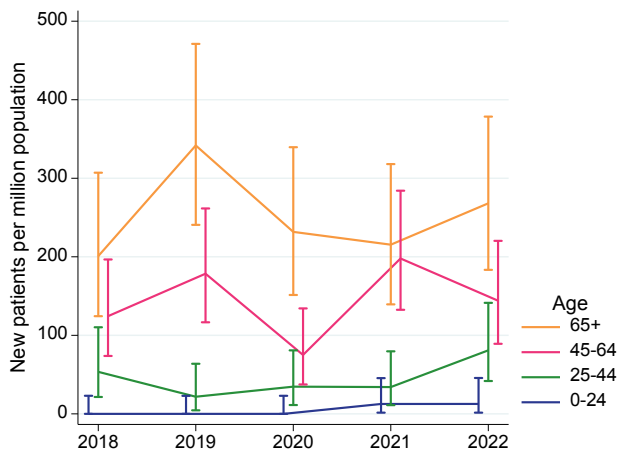
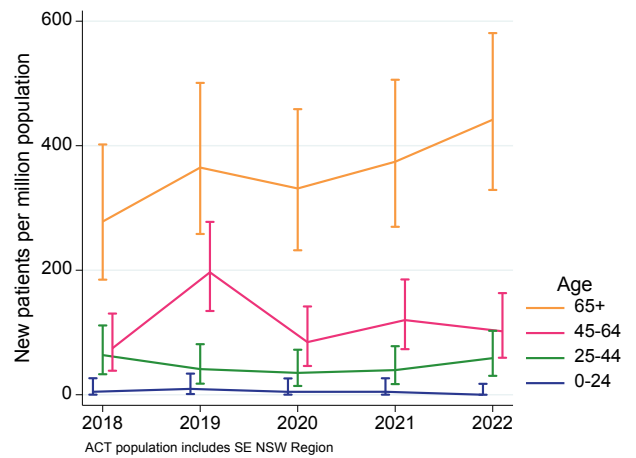


Figure 1.4.8
New Patients by Age Group - ACT



The rates in older patients are shown in table 1.4. Table 1.5 further categorises the 2022 data by gender.

Table 1.4
Incidence (pmp) of Kidney Failure with Replacement Therapy in Older Patients 2018-2022

Country	Age	2018	2019	2020	2021	2022
Australia	60-64	382 (281)	398 (286)	415 (288)	382 (261)	400 (268)
	65-69	429 (355)	407 (331)	427 (338)	448 (350)	432 (332)
	70-74	446 (438)	451 (425)	436 (393)	477 (416)	457 (399)
	75-79	334 (479)	348 (477)	383 (499)	379 (470)	398 (455)
	80-84	197 (407)	201 (399)	212 (403)	183 (336)	215 (380)
	85+	66 (132)	76 (150)	93 (179)	74 (139)	60 (109)
New Zealand	60-64	69 (255)	98 (350)	94 (323)	95 (320)	98 (322)
	65-69	87 (370)	69 (288)	101 (408)	96 (380)	97 (377)
	70-74	82 (428)	60 (298)	71 (334)	79 (361)	81 (368)
	75-79	42 (309)	49 (347)	50 (341)	42 (278)	45 (281)
	80-84	13 (149)	13 (143)	16 (165)	23 (222)	15 (137)
	85+	3 (35)	1 (12)	6 (68)	3 (33)	5 (54)

Table 1.5
Age and Gender of New Patients 2022

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 2022, among those with referral timing reported, 16% of Australian and 12% 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 2018-2022 by primary kidney disease.

Figure 1.5
Late Referral Rates - All Incident Patients 2013 - 2022

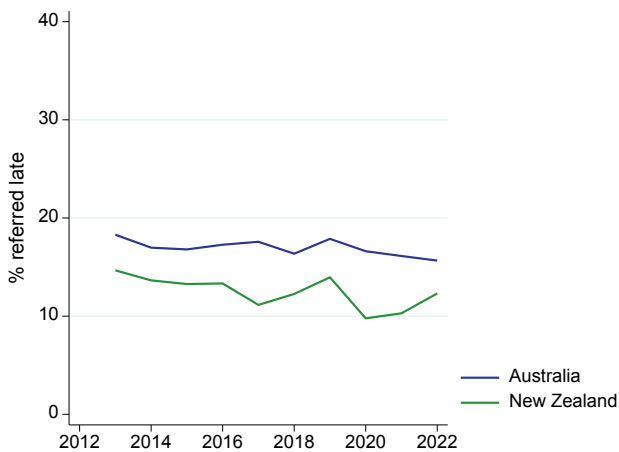


Figure 1.6
Late Referral Rates by State/Territory - Australia 2013 - 2022

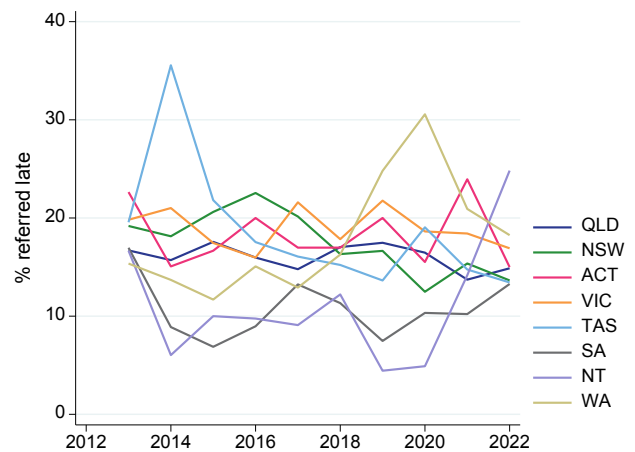


Figure 1.7.1
Late Referral Rates by Age - Australia 2013 - 2022

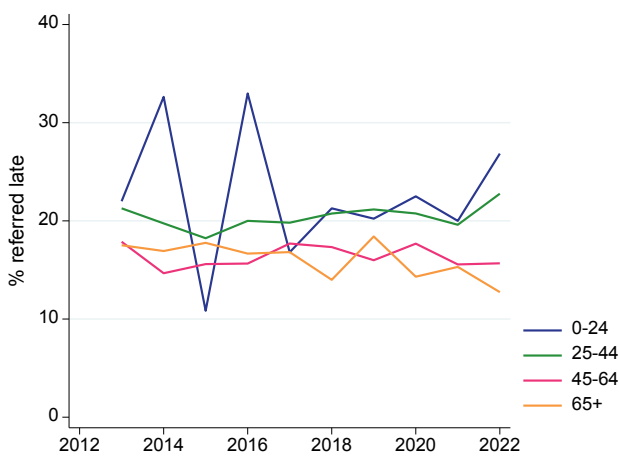


Figure 1.7.2
Late Referral Rates by Age - New Zealand 2013 - 2022

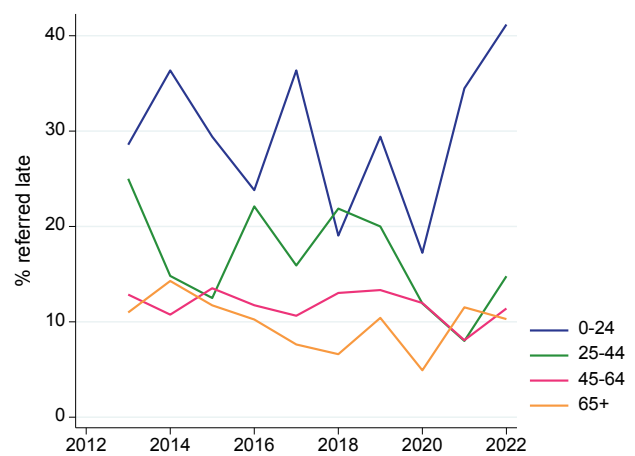


Table 1.6
Late Referral by Country and Primary Kidney Disease 2018-2022

Country	Primary kidney disease	Late	Not Late	Not Reported	Total
Australia	Diabetic kidney disease	876 (14%)	5543 (86%)	41 (1%)	6460
	Glomerular disease	506 (17%)	2496 (82%)	31 (1%)	3033
	Hypertension / Renal vascular disease	325 (16%)	1751 (84%)	15 (1%)	2091
	Familial / hereditary kidney diseases	79 (7%)	1082 (93%)	7 (0%)	1168
	Tubulointerstitial disease	215 (16%)	1084 (83%)	8 (1%)	1307
	Other systemic diseases affecting the kidney	191 (40%)	287 (60%)	4 (1%)	482
	Miscellaneous kidney disorders	521 (29%)	1291 (71%)	7 (0%)	1819
	Not reported	17 (10%)	59 (36%)	87 (53%)	163
	Total	2730 (17%)	13593 (82%)	200 (1%)	16523
New Zealand	Diabetic kidney disease	165 (10%)	1508 (89%)	12 (1%)	1685
	Glomerular disease	89 (13%)	567 (86%)	6 (1%)	662
	Hypertension / Renal vascular disease	33 (10%)	280 (89%)	3 (1%)	316
	Familial / hereditary kidney diseases	8 (4%)	183 (96%)	0 (0%)	191
	Tubulointerstitial disease	31 (12%)	217 (86%)	3 (1%)	251
	Other systemic diseases affecting the kidney	20 (36%)	36 (64%)	0 (0%)	56
	Miscellaneous kidney disorders	48 (21%)	183 (79%)	1 (0%)	232
	Not reported	3 (27%)	4 (36%)	4 (36%)	11
	Total	397 (12%)	2978 (87%)	29 (1%)	3404

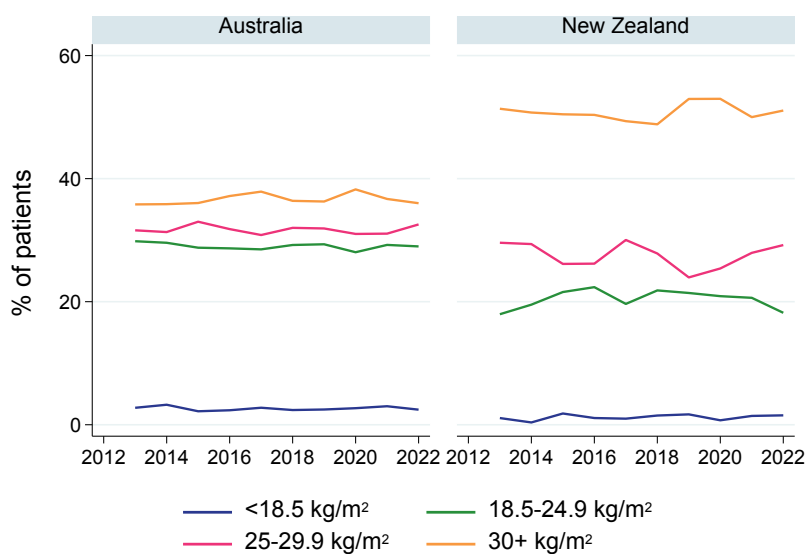
BODY MASS INDEX

Table 1.7 shows the body mass index (BMI, in kg/m²) category at KRT entry of new adult patients in 2022. 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 2022

Country	Category	BMI at KRT Entry
Australia	<18.5	81 (2%)
	18.5-24.9	958 (29%)
	25-29.9	1076 (32%)
	30+	1190 (35%)
	Not reported	50 (1%)
New Zealand	<18.5	10 (1%)
	18.5-24.9	119 (18%)
	25-29.9	191 (28%)
	30+	334 (50%)
	Not reported	18 (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 2022. 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 2022

Country	Status at KRT Entry	Coronary Artery Disease	Peripheral Vascular Disease	Cerebrovascular Disease	Chronic Lung Disease
Australia	No	2258 (66%)	2759 (81%)	3079 (90%)	2961 (87%)
	Suspected	164 (5%)	189 (6%)	52 (2%)	66 (2%)
	Yes	956 (28%)	429 (13%)	245 (7%)	352 (10%)
	Not reported	25 (1%)	26 (1%)	27 (1%)	24 (1%)
New Zealand	No	479 (70%)	598 (88%)	618 (91%)	569 (83%)
	Suspected	38 (6%)	34 (5%)	11 (2%)	25 (4%)
	Yes	162 (24%)	47 (7%)	50 (7%)	85 (12%)
	Not reported	3 (0%)	3 (0%)	3 (0%)	3 (0%)

Table 1.9
Smoking Status of New Patients 2022

Country	Status at KRT Entry	n (%)
Australia	Current	372 (11%)
	Former	1114 (33%)
	Never	1863 (55%)
	Not reported	54 (2%)
New Zealand	Current	101 (15%)
	Former	278 (41%)
	Never	298 (44%)
	Not reported	5 (1%)

Table 1.10
Diabetic Status of New Patients 2022

Country	Status at KRT Entry	n (%)
Australia	No	1582 (46%)
	Type 1	187 (5%)
	Type 2	1606 (47%)
	Not reported	28 (1%)
New Zealand	No	265 (39%)
	Type 1	24 (4%)
	Type 2	390 (57%)
	Not reported	3 (0%)

Figure 1.9.1
Comorbid Conditions at KRT Entry - Australia

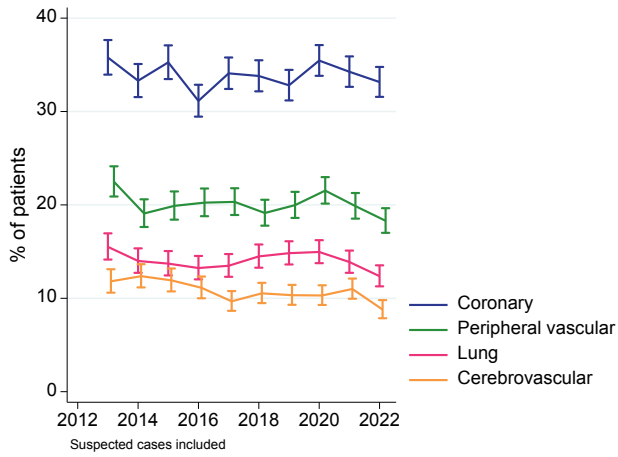


Figure 1.9.2
Comorbid Conditions at KRT Entry - New Zealand

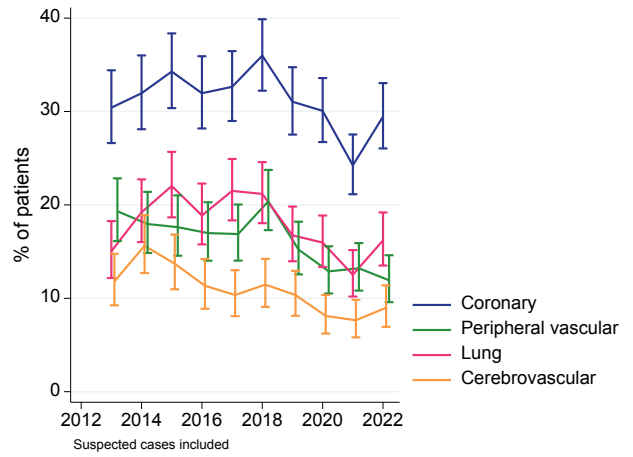
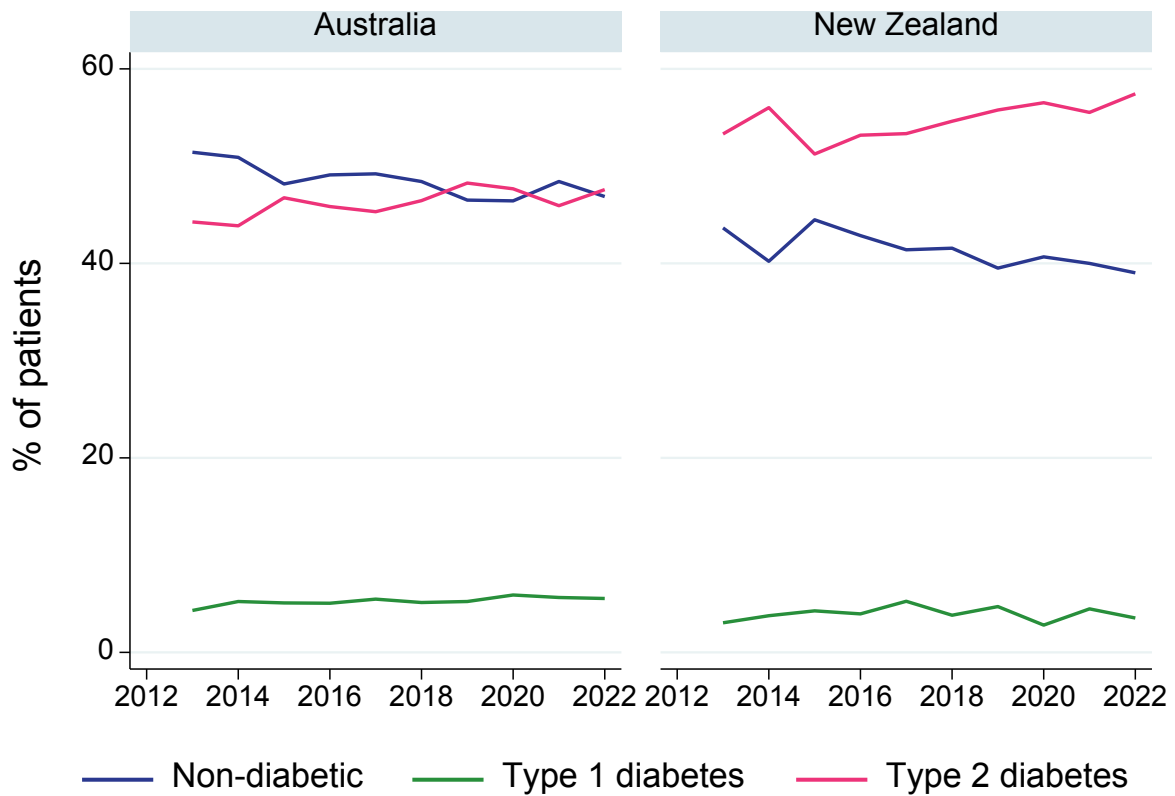


Figure 1.10
Diabetes Status at KRT Entry



PRIMARY KIDNEY DISEASE

The primary kidney disease of new patients over 2019-2022 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, type 2 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 1.11.1
Primary Kidney Disease of New Patients 2019 - 2022

Country	Primary kidney disease	2019	2020	2021	2022
Australia	Diabetic kidney disease	1311 (40%)	1311 (39%)	1266 (38%)	1350 (40%)
	Glomerular disease	608 (19%)	643 (19%)	601 (18%)	612 (18%)
	Hypertension / Renal vascular disease	429 (13%)	409 (12%)	440 (13%)	389 (11%)
	Familial / hereditary kidney diseases	222 (7%)	210 (6%)	258 (8%)	235 (7%)
	Tubulointerstitial disease	258 (8%)	260 (8%)	278 (8%)	265 (8%)
	Other systemic diseases affecting the kidney	107 (3%)	88 (3%)	108 (3%)	80 (2%)
	Miscellaneous kidney disorders	326 (10%)	379 (11%)	364 (11%)	434 (13%)
	Not reported	23 (1%)	22 (1%)	21 (1%)	38 (1%)
	Total	3284	3322	3336	3403
New Zealand	Diabetic kidney disease	329 (50%)	347 (48%)	354 (49%)	342 (50%)
	Glomerular disease	121 (18%)	143 (20%)	156 (22%)	127 (19%)
	Hypertension / Renal vascular disease	63 (10%)	70 (10%)	74 (10%)	60 (9%)
	Familial / hereditary kidney diseases	36 (5%)	38 (5%)	33 (5%)	42 (6%)
	Tubulointerstitial disease	53 (8%)	60 (8%)	46 (6%)	44 (6%)
	Other systemic diseases affecting the kidney	7 (1%)	11 (2%)	10 (1%)	16 (2%)
	Miscellaneous kidney disorders	50 (8%)	45 (6%)	42 (6%)	47 (7%)
	Not reported	0 (0%)	2 (<1%)	4 (<1%)	4 (<1%)
Total	659	716	719	682	

Table 1.12
Glomerular Disease (GN) as Primary Kidney Disease 2022

Primary kidney disease	Australia	New Zealand
Adult nephrotic syndrome	7	4
Anti-Glomerular basement membrane (GBM) disease / Goodpasture's syndrome	23	6
Congenital nephrotic syndrome (CNS)	5	1
Congenital nephrotic syndrome (CNS) - focal segmental glomerulosclerosis (FSGS)	2	0
Diffuse endocapillary glomerulonephritis	3	0
Familial IgA nephropathy	5	0
Familial focal segmental glomerulosclerosis (FSGS) - autosomal dominant	3	0
Familial focal segmental glomerulosclerosis (FSGS) - autosomal recessive	5	1
Focal and segmental proliferative glomerulonephritis	35	5
Focal segmental glomerulosclerosis (FSGS) secondary to lithium	1	0
Focal segmental glomerulosclerosis (FSGS) secondary to obesity	7	2
Glomerulonephritis	70	25
Glomerulonephritis - secondary to systemic disease	6	2
Granulomatosis with polyangiitis	3	1
Henoch-Schönlein purpura / nephritis	2	0
Idiopathic rapidly progressive (crescentic) glomerulonephritis	3	1
IgA nephropathy	171	33
IgM - associated nephropathy	2	0
Membranous nephropathy - idiopathic	20	4
Membranous nephropathy - infection associated	3	1
Mesangial proliferative glomerulonephritis	22	2
Mesangiocapillary glomerulonephritis type 1	9	5
Mesangiocapillary glomerulonephritis type 2 (dense deposit disease)	4	0
Mesangiocapillary glomerulonephritis type 3	1	0
Microscopic polyangiitis	5	4
Minimal change nephropathy	1	1
Nephrotic syndrome of childhood - no trial of steroids	1	0
Polyarteritis nodosa	2	0
Primary focal segmental glomerulosclerosis (FSGS)	119	18
Renal scleroderma / systemic sclerosis	7	2
Systemic lupus erythematosus / nephritis	41	6
Systemic vasculitis - ANCA negative	6	1
Systemic vasculitis - ANCA positive	18	2
Total	612	127

Table 1.13
Miscellaneous Primary Kidney Diseases 2022

Primary kidney disease	Australia	New Zealand
Acute cortical necrosis	9	0
Acute kidney injury	38	2
Acute kidney injury due to circulatory failure	2	0
Acute kidney injury due to hypovolaemia	2	0
Acute kidney injury due to nephrotoxicity	2	0
Acute kidney injury due to rhabdomyolysis	2	0
Acute kidney injury due to sepsis	24	4
Acute pyelonephritis	3	0
Chronic kidney disease (CKD) / chronic renal failure (CRF) - aetiology uncertain / unknown	239	28
Chronic kidney disease (CKD) / chronic renal failure (CRF) caused by tumour nephrectomy	4	4
Chronic kidney disease (CKD) / chronic renal failure (CRF) due to traumatic loss of kidney	6	0
Chronic renal failure	59	6
Haematuria and proteinuria	0	1
Renal cell carcinoma	18	0
Renal failure	13	1
Single kidney identified in adulthood	9	1
Transitional cell carcinoma	3	0
Wilms tumour	1	0

Figure 1.11.1
Biopsy Rates - Australia

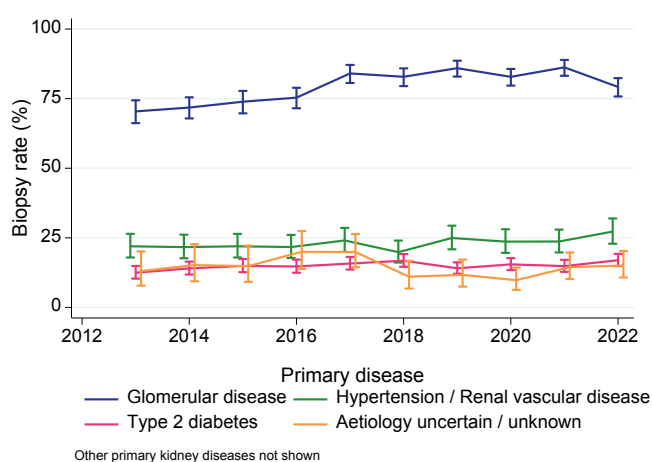
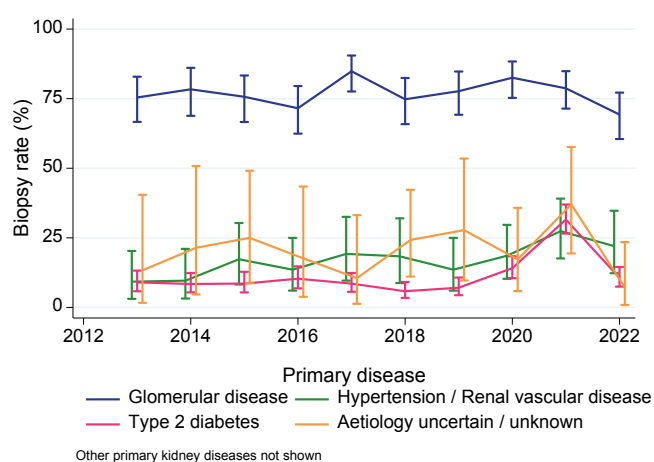


Figure 1.11.2
Biopsy Rates - New Zealand



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 2022 this was 7.3mL/min/1.73m² in Australia and 5.5mL/min/1.73m² in New Zealand. The median eGFR for adult patients at KRT start over 2020-2022 by Australian State/Territory is shown in figure 1.13.

Figure 1.12.1
eGFR at KRT Start for Adult Patients - Australia

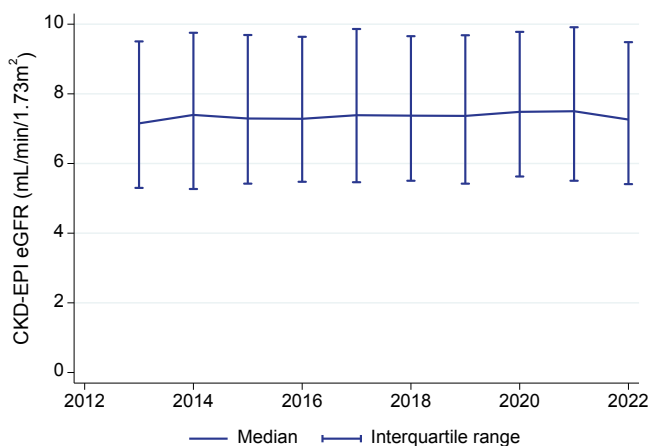


Figure 1.12.2
eGFR at KRT Start for Adult Patients - New Zealand

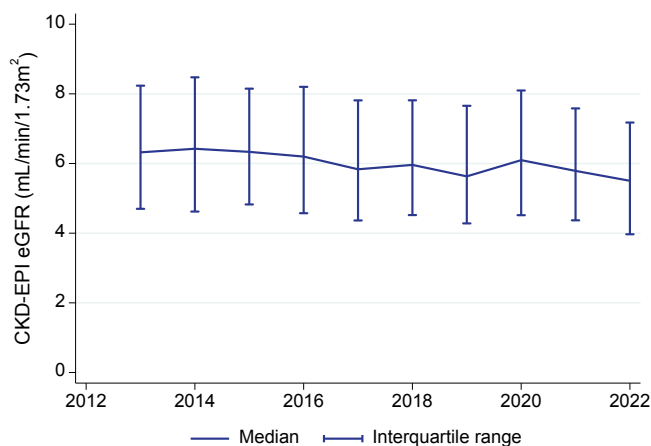
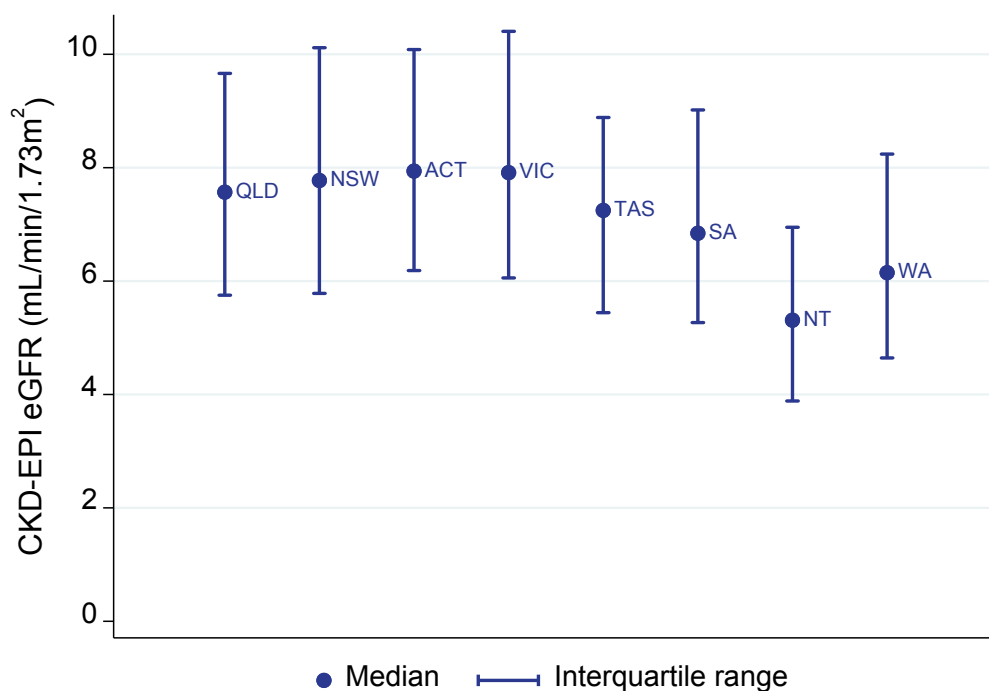
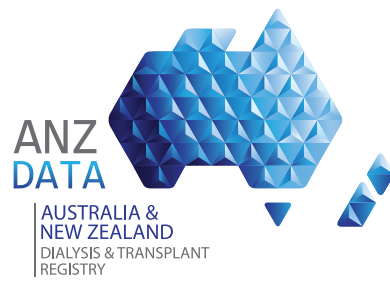


Figure 1.13
eGFR at KRT Start for Adult Patients - By State/Territory, Australia 2020-2022



REFERENCES

1. Australian Bureau of Statistics, 2022, Quarterly Population Estimates (ERP), by State/Territory, Sex and Age, Jun 2022, viewed 20 Dec 2022, <https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/jun-2022>
2. This work is based on/includes Stats NZ's data which are licensed by Stats NZ for re-use under the Creative Commons Attribution 4.0 International licence. Stats NZ, 2022, Estimated Resident Population by Age and Sex (1991+) (Annual-Jun), NZ Infoshare, viewed 20 Dec 2022, <http://infoshare.stats.govt.nz/>
3. Australian Bureau of Statistics, 2023, Regional Population by Age and Sex, Australia, 2022, viewed 28 Sep 2023, <https://www.abs.gov.au/statistics/people/population/regional-population-age-and-sex/2022>



CHAPTER 1

Incidence of Kidney Failure with
Replacement Therapy