



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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Suggested Citation

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Summary and Highlights

In Australia in 2020 there were 3259 new kidney replacement therapy (KRT) patients, with an overall incidence rate of 127 per million population. Although the absolute number of incident patients continued to slowly increase, year on year, the rate per million population has remained relatively constant in Australia over the last 4 years in line with population growth. By contrast, in New Zealand there were both a higher number of incident KRT patients (710) and a higher rate per million population (139 pmp) compared with earlier years (although with smaller overall numbers, more year on year variation is noted).

Both countries saw a decrease in the number of kidney transplants performed annually in 2020, likely in part related to impacts of the SARS-CoV-2 (COVID-19) pandemic (see Chapter 7).

Of the Australian states and territories, the Northern Territory continued to have the highest incidence of kidney failure with replacement therapy per million population (411 pmp), however this was substantially lower than 2019 (536 pmp) and the lowest rate since 2016.

In Australia the largest increase in rate of kidney failure with replacement therapy (pmp) was in people over 85 years of age. New Zealand saw increases in all age groups 65 years and older.

Diabetic kidney disease was the most common primary kidney disease in patients with kidney failure commencing replacement therapy in both Australia (38%) and New Zealand (46%). In both countries, the majority of patients commencing kidney replacement therapy had a diagnosis of diabetes reported to the Registry (53% in Australia and 59% in New Zealand).

Incidence and Prevalence of Kidney Replacement Therapy

Tables 1.1 and 1.2 show the incidence and prevalence of kidney failure with replacement therapy by country and by state as well as the incidence and prevalence 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 (2020)¹ and Stats NZ (2020)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 (2021)³.

Table 1.1 Incidence and Prevalence of Kidney Failure with Replacement Therapy 2016-2020 (pmp)

Country	Event	2016	2017	2018	2019	2020
Australia	Total New Patients	2923 (121)	3114 (127)	3166 (127)	3255 (128)	3259 (127)
	Total Transplants	1091 (45)	1109 (45)	1149 (46)	1104 (44)	885 (34)
	Living Donor Transplants	264	271	238	238	181
	Subsequent Transplants	159	158	122	117	81
	Total Deaths	2076	2178	2113	2162	2189
	Dialysis Patients	1818	1927	1842	1898	1938
	Transplant Patients	258	251	271	264	251
	Total Prevalent	23859 (986)	24710 (1004)	25697 (1029)	26708 (1053)	27684 (1078)
	Dialysis Patients	12817 (530)	13106 (533)	13521 (541)	13963 (550)	14554 (567)
	Transplant Patients	11042 (456)	11604 (472)	12176 (487)	12745 (502)	13130 (511)
New Zealand	Total New Patients	585 (124)	629 (131)	629 (128)	659 (132)	710 (139)
	Total Transplants	172 (36)	187 (39)	182 (37)	221 (44)	187 (37)
	Living Donor Transplants	82	69	84	91	87
	Subsequent Transplants	17	13	12	25	18
	Total Deaths	448	481	465	544	456
	Dialysis Patients	397	429	413	481	416
	Transplant Patients	51	52	52	63	40
	Total Prevalent	4559 (967)	4693 (975)	4846 (989)	4951 (994)	5203 (1022)
	Dialysis Patients	2770 (588)	2797 (581)	2869 (585)	2853 (573)	3004 (590)
	Transplant Patients	1789 (379)	1896 (394)	1977 (403)	2098 (421)	2199 (432)

Table 1.2 Incidence and Prevalence of Kidney Failure with Replacement Therapy and Country (pmp) 2020

State	New Patients	Transplant Operations	Deaths Dialysis	Deaths Transplant	Dialysis Dependent	Functioning Transplants	Total Prevalent
QLD	664 (128)	143 (28)	415	49	2927 (566)	2456 (475)	5383 (1040)
NSW*	975 (123)	292 (37)	550	73	4396 (554)	3699 (466)	8095 (1021)
ACT*	58 (87)	0 (0)	39	6	299 (450)	301 (453)	600 (904)
VIC	807 (121)	267 (40)	443	77	3435 (513)	3818 (570)	7253 (1083)
TAS	41 (76)	0 (0)	42	6	209 (387)	306 (566)	515 (953)
SA	240 (136)	93 (53)	139	25	975 (551)	1116 (631)	2091 (1182)
NT	101 (411)	0 (0)	80	4	773 (3143)	140 (569)	913 (3712)
WA	373 (140)	90 (34)	230	11	1540 (579)	1294 (486)	2834 (1065)
Australia	3259 (127)	885 (34)	1938	251	14554 (567)	13130 (511)	27684 (1078)
New Zealand	710 (139)	187 (37)	416	40	3004 (590)	2199 (432)	5203 (1022)

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

Incident Patients

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

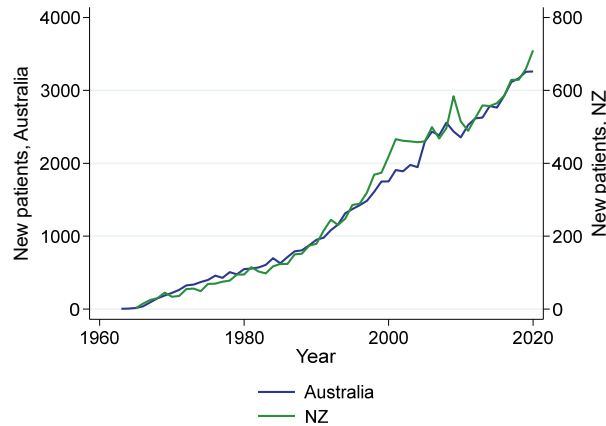


Figure 1.2 presents these data another way, showing the numbers of new patients per year and change in each country compared to the previous year over the last 30 years.

Figure 1.2.1 - New Patients and Change – Australia

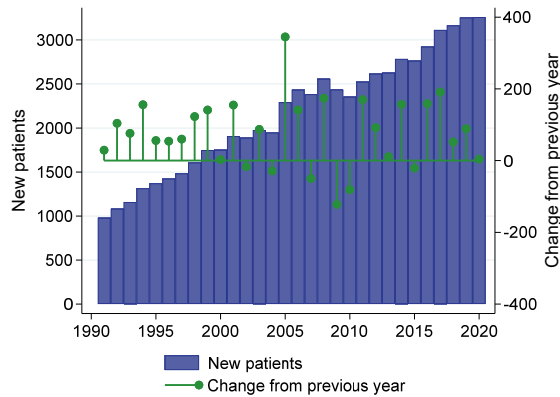


Figure 1.2.2 - New Patients and Change - New Zealand

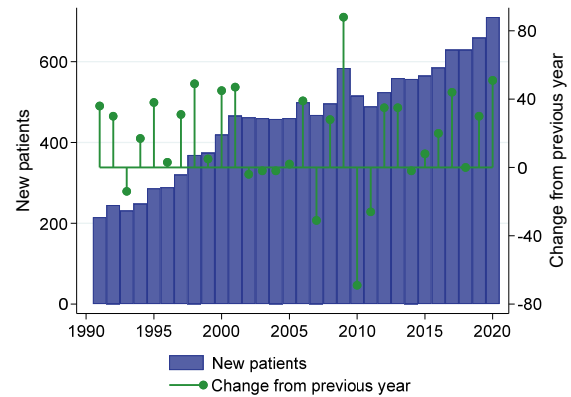


Table 1.3 shows the number of new patients (pmp) by state and country over 2016-2020.

Table 1.3 Kidney Failure with Replacement Therapy Incidence (pmp) 2016-2020

State	2016	2017	2018	2019	2020
QLD	526 (109)	628 (127)	669 (134)	674 (132)	664 (128)
NSW*	888 (118)	913 (119)	922 (119)	963 (123)	975 (123)
ACT*	70 (112)	53 (83)	53 (82)	80 (122)	58 (87)
VIC	732 (119)	777 (123)	804 (124)	751 (114)	807 (121)
TAS	57 (110)	56 (107)	46 (87)	65 (122)	41 (76)
SA	225 (131)	204 (118)	203 (117)	213 (122)	240 (136)
NT	82 (334)	119 (481)	131 (530)	132 (536)	101 (411)
WA	343 (134)	364 (141)	338 (130)	377 (144)	373 (140)
Australia	2923 (121)	3114 (127)	3166 (127)	3255 (128)	3259 (127)
New Zealand	585 (124)	629 (131)	629 (128)	659 (132)	710 (139)

*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

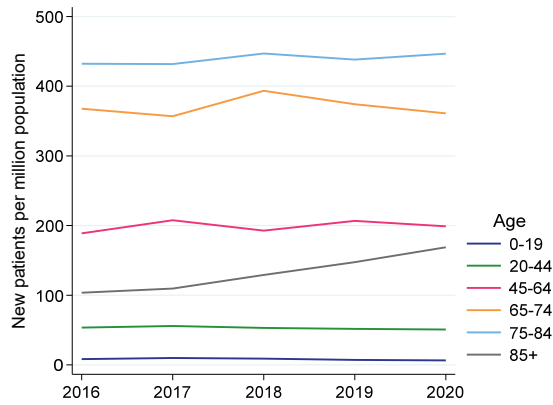


Figure 1.3.2 - New Patients - Age Specific Rates - New Zealand

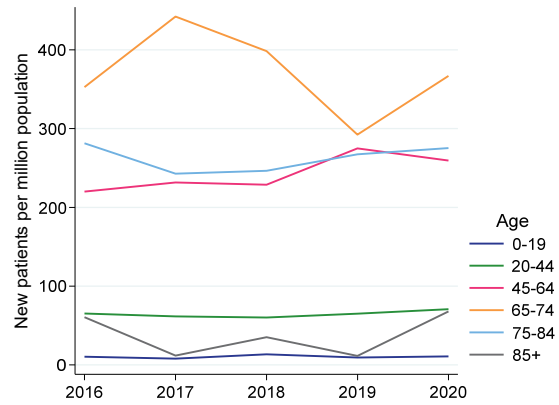


Figure 1.4.1 - New Patients by Age Group - NT

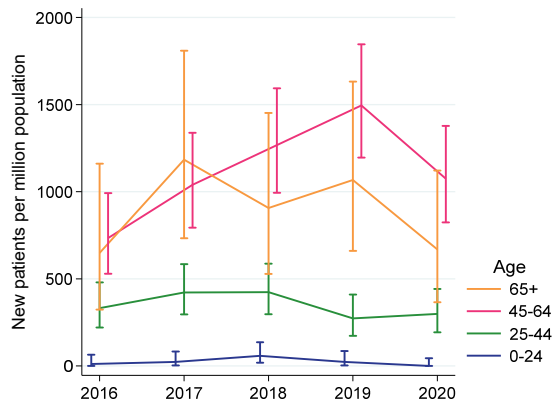


Figure 1.4.2 - New Patients by Age Group - NSW

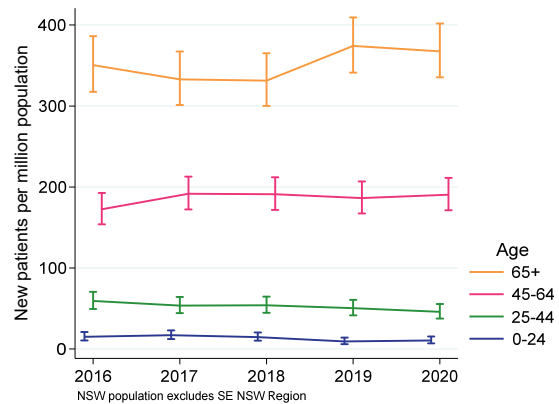


Figure 1.4.3 - New Patients by Age Group - VIC

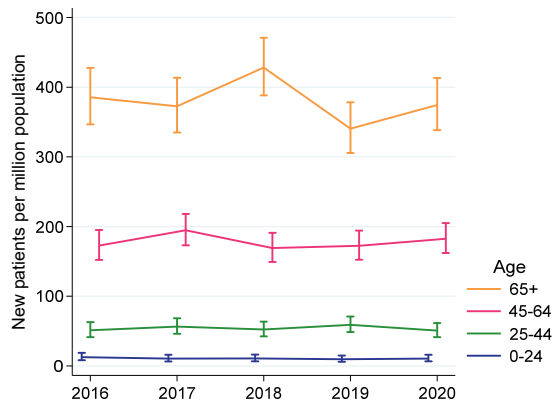


Figure 1.4.4 - New Patients by Age Group - QLD

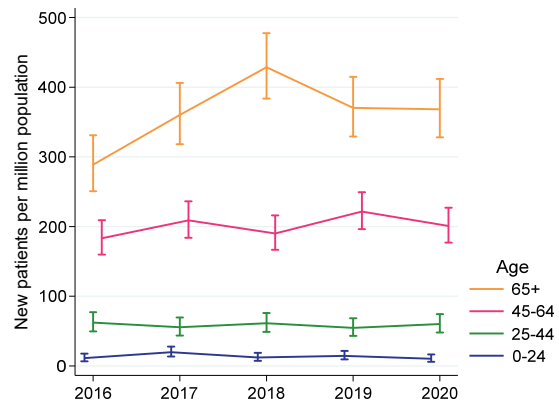


Figure 1.4.5 - New Patients by Age Group - SA

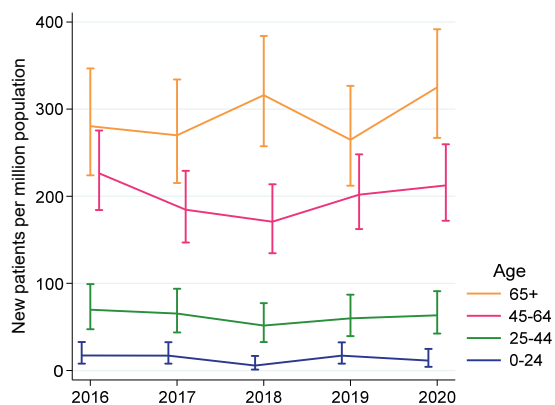


Figure 1.4.6 - New Patients by Age Group - WA

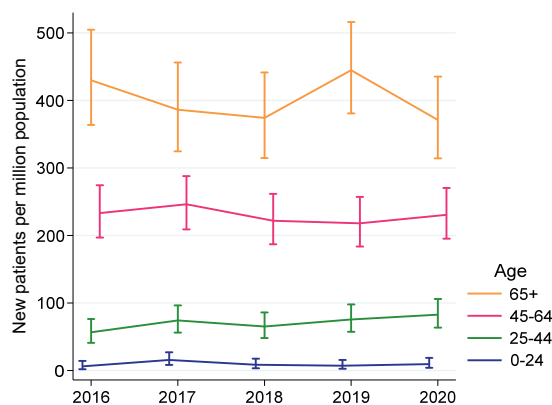


Figure 1.4.7 - New Patients by Age Group - TAS

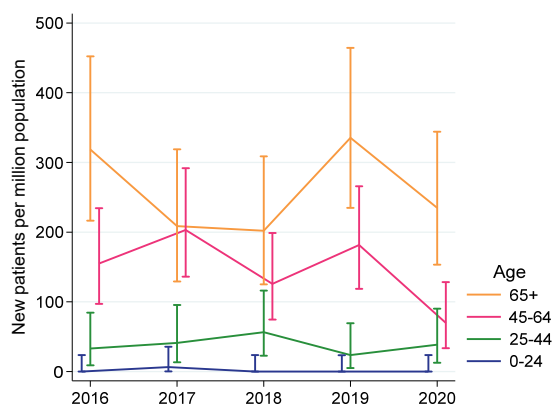
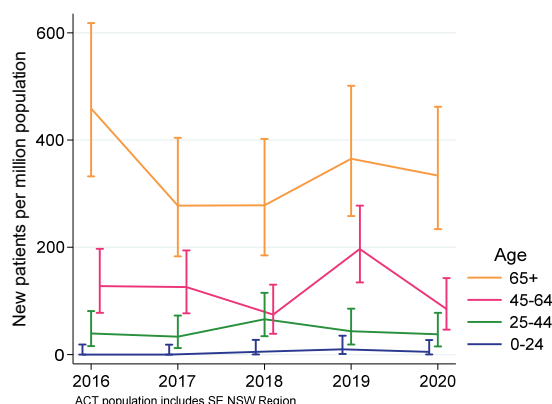


Figure 1.4.8 - New Patients by Age Group - ACT



The rates in older patients are shown in table 1.4. Table 1.5 further categorises the 2020 data by gender.

Table 1.4 Incidence (pmp) of Kidney Failure with Replacement Therapy in Older Patients 2016-2020

Country	Age	2016	2017	2018	2019	2020
Australia	60-64	344 (264)	377 (283)	376 (277)	396 (284)	404 (282)
	65-69	406 (340)	386 (323)	429 (355)	405 (330)	424 (338)
	70-74	360 (404)	382 (399)	446 (438)	450 (425)	427 (387)
	75-79	299 (459)	335 (495)	334 (477)	344 (468)	372 (481)
	80-84	179 (393)	160 (341)	196 (403)	199 (394)	209 (396)
	85+	50 (104)	54 (110)	65 (129)	76 (148)	89 (169)
New Zealand	60-64	85 (331)	72 (273)	69 (255)	98 (350)	92 (316)
	65-69	84 (363)	110 (472)	88 (374)	69 (288)	100 (403)
	70-74	57 (339)	72 (403)	82 (428)	60 (298)	69 (324)
	75-79	43 (340)	46 (344)	42 (309)	49 (347)	51 (348)
	80-84	16 (193)	7 (83)	13 (149)	13 (143)	16 (165)
	85+	5 (61)	1 (12)	3 (35)	1 (12)	6 (68)

Table 1.5 Age and Gender* of New Patients 2020

Country	Sex	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85+	Total	Mean	Median
Australia	F	4	4	18	70	109	182	273	301	185	23	1169	59.6	62
	M	6	14	34	96	144	304	480	550	396	66	2090	61.5	64
New Zealand	F	0	2	13	20	23	48	65	69	20	2	262	55.7	59
	M	1	1	12	16	49	97	121	100	47	4	448	57.2	58

* No data on persons identifying as a gender other than male or female were reported to the registry

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 2020, among those with referral timing reported, 17% of Australian and 10% 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 2016-2020 by primary kidney disease.

Figure 1.5 - Late Referral Rates - All Incident Patients 2011 – 2020

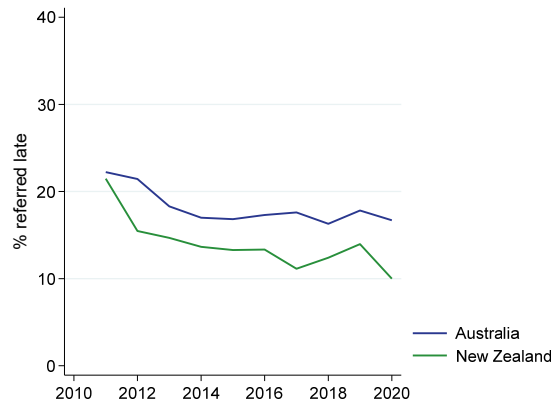


Figure 1.6 - Late Referral Rates by State/Territory - Australia 2011 – 2020

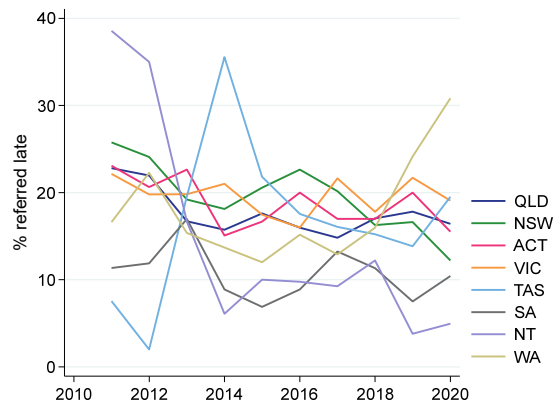


Figure 1.7.1 - Late Referral Rates by Age - Australia 2011 - 2020

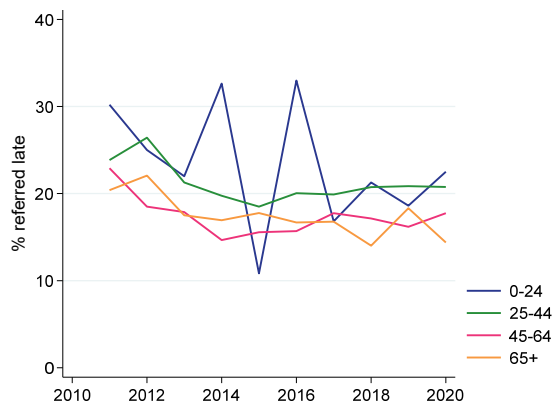


Figure 1.7.2 - Late Referral Rates by Age - New Zealand 2011 - 2020

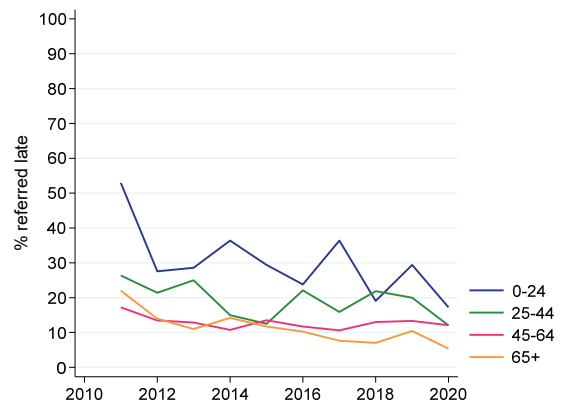


Table 1.6 Late Referral by Country and Primary Kidney Disease 2016-2020

Country	Primary kidney disease	Late	Not Late	Not Reported	Total
Australia	Diabetic Kidney Disease	867 (14%)	5047 (84%)	71 (1%)	5985
	Glomerulonephritis	445 (16%)	2261 (83%)	30 (1%)	2736
	Hypertension	336 (17%)	1623 (82%)	26 (1%)	1985
	Polycystic Disease	55 (6%)	885 (93%)	10 (1%)	950
	Reflux Nephropathy	24 (8%)	274 (91%)	4 (1%)	302
	Other	671 (27%)	1765 (72%)	28 (1%)	2464
	Uncertain	246 (27%)	648 (72%)	6 (1%)	900
	Not reported	50 (13%)	203 (51%)	142 (36%)	395
	Total	2694 (17%)	12706 (81%)	317 (2%)	15717
New Zealand	Diabetic Kidney Disease	148 (10%)	1376 (89%)	26 (2%)	1550
	Glomerulonephritis	95 (16%)	494 (82%)	11 (2%)	600
	Hypertension	35 (13%)	238 (86%)	5 (2%)	278
	Polycystic Disease	3 (2%)	143 (97%)	1 (1%)	147
	Reflux Nephropathy	5 (9%)	52 (91%)	0 (0%)	57
	Other	78 (17%)	360 (81%)	9 (2%)	447
	Uncertain	22 (19%)	92 (80%)	1 (1%)	115
	Not reported	3 (17%)	12 (67%)	3 (17%)	18
	Total	389 (12%)	2767 (86%)	56 (2%)	3212

Co-morbidities

Tables 1.7-1.9 show the co-morbidities at KRT entry of new patients in 2020. Trends in the prevalence of these co-morbidities at KRT entry are shown in figures 1.8-1.9, with the bars representing 95% confidence intervals

Table 1.7 Co-morbidities of New Patients 2020

Country	Status at KRT Entry	Coronary Artery Disease	Peripheral Vascular Disease	Cerebrovascular Disease	Chronic Lung Disease
Australia	No	2081 (64%)	2531 (78%)	2885 (89%)	2738 (84%)
	Suspected	194 (6%)	224 (7%)	73 (2%)	112 (3%)
	Yes	946 (29%)	467 (14%)	262 (8%)	372 (11%)
	Not reported	38 (1%)	37 (1%)	39 (1%)	37 (1%)
New Zealand	No	491 (69%)	614 (86%)	650 (92%)	593 (84%)
	Suspected	45 (6%)	41 (6%)	11 (2%)	20 (3%)
	Yes	171 (24%)	52 (7%)	46 (6%)	93 (13%)
	Not reported	3 (0%)	3 (0%)	3 (0%)	4 (1%)

Table 1.8 Smoking Status of New Patients 2020

Country	Status at KRT Entry	Smoking
Australia	Current	359 (11%)
	Former	1220 (37%)
	Never	1629 (50%)
	Not reported	51 (2%)
New Zealand	Current	104 (15%)
	Former	233 (33%)
	Never	367 (52%)
	Not reported	6 (1%)

Table 1.9 Diabetic Status of New Patients 2020

Country	Status at KRT Entry	Diabetes
Australia	No	1505 (46%)
	Type 1	193 (6%)
	Type 2	1529 (47%)
	Not reported	32 (1%)
New Zealand	No	287 (40%)
	Type 1	23 (3%)
	Type 2	395 (56%)
	Not reported	5 (1%)

Figure 1.8.1 - Comorbid Conditions at KRT Entry - Australia

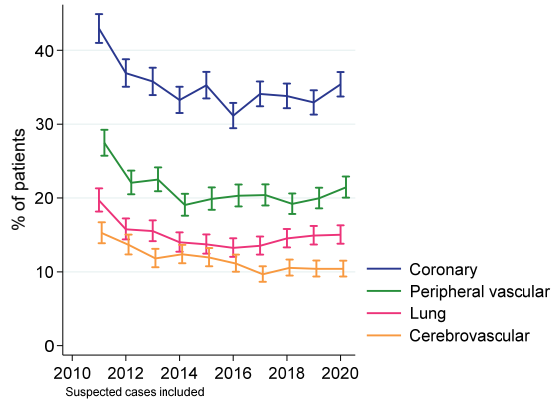


Figure 1.8.2 - Comorbid Conditions at KRT Entry - New Zealand

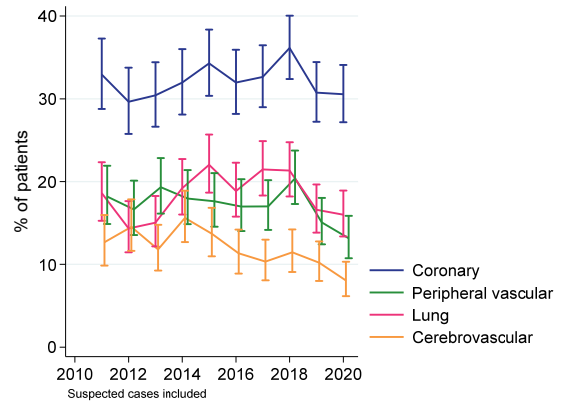
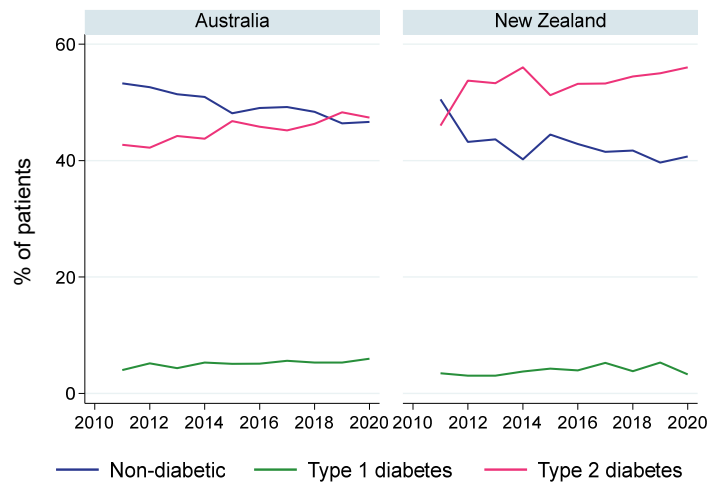


Figure 1.9 - Diabetes Status at KRT Entry



Primary Kidney Disease

The primary kidney disease of new patients over 2017-2020 are shown in table 1.10. Details of the type of glomerulonephritis reported are shown in table 1.11. Rates of biopsy confirmation of glomerulonephritis and diabetic kidney disease are shown in figure 1.10.

The “other” causes from table 1.10 are shown in detail in table 1.12.

Table 1.10 Primary Kidney Disease of New Patients 2017 - 2020

Country	Primary kidney disease	2017	2018	2019	2020
Australia	Diabetic Kidney Disease	1198 (38%)	1200 (38%)	1269 (39%)	1244 (38%)
	Glomerulonephritis	540 (17%)	524 (17%)	560 (17%)	573 (18%)
	Hypertension	397 (13%)	401 (13%)	402 (12%)	377 (12%)
	Polycystic Disease	210 (7%)	211 (7%)	178 (5%)	177 (5%)
	Reflux Nephropathy	70 (2%)	56 (2%)	59 (2%)	53 (2%)
	Other	433 (14%)	525 (17%)	548 (17%)	535 (16%)
	Uncertain	188 (6%)	159 (5%)	179 (5%)	230 (7%)
	Not reported	78 (3%)	90 (3%)	60 (2%)	70 (2%)
	Total		3114	3166	3255
	Diabetic Kidney Disease	327 (52%)	301 (48%)	312 (47%)	327 (46%)
	Glomerulonephritis	134 (21%)	111 (18%)	108 (16%)	130 (18%)
	Hypertension	52 (8%)	45 (7%)	60 (9%)	65 (9%)
	Polycystic Disease	29 (5%)	34 (5%)	29 (4%)	28 (4%)
	Reflux Nephropathy	6 (1%)	12 (2%)	14 (2%)	16 (2%)
	Other	60 (10%)	96 (15%)	106 (16%)	112 (16%)
	Uncertain	18 (3%)	26 (4%)	29 (4%)	25 (4%)
	Not reported	3 (<1%)	4 (1%)	1 (<1%)	7 (1%)
	Total	629	629	659	710

Table 1.11 Glomerulonephritis as Primary Kidney Disease 2020

Primary kidney disease	Australia	New Zealand
Advanced GN (unclassified=end stage)	12	4
Extra and intra capillary GN (rapidly progressive)	1	0
Familial GN (including Alports)	16	5
Focal and segmental proliferative GN	34	6
Focal sclerosing GN (including hyalinosis)	35	11
GN other (specify)	30	2
GN with systemic disease (specify)	5	1
Goodpastures with linear IgG and lung haemorrhage	8	3
Henoch-Schonlein purpura	7	0
Membranous GN	33	6
Mesangial proliferative (IgA+)	171	23
Mesangial proliferative (IgA-)	11	0
Mesangial proliferative (no if studies)	5	1
Mesangiocapillary GN (dense deposit disease)	3	0
Mesangiocapillary GN (double contour)	7	5
Microscopic polyarteritis	4	3
Presumed GN (no biopsy)	48	20
Primary focal sclerosing GN or focal glomerular sclerosis	80	25
Proliferative GN with linear IgG and no lung haemorrhage	1	1
S.L.E.	29	7
Scleroderma	14	0
Secondary focal sclerosing GN	11	6
Wegeners granulomatosis	8	1
Total	573	130

Table 1.12 Miscellaneous Primary Kidney Diseases 2020

Primary kidney disease	Australia	New Zealand
Analgesic Nephropathy	6	1
Cadmium Toxicity	1	0
Calcineurin Inhibitor Toxicity	8	0
Cystinosis	2	1
Gout	3	1
Interstitial Nephritis	40	11
Lead Nephropathy	0	2
Lithium Toxicity	27	5
Loss Of Single Kidney (Trauma-Surgery)	10	2
Oxalosis	1	0
Post Partum Nephropathy	1	0
Pyelonephritis	2	0
Renal Tuberculosis	2	0
Sarcoidosis	1	0
Bladder Neck Obstruction (Incl. Prostatomegaly)	4	1
Congenital Renal Hypoplasia And Dysplasia	19	5
Neuropathic Bladder	1	0
Obstructive Nephropathy	38	4
Other Lower Urinary Tract Abnormalities (With Secondary Reflux)	1	0
Pelvi-Ureteric Junction Obstruction	4	0
Posterior Urethral Valves	4	1
Ureteric Obstructive Nephropathy	11	3
Calculi	16	1
Medullary Cystic Disease	6	0
Cortical Necrosis	7	1
Haemolytic Uraemic Syndrome	7	2
Amyloid Disease	23	2
Light Chain Nephropathy (Not Malignant)	6	1
Paraproteinaemia (Including Multiple Myeloma)	23	3
Renal Cell Carcinoma (Grawitz)	27	2
Transitional Cell Carcinoma Urinary Tract	2	0
Other (Specify)	232	63

Figure 1.10.1 - Biopsy Rates - Australia

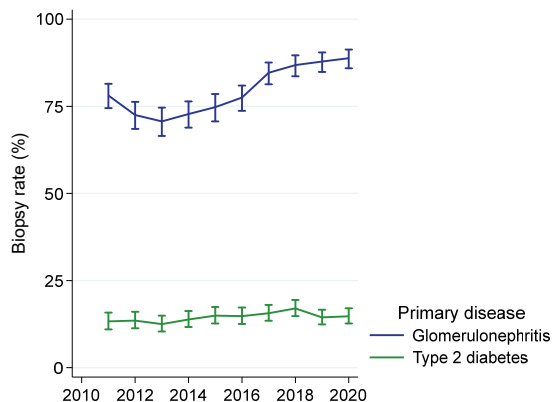
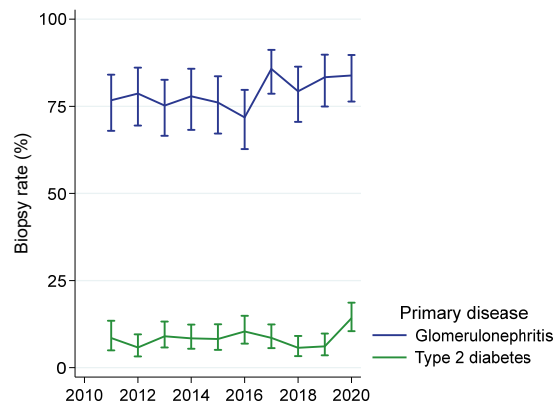


Figure 1.10.2 - Biopsy Rates - New Zealand



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 1.11. In 2020 this was 7.5mL/min/1.73m² in Australia and 6.1mL/min/1.73m² in New Zealand.

Figure 1.11.1 - eGFR at KRT Start - Australia

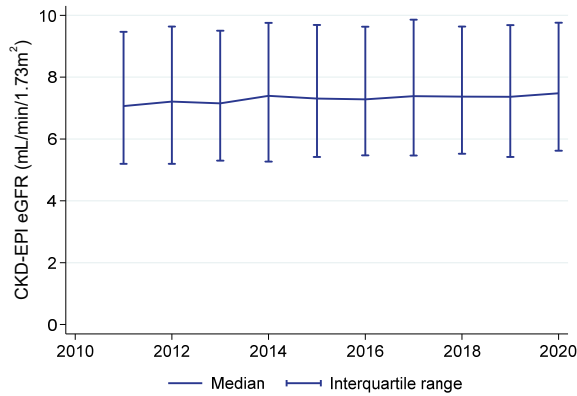
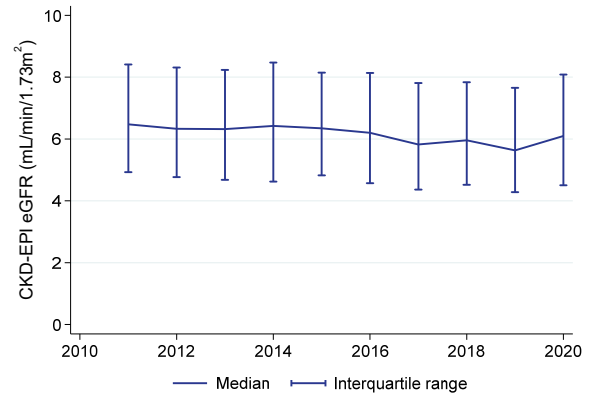


Figure 1.11.2 - eGFR at KRT Start - New Zealand



References

¹ Australian Bureau of Statistics, 2020, *Australian Demographic Statistics, Jun 2020, time series spreadsheets, cat. no. 3101.0*, viewed 4 Jan 2021,

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Jun%202020?OpenDocument>

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, 2020, *Estimated Resident Population by Age and Sex (1991+) (Annual-Jun)*, NZ Infoshare, viewed 4 Jan 2021, <http://archive.stats.govt.nz/infoshare/>

³ Australian Bureau of Statistics, 2021, *Regional Population by Age and Sex, Australia, 2020*, viewed 20 Sep 2021, <https://www.abs.gov.au/statistics/people/population/regional-population-age-and-sex/2020>