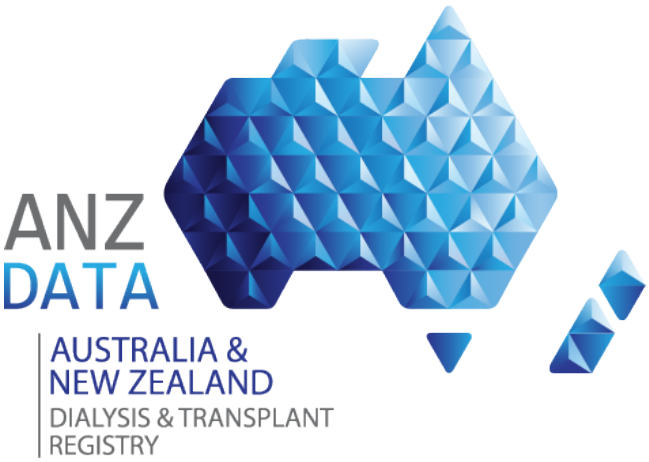


CHAPTER 4

Haemodialysis

Reporting the incidence, prevalence, and survival of haemodialysis patients in Australia and New Zealand; summarising dialysis prescriptions, laboratory results, dialysis adequacy, vascular access, and rates of home haemodialysis treatment

Contents

Summary and Highlights

The 44th ANZDATA Annual Report Haemodialysis Chapter includes a number of new figures and tables to better describe some of the changes in haemodialysis practice in our two countries.

The number of people receiving haemodialysis continues to rise in both countries. Fewer patients received a kidney transplant compared to 2019, perhaps not surprising given the COVID-19 pandemic. The age distribution demonstrates different peaks, with the highest proportion being people aged 65-74 years in Australia, and 55-64 years in New Zealand.

Patient survival has not changed over time, and new to this report we tabulate 1-year and 5-year survival in different age groups, stratified by presence or absence of diabetes and cardiovascular disease to facilitate discussions with patients considering dialysis (Tables 4.4 and 4.5).

An important function of this report is to highlight areas where practice varies. Large variation is seen across caring hospitals for the proportion of patients starting haemodialysis with established vascular access, the proportion having haemodialysis at home, and the proportion of patients prescribed an erythropoietin stimulating agent who have haemoglobin, ferritin or iron saturation to target at the time of the survey. The proportion of patients receiving thrice weekly haemodialysis having ≥5hours per session, or having >15 hours per week, varied between Australian states, and was higher in New Zealand than Australia (Tables 4.11 and 4.12).

Use of haemodiafiltration rose steeply until 2018 and has not continued to rise. There are large differences between Australian states, and between Australia and New Zealand, in the proportion of haemodialysis patients using this modality, and in the proportion receiving more than 20L of substitution volume (Fig 4.26).

An important new addition is data regarding who provides haemodialysis care to people receiving haemodialysis (Table 4.16), and also the recording of “Community house” as a location of haemodialysis (Table 4.15). In this first reporting of these data for New Zealand and Australia respectively, 9% and 13% of people having haemodialysis at home were not self-caring, and 23% and 18% of people receiving dialysis in satellite were reported as being self-caring.

Suggested Citation

ANZDATA Registry. 44th Report, Chapter 4: Haemodialysis. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2021. Available at: http://www.anzdata.org.au

Incidence, Cessation and Prevalence

Table 4.1 presents the incidence, cessation and prevalence of haemodialysis patients in Australia and New Zealand over 2016-2020. Note that dialysis modality changes lasting less than 30 days are not included.

Please note that in 2020 the ANZDATA registry began to record withdrawal from dialysis as a treatment decision in addition to documenting this as a cause of death. This change is reflected in fewer patients having death documented as cause of dialysis cessation in the table below. The majority of people who withdrawal from dialysis will pass away soon after this decision and therefore the total number of withdrawals and deaths can be compared with the number of deaths in previous years.

Table 4.1 Incidence, Cessation and Prevalence of Haemodialysis Patients in Australia and New Zealand 2016-2020

Country		2016	2017	2018	2019	2020
Australia	**All patients who commenced HD**					
	First dialysis treatment or returning after renal recovery	2025	2202	2281	2408	2308
	Transfer from PD (no prior HD)	410	407	392	389	390
	Transfer from PD (prior HD)	170	173	147	150	181
	Failed Transplant (no prior HD)	26	52	46	50	34
	Failed Transplant (prior HD)	160	159	198	161	151
	Total	**2791**	**2993**	**3064**	**3158**	**3064**
	All patients who ceased HD					
	Received kidney transplant	639	632	663	632	541
	Transfer to PD	309	312	291	325	305
	Renal recovery	68	78	83	77	85
	Withdrawal	0	0	0	0	464
	Deaths	1515	1639	1594	1628	1212
	Total	**2531**	**2661**	**2631**	**2662**	**2607**
	Total patients on HD at 31 December	**10364**	**10682**	**11090**	**11570**	**12010**
	Patients on HD at home* at 31 December (% of all HD patients)	**1134 (10.9%)**	**1049 (9.8%)**	**1060 (9.6%)**	**1074 (9.3%)**	**1133 (9.4%)**
New Zealand	**All patients who commenced HD**					
	First dialysis treatment or returning after renal recovery	348	383	363	386	405
	Transfer from PD (no prior HD)	107	78	98	102	124
	Transfer from PD (prior HD)	60	44	66	71	56
	Failed Transplant (no prior HD)	9	8	10	7	5
	Failed Transplant (prior HD)	16	21	21	18	27
	Total	**540**	**534**	**558**	**584**	**617**
	All patients who ceased HD					
	Received kidney transplant	93	96	80	106	84
	Transfer to PD	131	122	126	111	125
	Renal recovery	7	15	14	12	13
	Withdrawal	0	0	0	0	58
	Deaths	288	300	275	323	219
	Total	**519**	**533**	**495**	**552**	**499**
	Total patients on HD at 31 December	**1939**	**1933**	**2002**	**2029**	**2150**
	Patients on HD at home* at 31 December (% of all HD patients)	**470 (24.2%)**	**442 (22.9%)**	**425 (21.2%)**	**409 (20.2%)**	**388 (18.0%)**

*Includes Community House HD

Figures 4.1-4.2 and Table 4.2 present the age distribution of incident and prevalent haemodialysis patients in Australia and New Zealand.

Figure 4.1.1 - Age (%) of Incident Haemodialysis Patients - Australia 2020

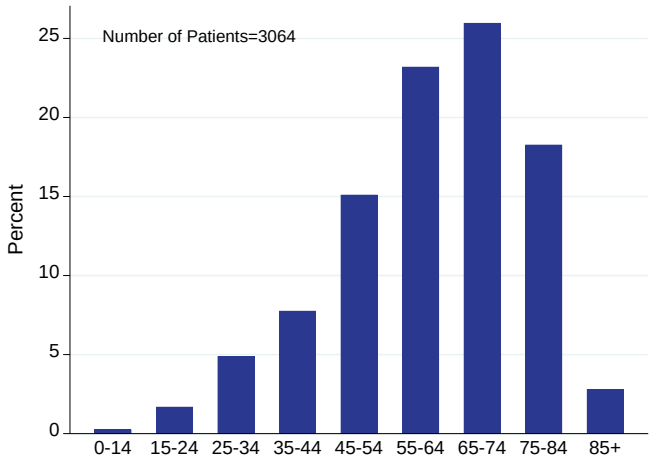


Figure 4.1.2 - Age (%) of Incident Haemodialysis Patients - New Zealand 2020

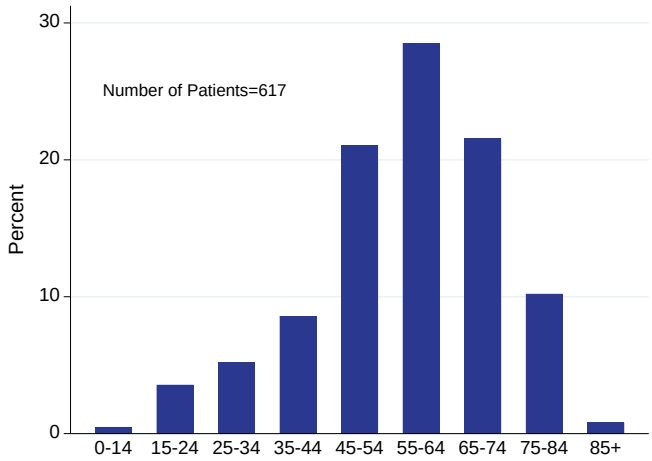


Figure 4.2.1 - Age (%) of Prevalent Haemodialysis Patients - Australia 31 Dec 2020

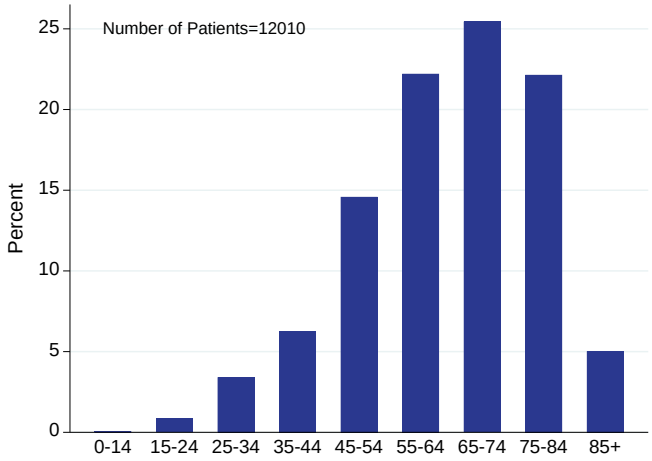


Figure 4.2.2 - Age (%) of Prevalent Haemodialysis Patients - New Zealand 31 Dec 2020

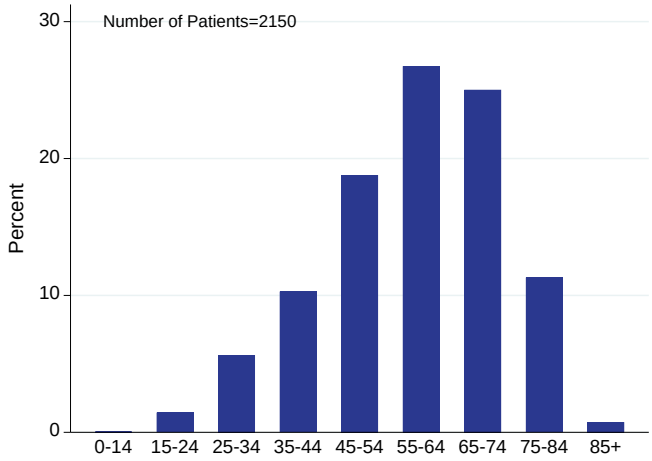


Table 4.2.1 Incident and Prevalent Haemodialysis Patients in Australia by Age Group 2016-2020

	Age group	2016	2017	2018	2019	2020
Incident Patients	**0-14**	16 (1%)	17 (1%)	13 (0%)	9 (0%)	8 (0%)
	15-24	62 (2%)	70 (2%)	65 (2%)	63 (2%)	52 (2%)
	25-34	141 (5%)	146 (5%)	144 (5%)	148 (5%)	150 (5%)
	35-44	258 (9%)	246 (8%)	275 (9%)	225 (7%)	238 (8%)
	45-54	453 (16%)	502 (17%)	488 (16%)	565 (18%)	463 (15%)
	55-64	589 (21%)	690 (23%)	682 (22%)	679 (22%)	711 (23%)
	65-74	745 (27%)	763 (25%)	807 (26%)	854 (27%)	796 (26%)
	75-84	479 (17%)	505 (17%)	522 (17%)	540 (17%)	560 (18%)
	85+	48 (2%)	54 (2%)	68 (2%)	75 (2%)	86 (3%)
	Total	**2791**	**2993**	**3064**	**3158**	**3064**
Prevalent Patients	**0-14**	11 (0%)	9 (0%)	13 (0%)	5 (0%)	6 (0%)
	15-24	93 (1%)	108 (1%)	112 (1%)	109 (1%)	102 (1%)
	25-34	349 (3%)	354 (3%)	381 (3%)	394 (3%)	410 (3%)
	35-44	753 (7%)	762 (7%)	767 (7%)	746 (6%)	752 (6%)
	45-54	1568 (15%)	1604 (15%)	1629 (15%)	1759 (15%)	1752 (15%)
	55-64	2180 (21%)	2287 (21%)	2399 (22%)	2508 (22%)	2668 (22%)
	65-74	2599 (25%)	2684 (25%)	2793 (25%)	2948 (25%)	3056 (25%)
	75-84	2291 (22%)	2331 (22%)	2441 (22%)	2533 (22%)	2660 (22%)
	85+	520 (5%)	543 (5%)	555 (5%)	568 (5%)	604 (5%)
	Total	**10364**	**10682**	**11090**	**11570**	**12010**

Table 4.2.2 Incident and Prevalent Haemodialysis Patients in New Zealand by Age Group 2016-2020

	Age group	2016	2017	2018	2019	2020
Incident Patients	0-14	2 (0%)	3 (1%)	5 (1%)	1 (0%)	3 (0%)
	15-24	12 (2%)	13 (2%)	9 (2%)	9 (2%)	22 (4%)
	25-34	34 (6%)	42 (8%)	47 (8%)	43 (7%)	32 (5%)
	35-44	50 (9%)	40 (7%)	55 (10%)	55 (9%)	53 (9%)
	45-54	100 (19%)	119 (22%)	101 (18%)	146 (25%)	130 (21%)
	55-64	155 (29%)	135 (25%)	144 (26%)	153 (26%)	176 (29%)
	65-74	132 (24%)	138 (26%)	151 (27%)	115 (20%)	133 (22%)
	75-84	50 (9%)	43 (8%)	43 (8%)	61 (10%)	63 (10%)
	85+	5 (1%)	1 (0%)	3 (1%)	1 (0%)	5 (1%)
	Total	**540**	**534**	**558**	**584**	**617**
Prevalent Patients	0-14	1 (0%)	1 (0%)	3 (0%)	1 (0%)	1 (0%)
	15-24	32 (2%)	29 (2%)	33 (2%)	22 (1%)	31 (1%)
	25-34	116 (6%)	118 (6%)	122 (6%)	114 (6%)	121 (6%)
	35-44	204 (11%)	203 (11%)	209 (10%)	218 (11%)	221 (10%)
	45-54	369 (19%)	368 (19%)	367 (18%)	376 (19%)	404 (19%)
	55-64	538 (28%)	525 (27%)	535 (27%)	548 (27%)	575 (27%)
	65-74	493 (25%)	502 (26%)	527 (26%)	528 (26%)	538 (25%)
	75-84	171 (9%)	170 (9%)	192 (10%)	207 (10%)	243 (11%)
	85+	15 (1%)	17 (1%)	14 (1%)	15 (1%)	16 (1%)
	Total	**1939**	**1933**	**2002**	**2029**	**2150**

Patient Survival

Table 4.3 and figure 4.3 present unadjusted haemodialysis patient survival by era and country. The outcome is patient death, censored at transplantation and transfer to peritoneal dialysis for ≥30 days. Survival for all incident kidney replacement therapy (KRT) patients who were treated with haemodialysis at commencement is reported. Survival begins from the date of commencing KRT with haemodialysis.

Survival of people receiving dialysis differs substantially according to age, diabetes status and cardiovascular disease status (Tables 4.4 and 4.5) and data are presented this way to enable clinicians to estimate their patient's survival based on where they fit in this table. Survival by individual components of this table is presented in the Figures 4.4-4.7.

Table 4.3 Patient Survival by Era - Haemodialysis at KRT Start - Censored for Transplant and Transfer to PD: 2009-2020; % [95% Confidence Interval]

Country	Era	Number of Patients	Survival			
			6 months	1 year	3 years	5 years
Australia	2009-2011	5352	93 [92, 93]	88 [87, 88]	69 [67, 70]	53 [51, 54]
	2012-2014	5576	94 [93, 94]	88 [87, 89]	69 [68, 71]	50 [48, 51]
	2015-2017	6073	94 [93, 95]	89 [88, 90]	70 [69, 72]	52 [50, 54]
	2018-2020	6917	95 [94, 95]	90 [89, 90]	-	-
New Zealand	2009-2011	1016	95 [93, 96]	91 [89, 93]	72 [68, 75]	54 [50, 57]
	2012-2014	1043	93 [91, 95]	89 [87, 91]	71 [67, 74]	52 [48, 55]
	2015-2017	1040	93 [91, 95]	88 [86, 90]	72 [68, 75]	53 [48, 57]
	2018-2020	1143	94 [92, 95]	88 [86, 91]	-	-

Figure 4.3.1 - Patient Survival by Era - Haemodialysis at KRT Start - Australia 2009-2020 Censored for Transplant and Transfer to PD

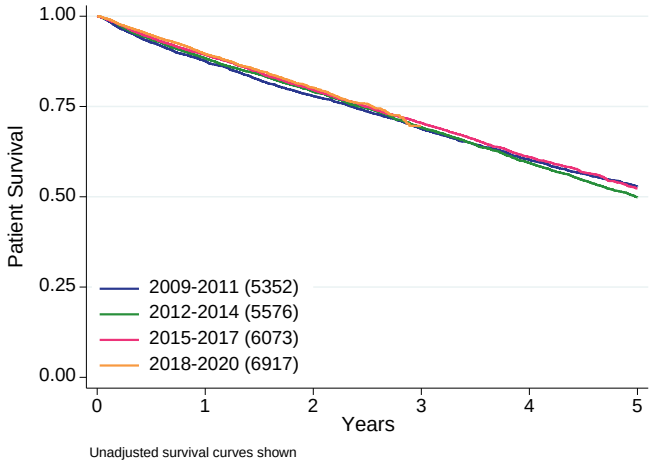


Figure 4.3.2 - Patient Survival by Era - Haemodialysis at KRT Start - New Zealand 2009-2020 Censored for Transplant and Transfer to PD

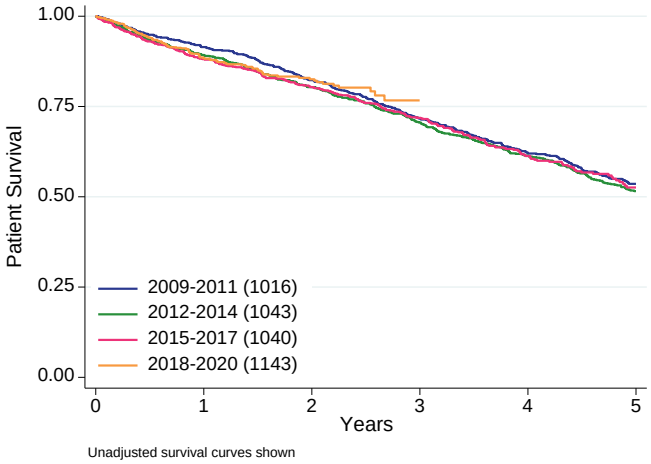


Table 4.4 Patient Survival by Age Group, Diabetes Status and Cardiovascular Disease Status - Haemodialysis at KRT Start - Censored for Transplant and Transfer to PD: Australia 2009-2020; % [95% Confidence Interval]

Age Group	Survival							
	DM-, CVD-		DM+, CVD-		DM-, CVD+		DM+, CVD+	
	1 year	5 years	1 year	5 years	1 year	5 years	1 year	5 years
<40 years	97 [96, 98]	90 [87, 93]	94 [91, 96]	69 [61, 75]	93 [86, 97]	66 [50, 78]	89 [84, 93]	56 [46, 64]
40-59 years	95 [94, 96]	76 [72, 79]	95 [93, 96]	69 [66, 72]	92 [90, 94]	62 [56, 67]	91 [90, 92]	56 [53, 59]
60-74 years	91 [89, 92]	62 [59, 65]	92 [90, 93]	58 [55, 62]	83 [81, 85]	47 [43, 50]	87 [86, 88]	44 [41, 46]
≥75 years	85 [83, 87]	42 [38, 46]	87 [84, 89]	40 [36, 45]	80 [77, 82]	33 [31, 36]	79 [77, 81]	28 [25, 30]

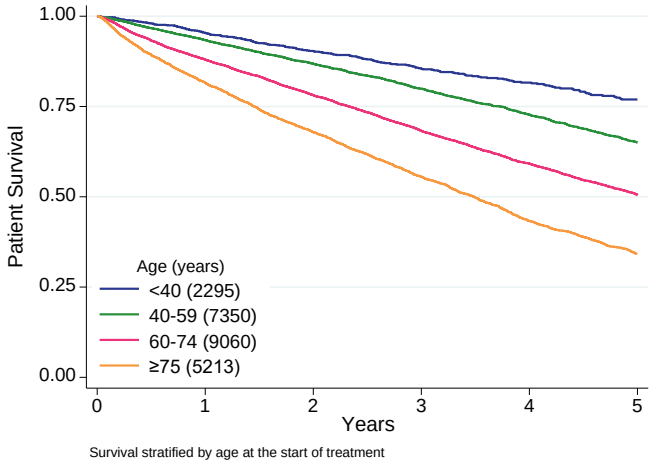
DM-, CVD- : No diabetes and no cardiovascular disease
DM+, CVD- : Diabetes but no cardiovascular disease
DM-, CVD+ : Cardiovascular disease but no diabetes
DM+, CVD+ : Both cardiovascular disease and diabetes

Table 4.5 Patient Survival by Age Group, Diabetes Status and Cardiovascular Disease Status - Haemodialysis at KRT Start - Censored for Transplant and Transfer to PD: New Zealand 2009-2020; % [95% Confidence Interval]

Age Group	Survival							
	DM-, CVD-		DM+, CVD-		DM-, CVD+		DM+, CVD+	
	1 year	5 years	1 year	5 years	1 year	5 years	1 year	5 years
<40 years	97 [94, 99]	91 [84, 95]	94 [87, 98]	70 [56, 81]	91 [69, 98]	71 [42, 87]	79 [58, 90]	40 [18, 61]
40-59 years	96 [93, 98]	71 [63, 78]	94 [92, 96]	70 [64, 75]	89 [82, 94]	56 [40, 70]	87 [84, 90]	47 [41, 53]
60-74 years	87 [81, 91]	53 [43, 61]	92 [89, 95]	54 [47, 60]	84 [78, 89]	40 [31, 49]	86 [83, 89]	39 [34, 45]
≥75 years	83 [72, 90]	11 [4, 23]	85 [73, 92]	25 [11, 41]	72 [61, 80]	23 [13, 35]	78 [69, 84]	24 [15, 34]

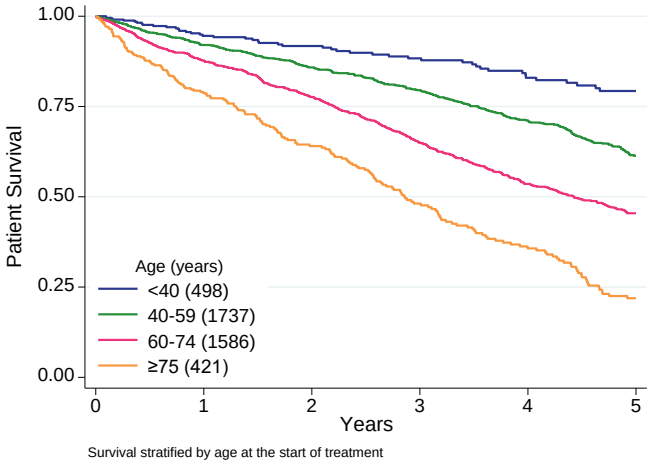
DM-, CVD- : No diabetes and no cardiovascular disease
DM+, CVD- : Diabetes but no cardiovascular disease
DM-, CVD+ : Cardiovascular disease but no diabetes
DM+, CVD+ : Both cardiovascular disease and diabetes

Figure 4.4.1 - Patient Survival by Age Group Haemodialysis at KRT Start - Australia 2009-2020 Censored for Transplant and Transfer to PD



Survival stratified by age at the start of treatment

Figure 4.4.2 - Patient Survival by Age Group Haemodialysis at KRT Start - New Zealand 2009-2020 Censored for Transplant and Transfer to PD



Survival stratified by age at the start of treatment

Figure 4.5.1 - Patient Survival by Diabetes Haemodialysis at KRT Start - Australia 2009-2020 Censored for Transplant and Transfer to PD

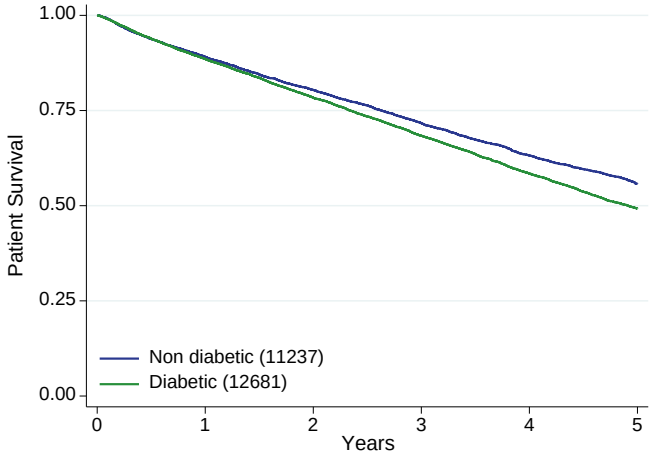


Figure 4.5.2 - Patient Survival by Diabetes Haemodialysis at KRT Start - New Zealand 2009-2020 Censored for Transplant and Transfer to PD

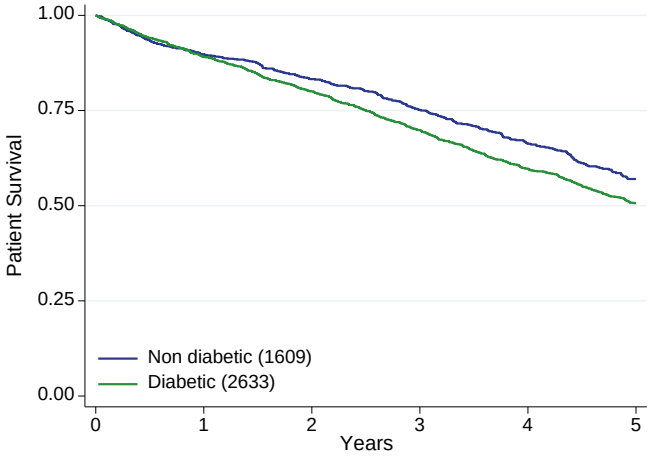
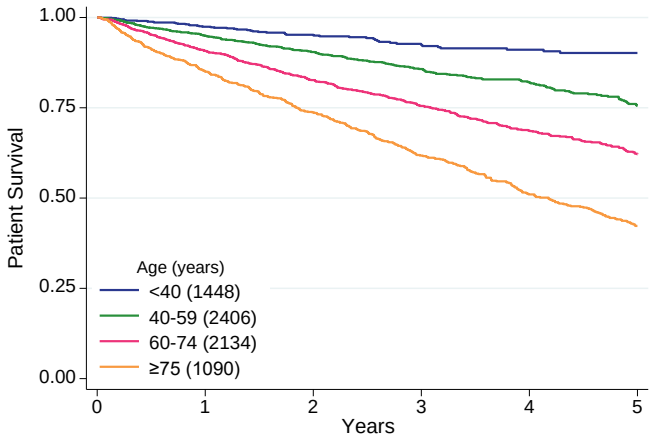
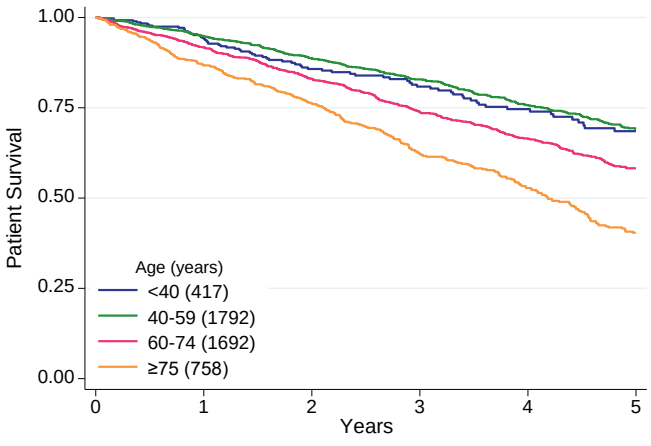


Figure 4.6.1 - Patient Survival by Age Group Haemodialysis at KRT Start - Australia 2009-2020 Censored for Transplant and Transfer to PD No Diabetes and No Cardiovascular Disease



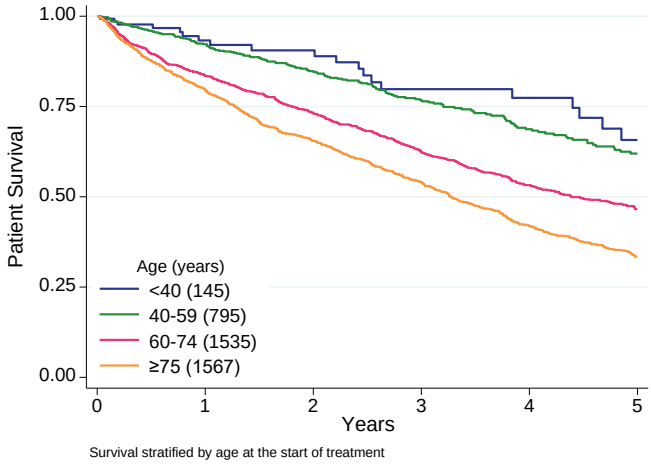
Survival stratified by age at the start of treatment

Figure 4.6.2 - Patient Survival by Age Group Haemodialysis at KRT Start - Australia 2009-2020 Censored for Transplant and Transfer to PD Diabetes but No Cardiovascular Disease



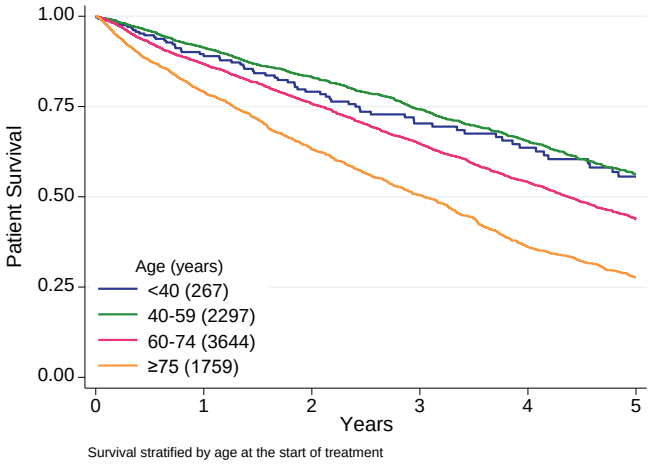
Survival stratified by age at the start of treatment

Figure 4.6.3 - Patient Survival by Age Group Haemodialysis at KRT Start - Australia 2009-2020 Censored for Transplant and Transfer to PD Cardiovascular Disease but No Diabetes



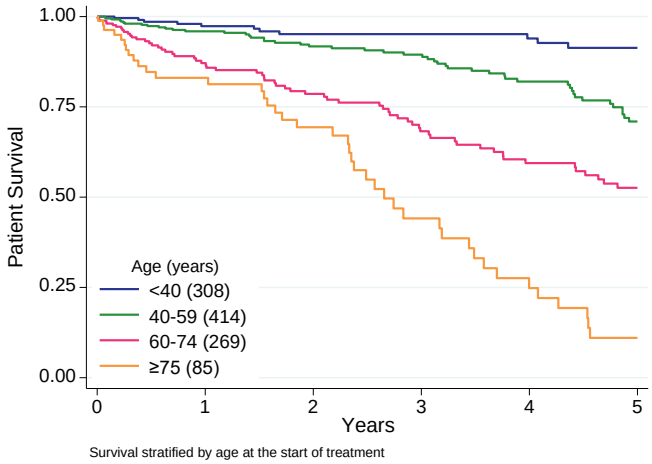
Survival stratified by age at the start of treatment

Figure 4.6.4 - Patient Survival by Age Group Haemodialysis at KRT Start - Australia 2009-2020 Censored for Transplant and Transfer to PD Both Diabetes and Cardiovascular Disease



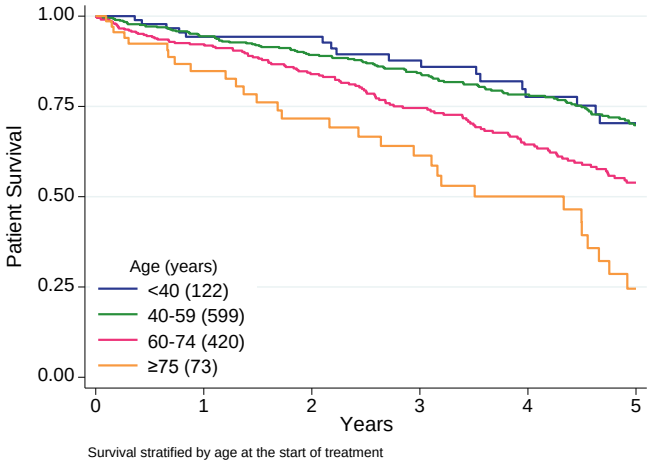
Survival stratified by age at the start of treatment

Figure 4.7.1 - Patient Survival by Age Group Haemodialysis at KRT Start - New Zealand 2009-2020 Censored for Transplant and Transfer to PD No Diabetes and No Cardiovascular Disease



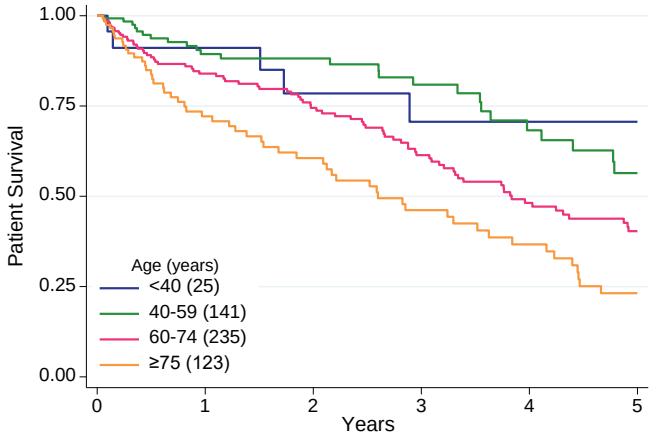
Survival stratified by age at the start of treatment

Figure 4.7.2 - Patient Survival by Age Group Haemodialysis at KRT Start - New Zealand 2009-2020 Censored for Transplant and Transfer to PD Diabetes but No Cardiovascular Disease



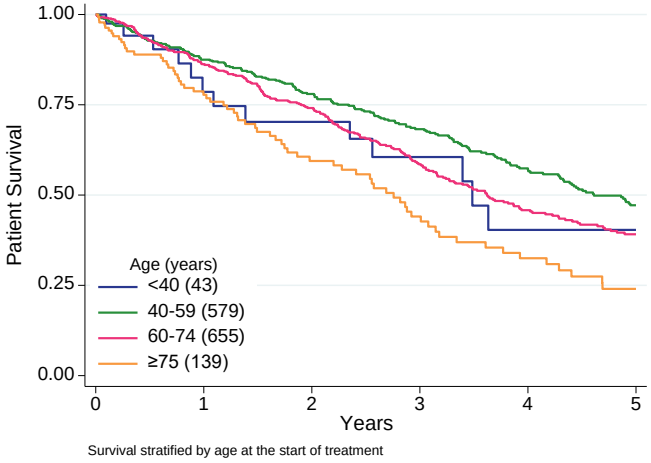
Survival stratified by age at the start of treatment

Figure 4.7.3 - Patient Survival by Age Group Haemodialysis at KRT Start - New Zealand 2009-2020 Censored for Transplant and Transfer to PD Cardiovascular Disease but No Diabetes



Survival stratified by age at the start of treatment

Figure 4.7.4 - Patient Survival by Age Group Haemodialysis at KRT Start - New Zealand 2009-2020 Censored for Transplant and Transfer to PD Both Diabetes and Cardiovascular Disease



Survival stratified by age at the start of treatment

Vascular Access

Incident Patients

Figures 4.8 to 4.11 and table 4.6 show data related to vascular access for incident haemodialysis patients.

ANZDATA does not collect information about indication for HD catheter usage, hence the reason that around half of non-late referred patients commenced with a central venous catheter is not known.

Figure 4.8 - Vascular Access - Initial KRT - Haemodialysis as Initial Modality

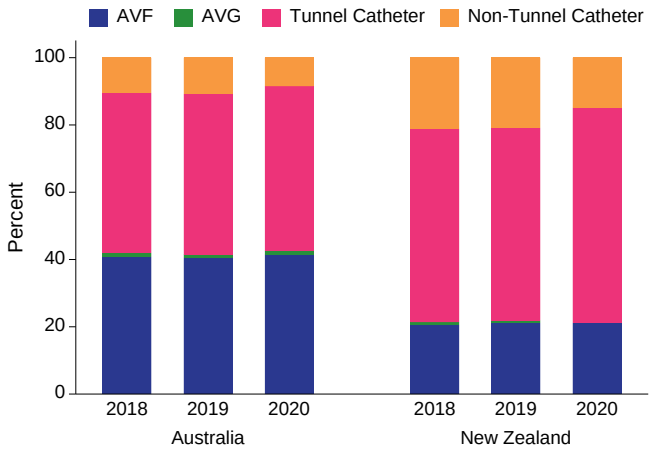


Figure 4.9 - Vascular Access - Initial KRT - By Age Group 2020

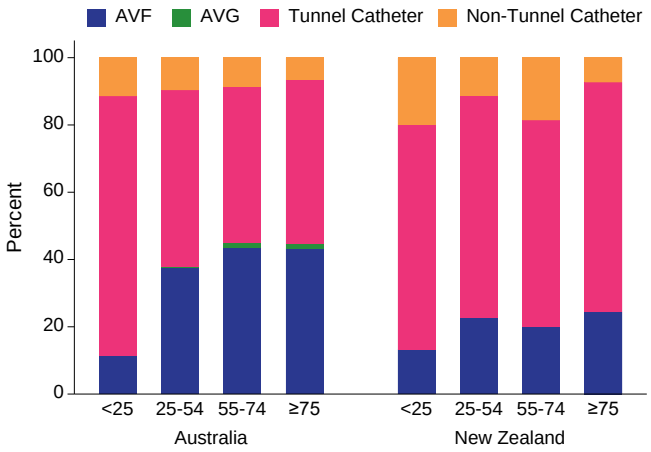


Figure 4.10.1 - Vascular Access - Initial KRT - By Gender – Australia

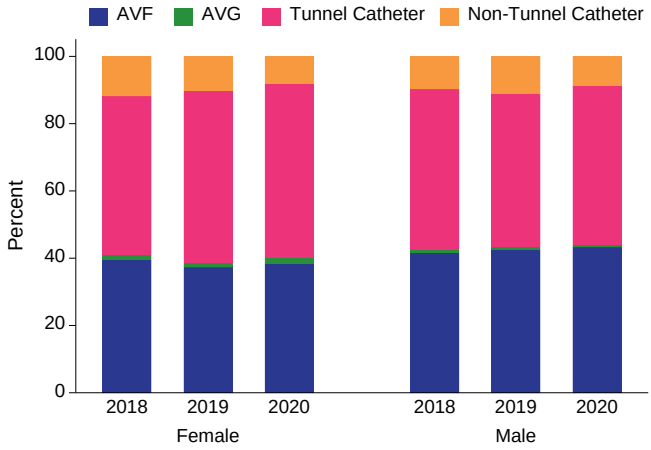


Figure 4.10.2 - Vascular Access - Initial KRT - By Gender - New Zealand

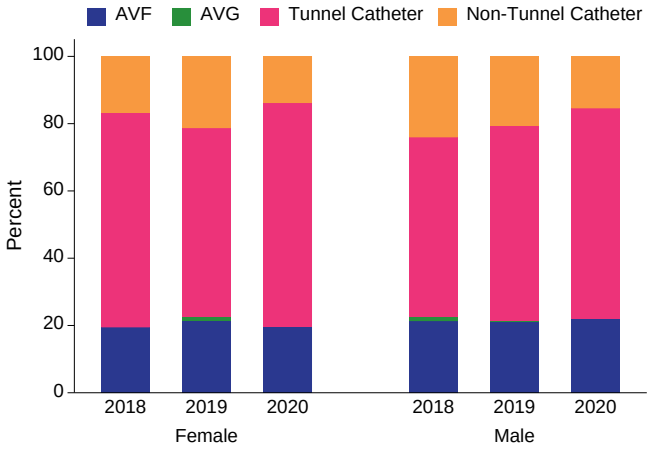


Figure 4.11.1 - Vascular Access - Initial KRT - By Referral Time - Australia

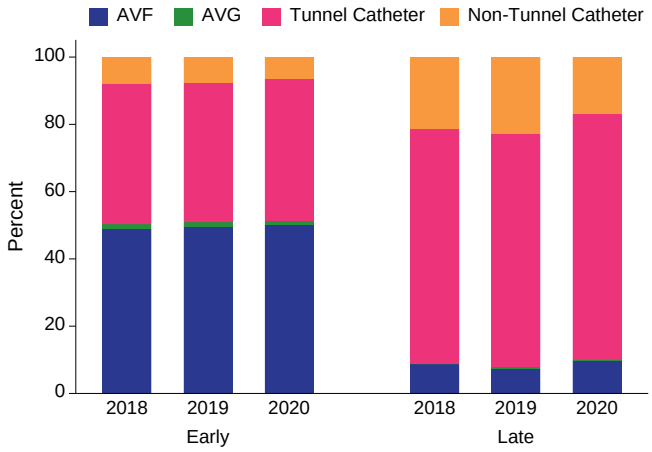


Figure 4.11.2 - Vascular Access - Initial KRT - By Referral Time - New Zealand

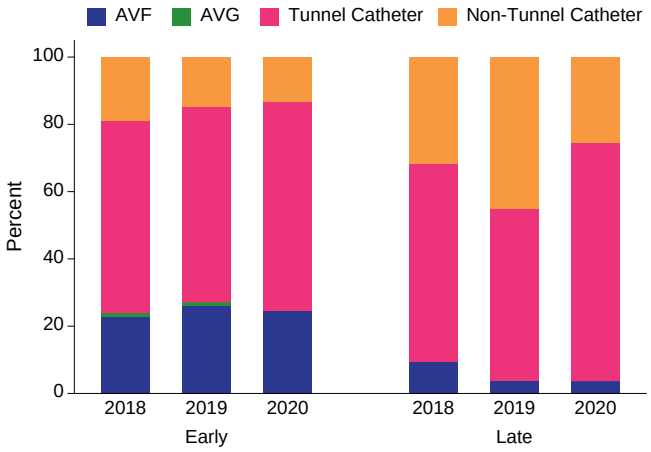


Table 4.6 Incident Vascular Access by Australian State/Territory and Country 2018-2020

State/Country	2018		2019		2020	
	AVF/AVG	CVC	AVF/AVG	CVC	AVF/AVG	CVC
QLD	211 (44%)	272 (56%)	213 (42%)	292 (58%)	205 (42%)	281 (58%)
NSW/ACT	263 (42%)	360 (58%)	309 (43%)	418 (57%)	288 (43%)	375 (57%)
VIC	235 (42%)	321 (58%)	203 (38%)	327 (62%)	259 (46%)	310 (54%)
TAS	11 (29%)	27 (71%)	24 (44%)	30 (56%)	10 (30%)	23 (70%)
SA	73 (47%)	81 (53%)	79 (47%)	88 (53%)	80 (49%)	83 (51%)
NT	42 (34%)	81 (66%)	48 (42%)	65 (58%)	31 (37%)	53 (63%)
WA	100 (40%)	149 (60%)	113 (40%)	168 (60%)	97 (35%)	182 (65%)
Australia	**935 (42%)**	**1291 (58%)**	**989 (42%)**	**1388 (58%)**	**970 (43%)**	**1307 (57%)**
New Zealand	**77 (21%)**	**283 (79%)**	**84 (22%)**	**299 (78%)**	**84 (21%)**	**312 (79%)**

Figure 4.12 shows the proportion of patients in each hospital starting haemodialysis as their first KRT with an AVF/AVG, arranged from the lowest to highest. In Australia, this ranged widely from 9-75%. The corresponding range in New Zealand was 9-45%. This wide variation reflects differences in practices, protocols, resources and patient case-mix among centres.

Figure 4.12.1 - % Initial KRT HD Patients Starting with AVF/AVG - Australia 2020

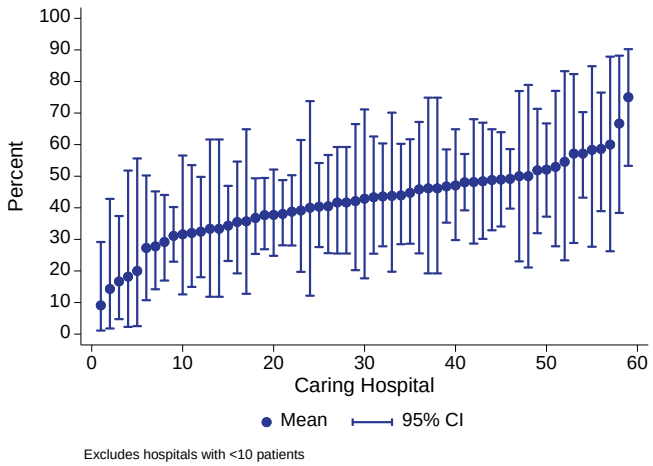
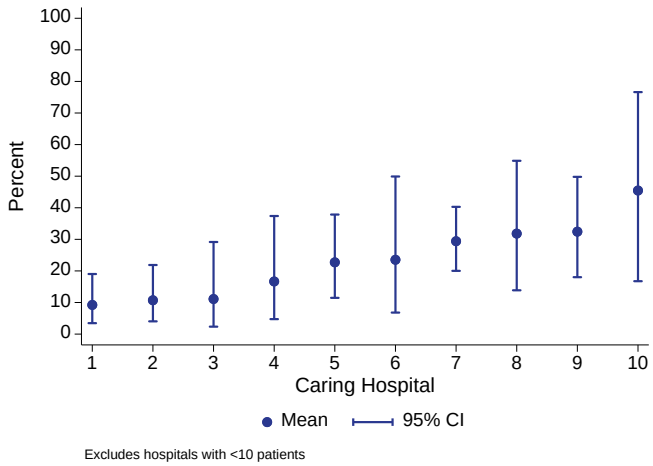


Figure 4.12.2 - % Initial KRT HD Patients Starting with AVF/AVG - New Zealand 2020



Prevalent Patients

Figures 4.13 to 4.16 and table 4.7 show dialysis access among prevalent (rather than incident) patients (those receiving haemodialysis at 31 December 2020).

Figure 4.13 - Prevalent Haemodialysis Access

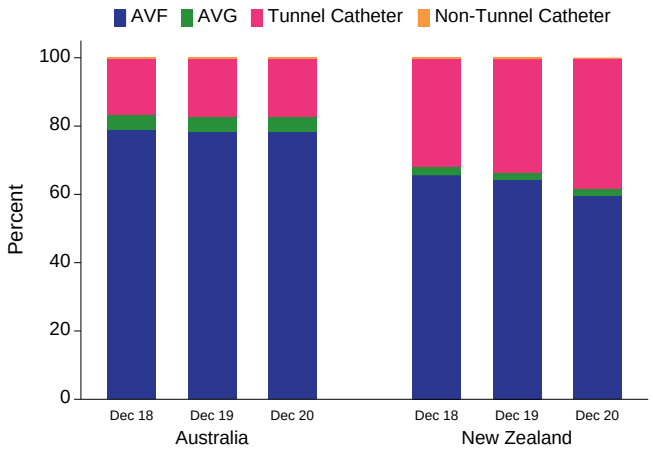


Figure 4.14 - Prevalent Haemodialysis Access - By Age Group 2020

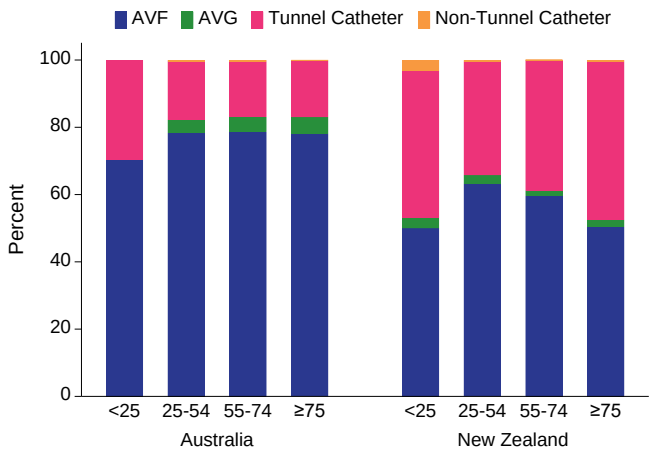


Figure 4.15.1 - Prevalent Haemodialysis Access - By Gender - Australia

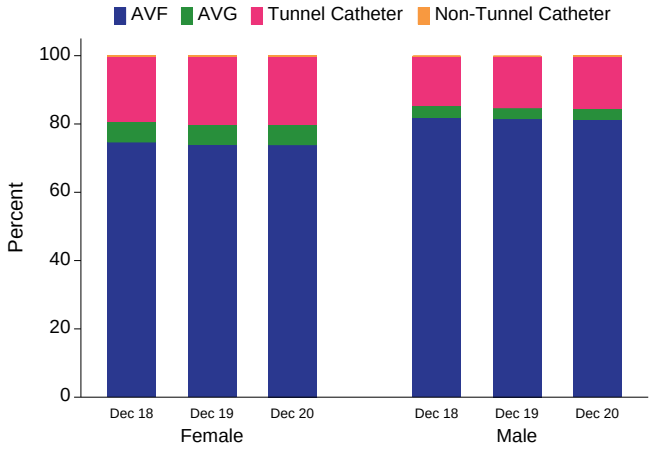


Figure 4.15.2 - Prevalent Haemodialysis Access - By Gender - New Zealand

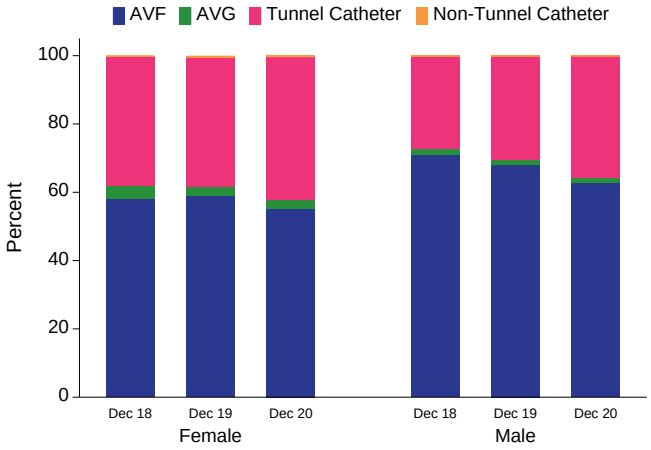


Figure 4.16 - Prevalent Haemodialysis Access - By Location 2020

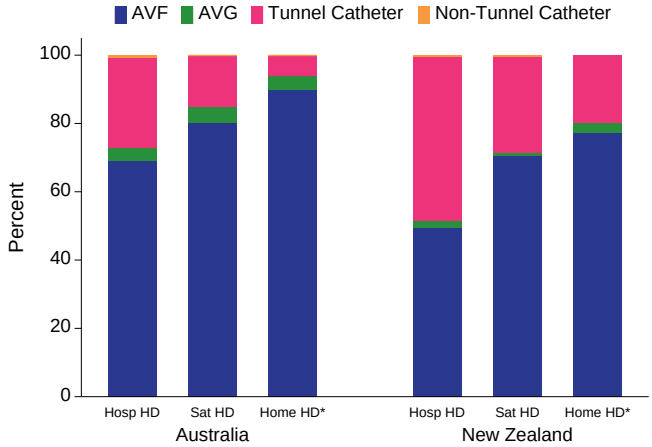
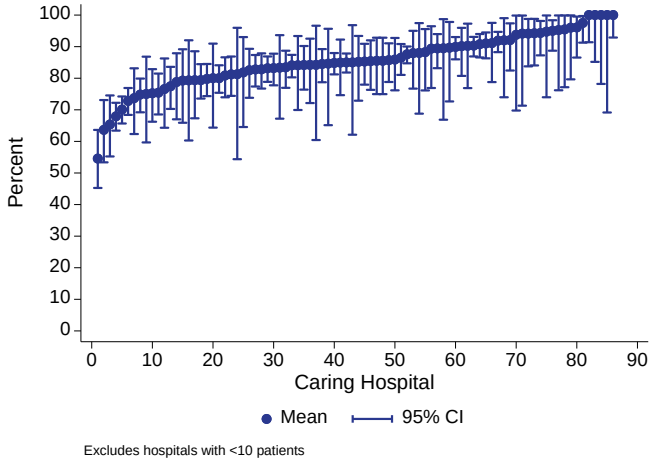


Table 4.7 Prevalent Vascular Access by Australian State/Territory and Country at 31 December 2020

State/Country	2018		2019		2020	
	AVF/AVG	CVC	AVF/AVG	CVC	AVF/AVG	CVC
QLD	1791 (84%)	353 (16%)	1911 (85%)	346 (15%)	1971 (85%)	358 (15%)
NSW/ACT	2715 (83%)	552 (17%)	2740 (80%)	666 (20%)	2888 (81%)	688 (19%)
VIC	2159 (84%)	415 (16%)	2139 (83%)	437 (17%)	2317 (83%)	464 (17%)
TAS	138 (75%)	45 (25%)	139 (72%)	55 (28%)	128 (74%)	46 (26%)
SA	688 (89%)	84 (11%)	695 (88%)	95 (12%)	728 (87%)	106 (13%)
NT	587 (88%)	81 (12%)	642 (91%)	65 (9%)	628 (91%)	62 (9%)
WA	883 (78%)	244 (22%)	914 (78%)	252 (22%)	974 (77%)	284 (23%)
Australia	**8961 (83%)**	**1774 (17%)**	**9180 (83%)**	**1916 (17%)**	**9634 (83%)**	**2008 (17%)**
New Zealand	**1331 (68%)**	**622 (32%)**	**1288 (66%)**	**655 (34%)**	**1271 (62%)**	**790 (38%)**

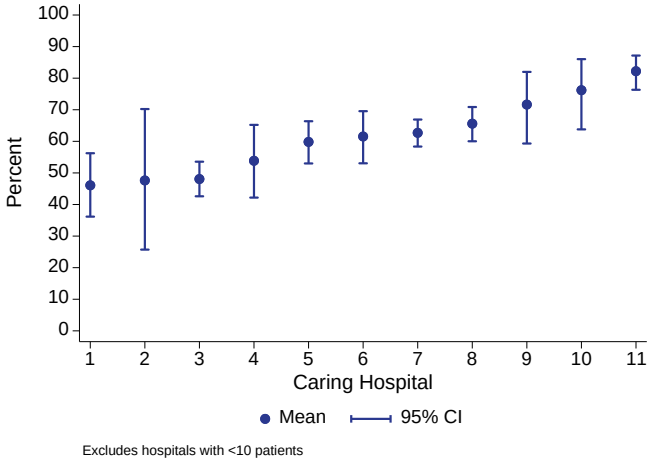
Figure 4.17 shows the proportion of haemodialysis patients at each hospital dialysing with an AVF/AVG on 31st December 2020, arranged from the lowest to highest. In Australia, these proportions varied widely from 55-100%. The corresponding range in New Zealand was 46-82%.

Figure 4.17.1 - % Prevalent HD Patients Dialysing with AVF/AVG - Australia 31 December 2020



Excludes hospitals with <10 patients

Figure 4.17.2 - % Prevalent HD Patients Dialysing with AVF/AVG - New Zealand 31 December 2020



Excludes hospitals with <10 patients

Dialysis Prescription

Hours, Sessions and Blood Flow

Table 4.8 Blood Flow Rate by Type of Access - December 2020

Blood Flow Rate	Australia				New Zealand			
	AVF	AVG	CVC	Total	AVF	AVG	CVC	Total
<200	31 (0.3%)	1 (0.2%)	29 (1.4%)	**61 (0.5%)**	2 (0.2%)	0 (0.0%)	3 (0.4%)	**5 (0.2%)**
200-249	138 (1.5%)	16 (3.1%)	85 (4.2%)	**239 (2.0%)**	34 (2.8%)	1 (2.4%)	30 (3.8%)	**65 (3.0%)**
250-299	1343 (14.7%)	88 (17.3%)	700 (34.9%)	**2135 (17.8%)**	174 (14.1%)	3 (7.3%)	240 (30.4%)	**419 (19.5%)**
300-349	6316 (69.2%)	353 (69.4%)	1156 (57.6%)	**7853 (65.4%)**	781 (63.5%)	36 (87.8%)	475 (60.1%)	**1294 (60.2%)**
350-399	1134 (12.4%)	47 (9.2%)	30 (1.5%)	**1212 (10.1%)**	214 (17.4%)	1 (2.4%)	38 (4.8%)	**253 (11.8%)**
400+	152 (1.7%)	3 (0.6%)	2 (0.1%)	**157 (1.3%)**	25 (2.0%)	0 (0.0%)	4 (0.5%)	**29 (1.3%)**
Total	**9125**	**509**	**2008**	**12010**	**1230**	**41**	**790**	**2150**

** CVV-HD Patients excluded from Total.*
*** Blood Flow Rate or Type of Access Not Reported for 386 Australian and 89 New Zealand patients.*

Figure 4.18.1 - Distribution of Blood Flow Rates - Prevalent Haemodialysis - Australia

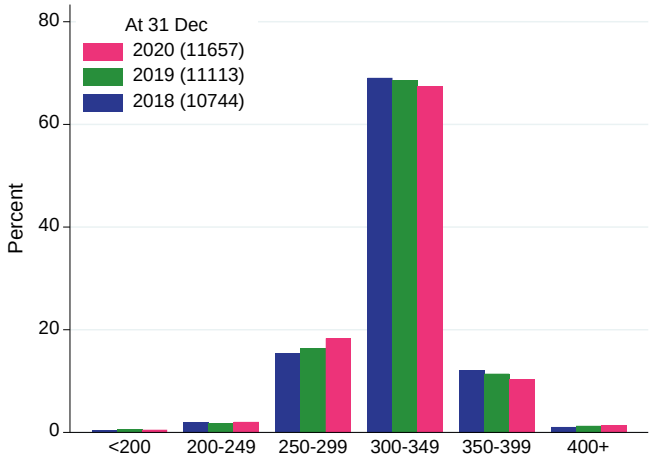


Figure 4.18.2 - Distribution of Blood Flow Rates - Prevalent Haemodialysis - New Zealand

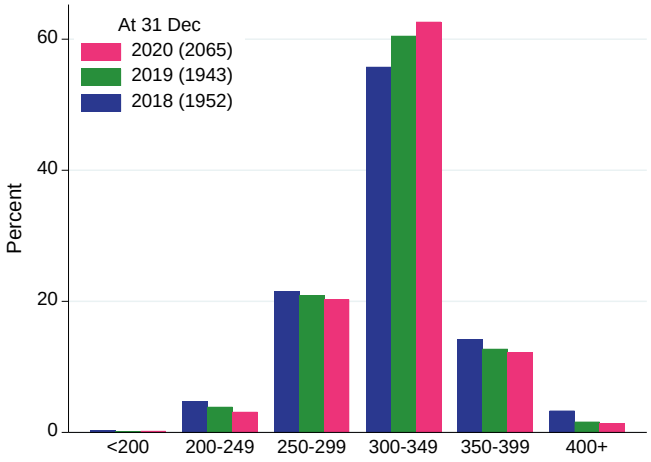


Table 4.9 shows the number of weekly sessions, and hours per session, at 31 December 2020. Figures 4.19 and 4.20 show HD frequency and session length respectively over 2018-2020. Figure 4.21 combines sessions and session length to show the total number of weekly hours of HD over 2018-2020.

Table 4.9 Duration and Number of Sessions per Week - December 2020

Country	Sessions per week	Hours of Each Treatment					
		<4	4	4.5	5	>5	Total
Australia	**<3**	93 (18.7%)	267 (53.6%)	76 (15.3%)	59 (11.8%)	3 (0.6%)	**498**
	3	461 (4.4%)	4564 (43.2%)	2370 (22.5%)	2764 (26.2%)	396 (3.8%)	**10555**
	3.1-4.9	37 (6.8%)	114 (21.1%)	46 (8.5%)	143 (26.4%)	201 (37.2%)	**541**
	5+	26 (34.7%)	13 (17.3%)	1 (1.3%)	7 (9.3%)	28 (37.3%)	**75**
	Total	**617 (5.3%)**	**4958 (42.5%)**	**2493 (21.4%)**	**2973 (25.5%)**	**628 (5.4%)**	**11669**
New Zealand	**<3**	10 (26.3%)	10 (26.3%)	5 (13.2%)	10 (26.3%)	3 (7.9%)	**38**
	3	22 (1.2%)	510 (28.1%)	524 (28.9%)	603 (33.2%)	155 (8.5%)	**1814**
	3.1-4.9	6 (3.0%)	43 (21.4%)	28 (13.9%)	73 (36.3%)	51 (25.4%)	**201**
	5+	6 (60.0%)	0 (0.0%)	0 (0.0%)	3 (30.0%)	1 (10.0%)	**10**
	Total	**44 (2.1%)**	**563 (27.3%)**	**557 (27.0%)**	**689 (33.4%)**	**210 (10.2%)**	**2063**

** Intermediate durations are rounded up, e.g. 4.25 is included in 4.5.*
*** Hours or number of sessions were not reported for 341 Australian and 87 New Zealand patients.*

Figure 4.19 - Haemodialysis Frequency Per Week - 2018-2020

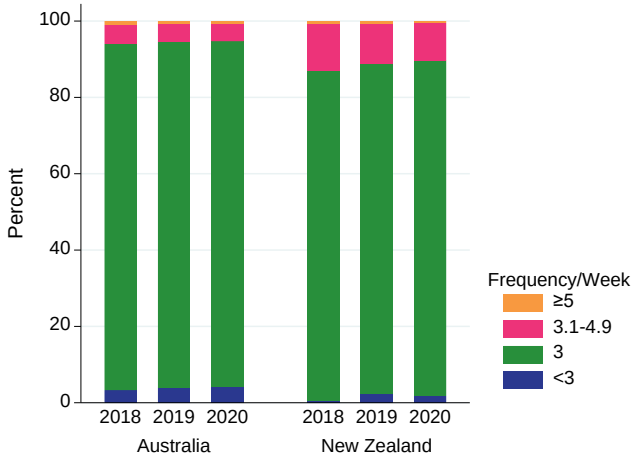


Figure 4.20 - Haemodialysis Session Length (Hours) - December 2018-2020

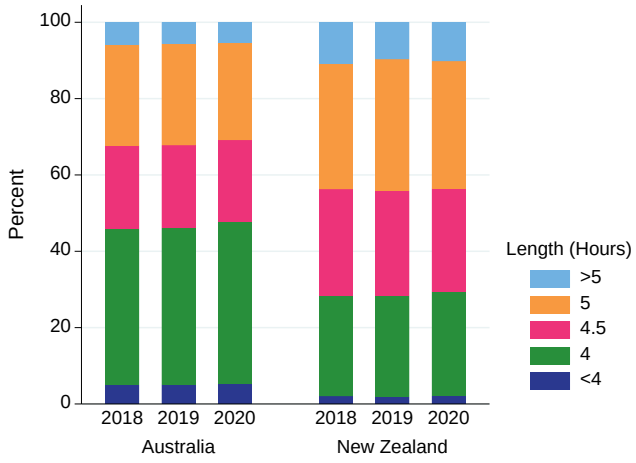
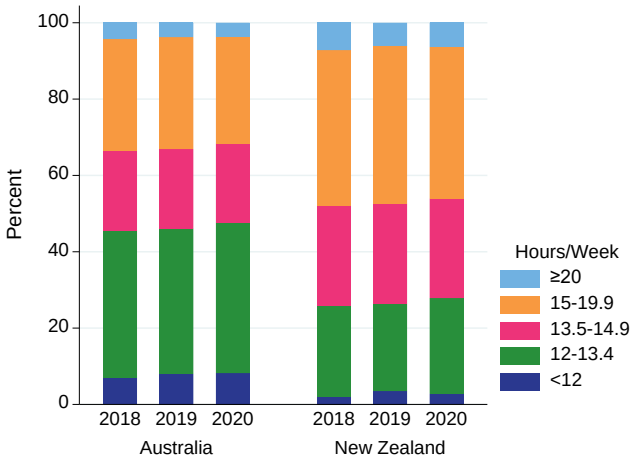


Figure 4.21 - Haemodialysis Duration (Hours Per Week) - December 2018-2020



Figures 4.22-4.24 show trends in dialysis prescription. Tables 4.10-4.12 present these same data for 2017-2020 by state and country.

Figure 4.22 - Percentage of HD Patients Dialysing More than 3 Days Per Week

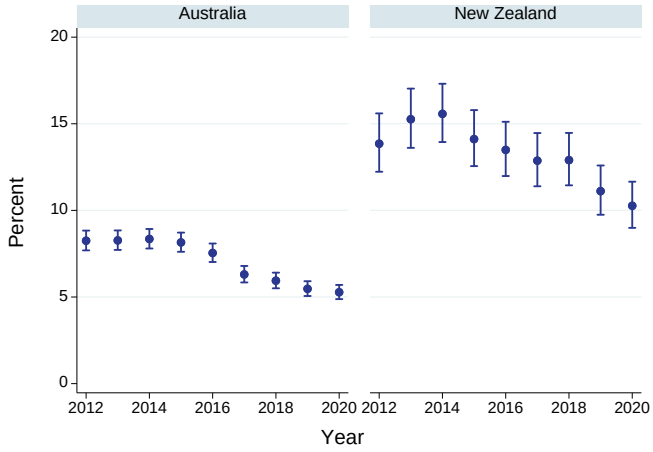


Figure 4.23 - Percentage of HD Patients Dialysing 3 Days Per Week Dialysing 5 Hours or Longer Per Session

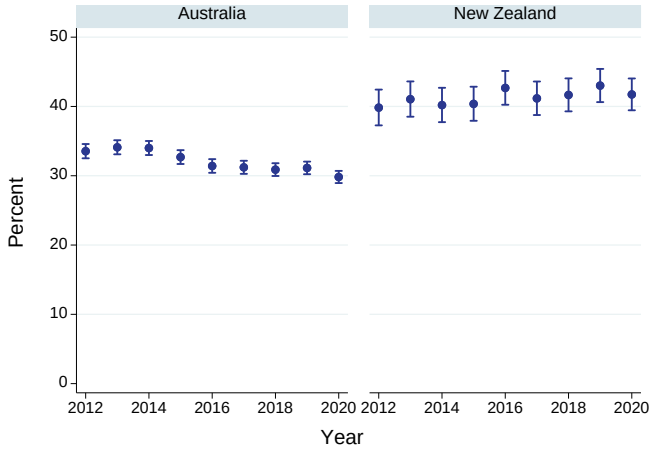


Figure 4.24 - Percentage of HD Patients Dialysing >15 Hours Per Week

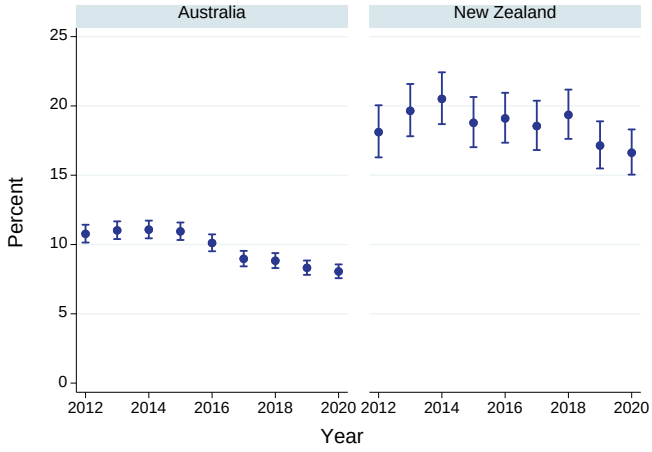


Table 4.10 Haemodialysis >3 Sessions per Week by Australian State/Territory and Country 2017-2020

State	2017	2018	2019	2020
QLD	141 (7.1%)	159 (7.4%)	139 (6.2%)	113 (4.8%)
NSW/ACT	189 (5.9%)	178 (5.4%)	179 (5.2%)	181 (5.1%)
VIC	195 (8.0%)	177 (6.9%)	159 (6.2%)	190 (6.8%)
TAS	14 (8.0%)	15 (8.2%)	12 (6.2%)	16 (9.2%)
SA	23 (3.1%)	28 (3.6%)	32 (4.1%)	24 (2.9%)
NT	9 (1.4%)	7 (1.0%)	7 (1.0%)	5 (0.7%)
WA	75 (7.0%)	75 (6.6%)	81 (6.9%)	87 (6.9%)
Australia	**646 (6.3%)**	**639 (5.9%)**	**609 (5.5%)**	**616 (5.3%)**
New Zealand	**243 (12.9%)**	**252 (12.9%)**	**216 (11.1%)**	**212 (10.3%)**

Table 4.11 Haemodialysis ≥5 Hours per Session - Three Sessions per Week by Australian State/Territory and Country 2017-2020

State	2017	2018	2019	2020
QLD	576 (32.4%)	531 (28.4%)	568 (28.9%)	566 (27.7%)
NSW/ACT	1351 (47.0%)	1423 (48.3%)	1467 (47.7%)	1492 (46.4%)
VIC	635 (28.5%)	690 (29.4%)	704 (29.9%)	711 (28.1%)
TAS	21 (13.2%)	23 (14.0%)	31 (17.2%)	22 (14.2%)
SA	78 (11.0%)	76 (10.3%)	71 (9.6%)	70 (8.8%)
NT	192 (30.6%)	201 (30.2%)	220 (31.4%)	212 (31.2%)
WA	63 (6.5%)	69 (6.7%)	73 (6.9%)	74 (6.5%)
Australia	**2916 (31.2%)**	**3013 (30.9%)**	**3134 (31.1%)**	**3147 (29.8%)**
New Zealand	**671 (41.2%)**	**704 (41.7%)**	**723 (43.0%)**	**757 (41.7%)**

Table 4.12 Haemodialysis >15 Hours per Week by Australian State/Territory and Country 2017-2020

State	2017	2018	2019	2020
QLD	183 (9.2%)	197 (9.2%)	182 (8.1%)	156 (6.7%)
NSW/ACT	392 (12.3%)	402 (12.3%)	395 (11.5%)	414 (11.6%)
VIC	215 (8.8%)	220 (8.5%)	209 (8.1%)	233 (8.4%)
TAS	15 (8.5%)	15 (8.2%)	15 (7.7%)	18 (10.3%)
SA	28 (3.8%)	33 (4.3%)	32 (4.1%)	33 (4.0%)
NT	18 (2.8%)	20 (3.0%)	24 (3.4%)	15 (2.2%)
WA	68 (6.3%)	62 (5.5%)	68 (5.8%)	71 (5.6%)
Australia	**919 (9.0%)**	**949 (8.8%)**	**925 (8.3%)**	**940 (8.1%)**
New Zealand	**350 (18.5%)**	**378 (19.4%)**	**333 (17.1%)**	**343 (16.6%)**

Haemodialysis and Haemodiafiltration

Figure 4.25 shows the change in percentage of haemodialysis patients treated with haemodiafiltration over time for Australia and New Zealand. Table 4.13 shows the use of high-flux dialysis and haemodiafiltration by state/territory and country in 2020. [HD WG has requested the text size of the three subgroups of standard HD be smaller (or the rest bigger) in this table.]

Figure 4.25 - Use of Haemodiafiltration - Prevalent Haemodialysis Patients 2011-2020

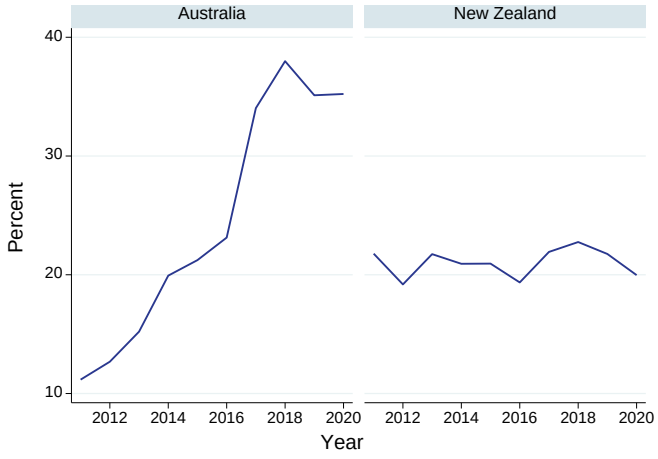


Table 4.13 Number of Patients Receiving Standard Haemodialysis (and Membrane Type), Haemofiltration and Haemodiafiltration - December 2020

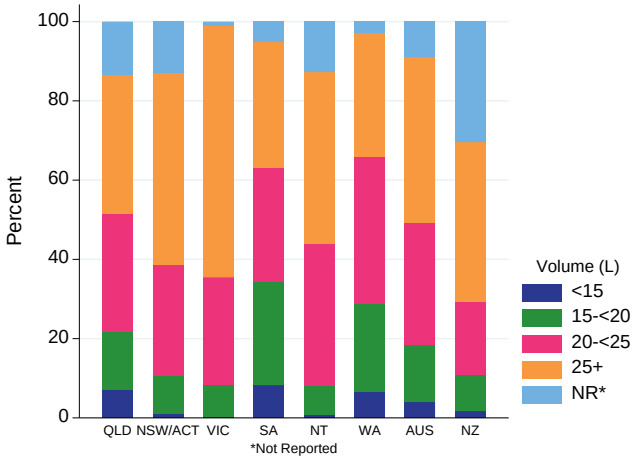
HD Modality	QLD	NSW/ACT	VIC	TAS	SA	NT	WA	Australia	New Zealand
Haemodialysis	1250 (53.3%)	2466 (68.7%)	2281 (81.5%)	174 (100.0%)	543 (65.1%)	430 (62.4%)	405 (33.0%)	**7549 (64.8%)**	**1647 (80.0%)**
High Flux	1201	2427	2071	150	542	430	286	**7107**	**1389**
Non-High Flux	47	34	196	24	1	0	118	**420**	**254**
Unreported	2	5	14	0	0	0	1	**22**	**4**
Haemofiltration	2 (0.1%)	3 (0.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	**5 (0.0%)**	**0 (0.0%)**
Haemodiafiltration	1092 (46.6%)	1118 (31.2%)	519 (18.5%)	0 (0.0%)	291 (34.9%)	259 (37.6%)	821 (67.0%)	**4100 (35.2%)**	**411 (20.0%)**
Total	**2344**	**3587**	**2800**	**174**	**834**	**689**	**1226**	**11654**	**2058**

In the 2017 survey, the mode of delivery of substitution fluid for haemodiafiltration was recorded for the first time (table 4.14). In Australia and New Zealand, the predominant mode of delivery of substitution fluid for HDF was post-dilution.

Table 4.14 Mode of delivery of substitution fluid in patients using haemodiafiltration - December 2020

Country	HDF Type	2017	2018	2019	2020
Australia	**Predilution**	198 (6%)	231 (6%)	266 (7%)	299 (7%)
	Mixed Dilution	62 (2%)	156 (4%)	67 (2%)	60 (1%)
	Postdilution	3180 (92%)	3680 (90%)	3583 (91%)	3741 (91%)
	Not Reported	24 (1%)	0 (0%)	0 (0%)	0 (0%)
	Total	**3464**	**4067**	**3916**	**4100**
New Zealand	**Predilution**	148 (36%)	167 (38%)	89 (21%)	98 (24%)
	Mixed Dilution	2 (0%)	0 (0%)	0 (0%)	0 (0%)
	Postdilution	265 (64%)	277 (62%)	336 (79%)	313 (76%)
	Not Reported	1 (0%)	0 (0%)	0 (0%)	0 (0%)
	Total	**416**	**444**	**425**	**411**

Figure 4.26 - HDF Substitution Volume by State/Territory and Country - at 31 Dec 2020



Place of Dialysis and Self-care

Community house haemodialysis has been collected as a 'sub-modality' of haemodialysis since 2020. Community house haemodialysis enables patients/carers to undertake haemodialysis, independent of nursing or medical supervision, in a shared house or community facility.

Table 4.15 Prevalent Haemodialysis Patients by Method and Location 2016-2020

Country	Modality	2016	2017	2018	2019	2020
Australia	**Hospital**	2754 (27%)	2794 (26%)	2937 (26%)	2998 (26%)	3028 (25%)
	Satellite	6476 (62%)	6839 (64%)	7093 (64%)	7498 (65%)	7849 (65%)
	Home	1134 (11%)	1049 (10%)	1060 (10%)	1074 (9%)	1108 (9%)
	Community House	0 (0%)	0 (0%)	0 (0%)	0 (0%)	25 (0%)
	Total	**10364**	**10682**	**11090**	**11570**	**12010**
New Zealand	**Hospital**	1019 (53%)	1019 (53%)	1075 (54%)	1126 (55%)	1231 (57%)
	Satellite	450 (23%)	472 (24%)	502 (25%)	494 (24%)	531 (25%)
	Home	470 (24%)	442 (23%)	425 (21%)	409 (20%)	355 (17%)
	Community House	0 (0%)	0 (0%)	0 (0%)	0 (0%)	33 (2%)
	Total	**1939**	**1933**	**2002**	**2029**	**2150**

Self-care is defined as dialysis performed by the patient with minimal assistance from a health care professional. Self-care enables patients to perform dialysis procedures independent of nursing or medical assistance in any type of facility or community setting.

Table 4.16 Haemodialysis Patients by Self-care 2020

Country	Modality	Self Care	Not Self Care	Not Reported	Total
Australia	Hospital	442 (15%)	2431 (80%)	155 (5%)	3028
	Satellite	1377 (18%)	6213 (79%)	259 (3%)	7849
	Home	946 (85%)	144 (13%)	18 (2%)	1108
	Community House	5 (20%)	16 (64%)	4 (16%)	25
	Total	**2770 (23%)**	**8804 (73%)**	**436 (4%)**	**12010**
New Zealand	Hospital	74 (6%)	1080 (88%)	77 (6%)	1231
	Satellite	123 (23%)	386 (73%)	22 (4%)	531
	Home	304 (86%)	31 (9%)	20 (6%)	355
	Community House	32 (97%)	1 (3%)	0 (0%)	33
	Total	**533 (25%)**	**1498 (70%)**	**119 (6%)**	**2150**

Home Haemodialysis

Prevalence

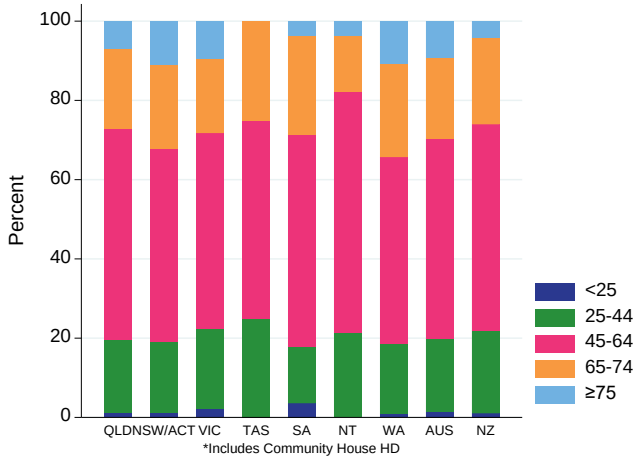
The distribution of prevalent home haemodialysis patients (including community house haemodialysis patients) by state is shown in table 4.17. The 2020 data are further stratified by age in figure 4.27.

Table 4.17 Number (%) of Prevalent Haemodialysis Patients Treated with Home Haemodialysis* 2016 - 2020

State	2016	2017	2018	2019	2020
QLD	266 (13.3%)	249 (11.9%)	264 (11.9%)	257 (11.1%)	244 (9.9%)
NSW/ACT	476 (14.4%)	434 (13.1%)	446 (13.2%)	450 (12.7%)	472 (12.9%)
VIC	204 (8.3%)	195 (7.7%)	179 (6.8%)	186 (6.8%)	223 (7.8%)
TAS	21 (11.7%)	11 (6.3%)	12 (6.6%)	11 (5.7%)	8 (4.6%)
SA	30 (4.4%)	28 (3.7%)	34 (4.4%)	36 (4.5%)	28 (3.4%)
NT	40 (6.5%)	39 (5.9%)	34 (4.9%)	38 (5.2%)	56 (7.8%)
WA	97 (8.6%)	93 (8.0%)	91 (7.6%)	96 (7.6%)	102 (7.8%)
Australia	**1134 (10.9%)**	**1049 (9.8%)**	**1060 (9.6%)**	**1074 (9.3%)**	**1133 (9.4%)**
New Zealand	**470 (24.2%)**	**442 (22.9%)**	**425 (21.2%)**	**409 (20.2%)**	**388 (18.0%)**

*Includes Community House HD

Figure 4.27 - Age Distribution of Home HD* Patients by State/Territory and Country - at 31 Dec 2020



The trends in the proportion treated with home HD in different age groups are illustrated in figure 4.28.

Figure 4.28.1 - Home HD* Percent of all HD by Age at 31 Dec 2020 – Australia

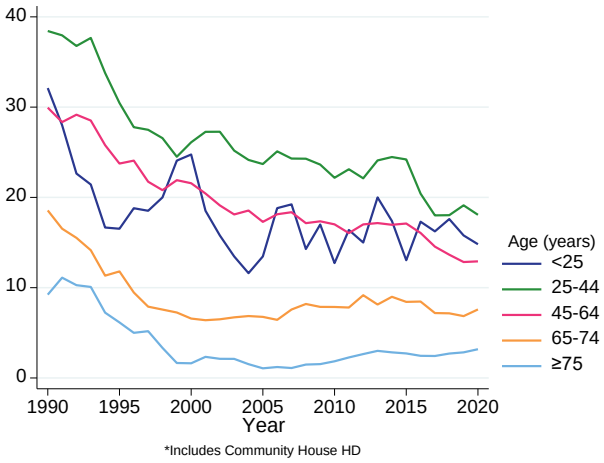
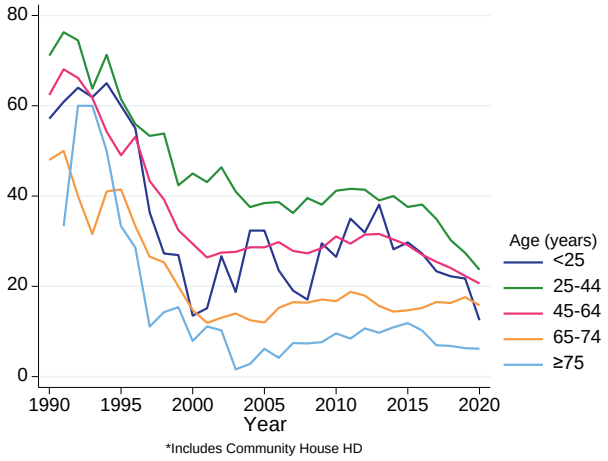


Figure 4.28.2 - Home HD* Percent of all HD by Age at 31 Dec 2020 - New Zealand



There is substantial variation between hospitals, and between countries, in the proportion of haemodialysis patients who dialyse at home (figure 4.29).

Figure 4.29.1 - % Haemodialysis Patients on Home HD* - Australia 31 December 2020

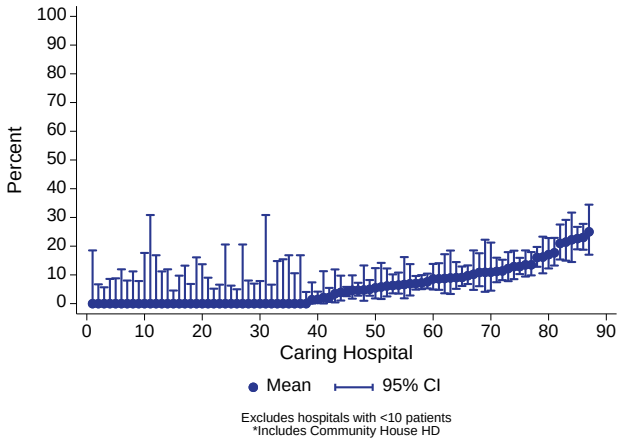
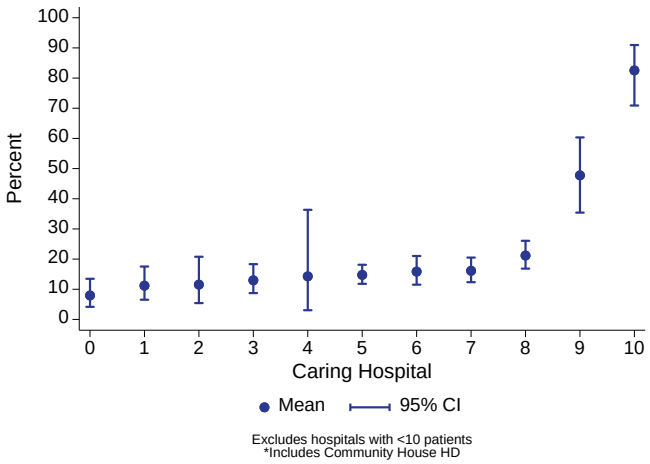


Figure 4.29.2 - % Haemodialysis Patients on Home HD* - New Zealand 31 December 2020



Home Haemodialysis Survival and Treatment Failure

Home Haemodialysis treatment failure refers to cessation of Home Haemodialysis (including Community House Haemodialysis) to have haemodialysis in satellite or hospital for more than 30 days, to do peritoneal dialysis for more than 30 days, or due to death of the patient. Receipt of a kidney transplant is not a 'treatment failure' and so follow-up is censored at transplantation, or 31 Dec 2020. Only patients initiating home haemodialysis within the first 365 days of KRT commencement are included. When death of a patient is counted as a censoring event (rather than 'failure'), the differences between the age groups become less apparent (figure 4.32).

Figure 4.30 - Treatment Survival - Home Haemodialysis* 2010 - 2020

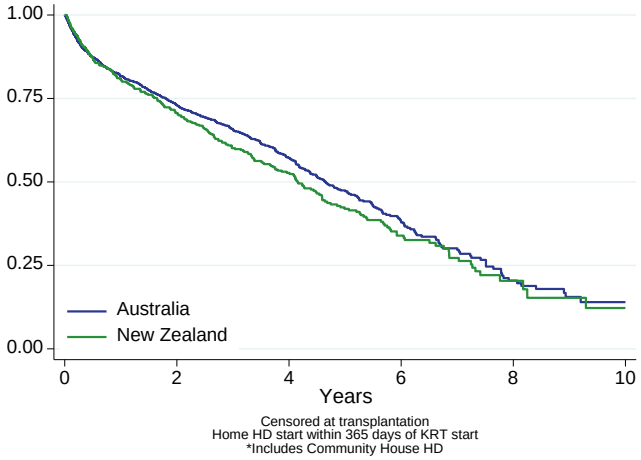


Figure 4.31 - Treatment Survival by Age Group - Home Haemodialysis* 2010 - 2020

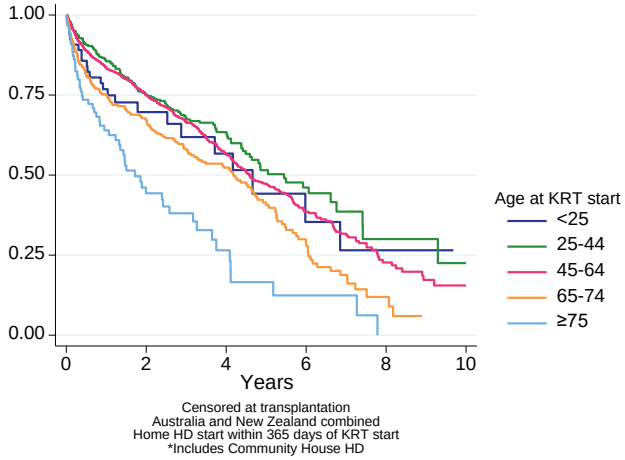
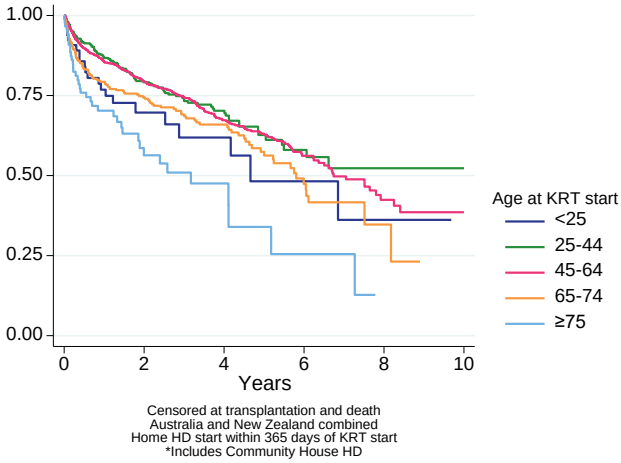


Figure 4.32 - Death-Censored Treatment Survival by Age Group - Home Haemodialysis 2010 – 2020

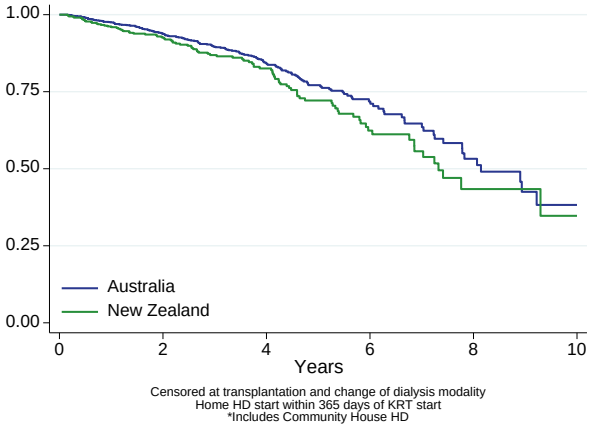


The modality or status following Home Haemodialysis treatment failure or censoring for 2010 - 2020 are shown in table 4.18.

Table 4.18 Reason for Home Haemodialysis Treatment Failure 2020

Modality or Status Following Treatment Failure	Australia	New Zealand
Other HD >= 30 days	433 (25%)	165 (29%)
PD >= 30 days	28 (2%)	14 (2%)
Transplant	546 (32%)	121 (21%)
Lost to Follow Up	3 (0%)	0 (0%)
Renal Recovery	13 (1%)	5 (1%)
End of follow-up	525 (30%)	174 (30%)
Death	169 (10%)	91 (16%)
Withdrawal	5 (0%)	2 (0%)
Total	**1722**	**572**

Figure 4.33 - Patient Survival - Home Haemodialysis* 2010 – 2020



Home Haemodialysis Prescription

The following figures explore trends in home haemodialysis prescriptions.

Figure 4.34 - Home Haemodialysis* Frequency Per Week - 2018-2020

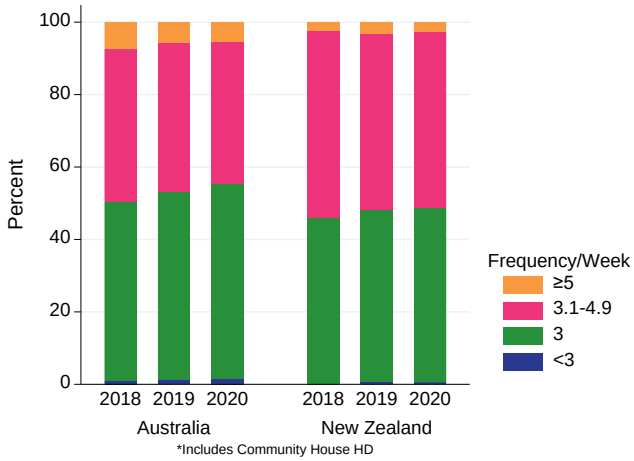


Figure 4.35 - Home Haemodialysis* Session Length (Hours) - December 2018-2020

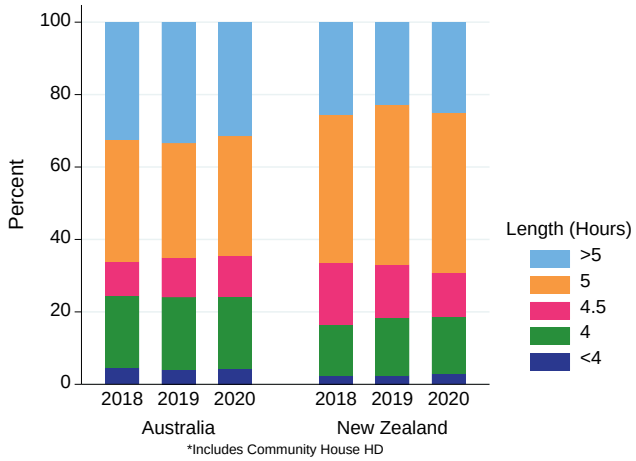


Figure 4.36 - Home Haemodialysis* Duration (Hours Per Week) - December 2018-2020

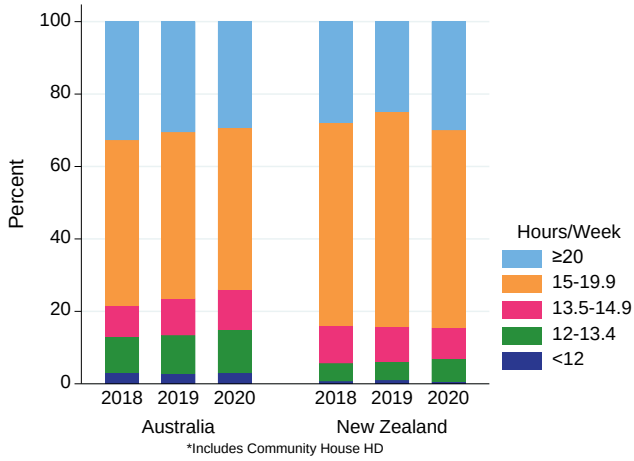


Figure 4.37 - Percentage of Home HD* Patients Dialysing More than 3 Days Per Week

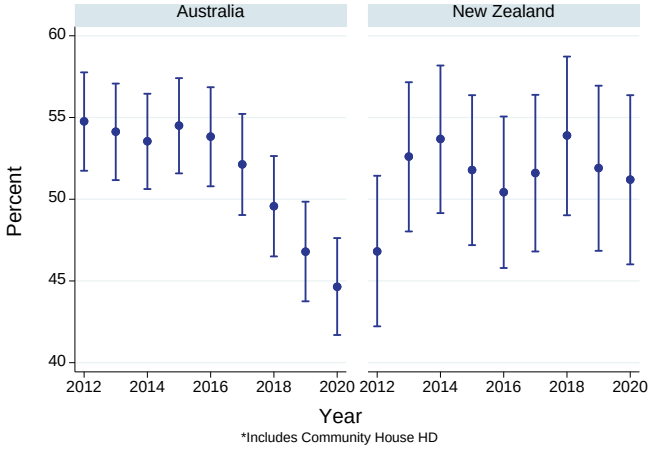


Figure 4.38 - Percentage of Home HD* Patients Dialysing 3 Days Per Week Dialysing 5 Hours or Longer Per Session

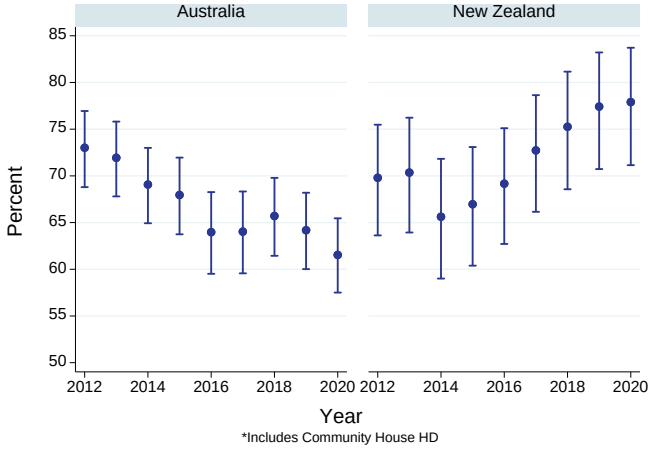
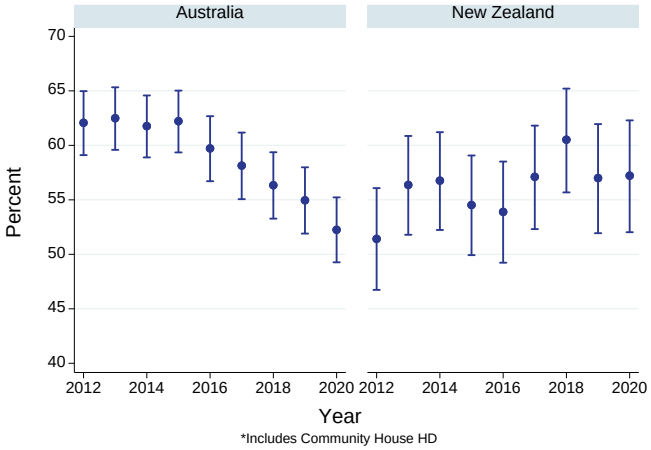


Figure 4.39 - Percentage of Home HD* Patients Dialysing >15 Hours Per Week



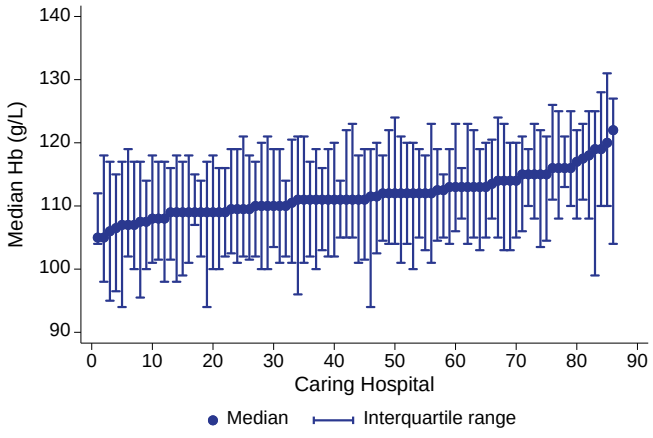
*Includes Community House HD

Laboratory Based Data at the time of the Annual Survey

Anaemia Management

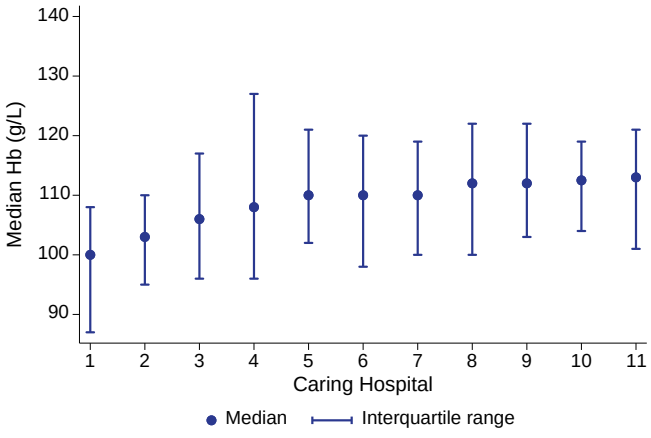
The median haemoglobin at 31 Dec 2020 of haemodialysis patients at each centre ranged from 105 to 122g/L in Australia and 100 to 113g/L in New Zealand (Figure 4.40). 78% of patients in Australia, and 79% in New Zealand were prescribed an erythropoiesis stimulating agent (ESA) at the time of the annual survey.

Figure 4.40.1 - Haemoglobin in Haemodialysis Patients - Australia 31 December 2020



Excludes hospitals with <10 patients

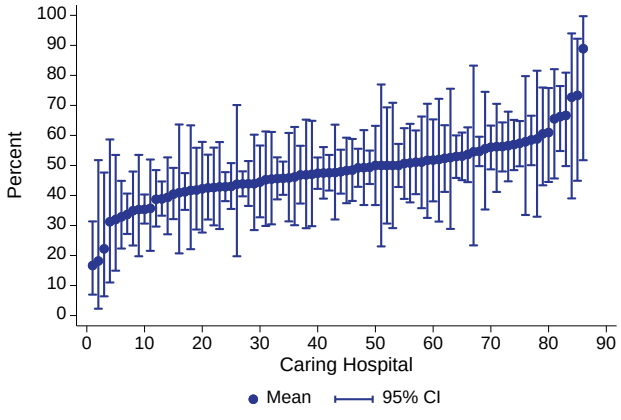
Figure 4.40.2 - Haemoglobin in Haemodialysis Patients - New Zealand 31 December 2020



Excludes hospitals with <10 patients

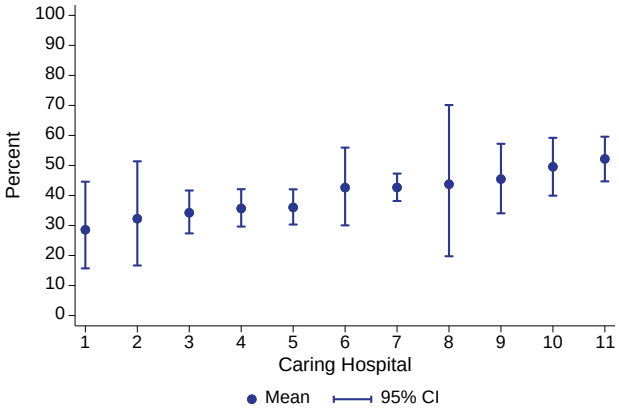
The proportion of patients on haemodialysis prescribed an ESA whose haemoglobin was between 110-115g/L ranged from 9-74% in Australia and 6-53% in New Zealand (Figure 4.41).

Figure 4.41.1 - % Haemodialysis Patients receiving an ESA with Hb 100-115 g/L - Australia 31 December 2020



Excludes hospitals with <10 patients

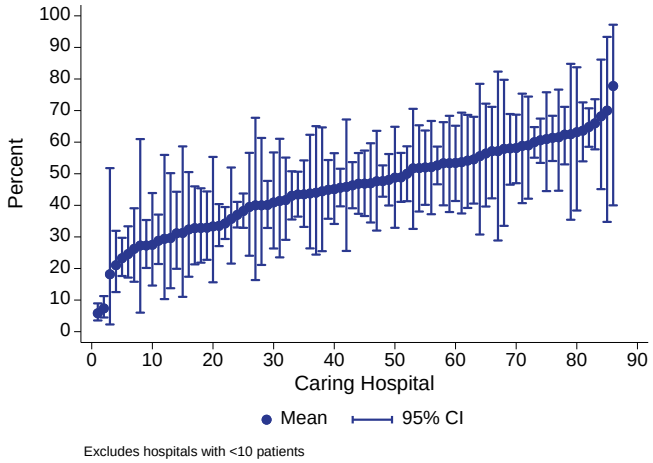
Figure 4.41.2 - % Haemodialysis Patients receiving an ESA with Hb 100-115 g/L - New Zealand 31 December 2020



Excludes hospitals with <10 patients

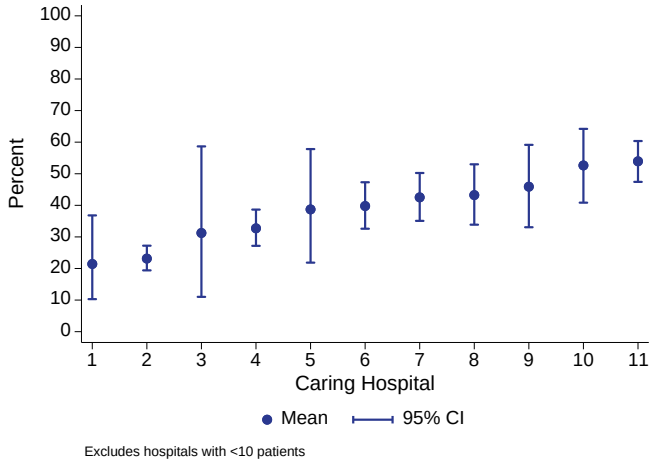
The proportion of patients receiving an ESA considered iron replete (ferritin between 200-500µg/L) ranged from 6-78% in Australia and 21-54% in New Zealand (figure 4.42). Figure 4.43 presents equivalent data for transferrin saturation.

Figure 4.42.1 - % Haemodialysis Patients receiving an ESA with Ferritin 200-500 µg/L - Australia 31 December 2020



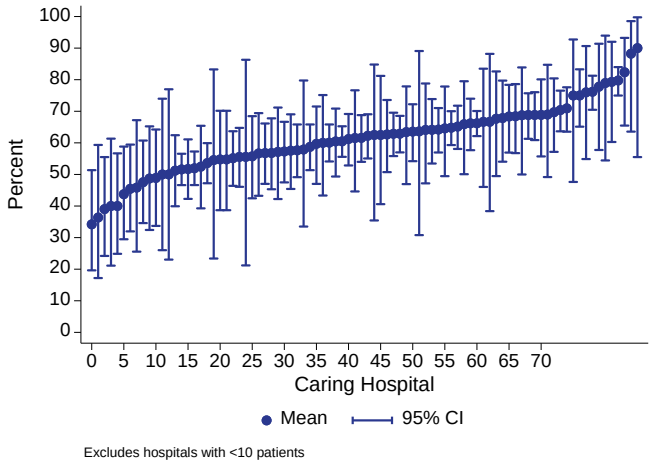
Excludes hospitals with <10 patients

Figure 4.42.2 - % Haemodialysis Patients receiving an ESA with Ferritin 200-500 µg/L - New Zealand 31 December 2020



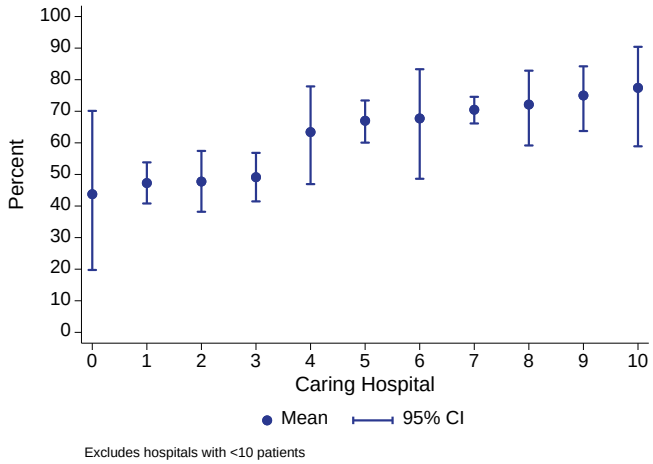
Excludes hospitals with <10 patients

Figure 4.43.1 - % Haemodialysis Patients receiving an ESA with TSat>20% - Australia 31 December 2020



Excludes hospitals with <10 patients

Figure 4.43.2 - % Haemodialysis Patients receiving an ESA with TSat>20% - New Zealand 31 December 2020

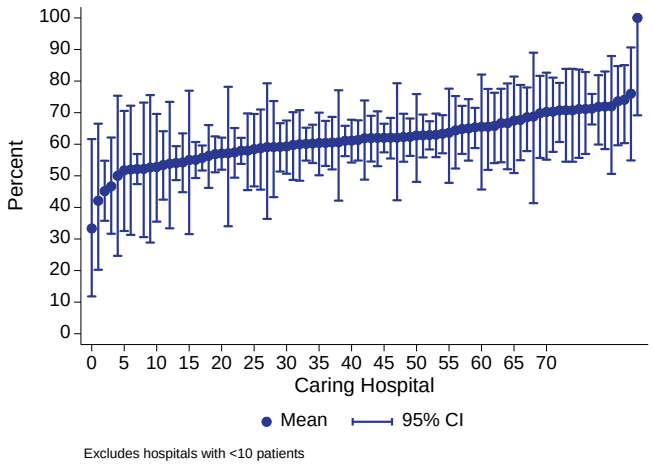


Excludes hospitals with <10 patients

Calcium and Phosphate

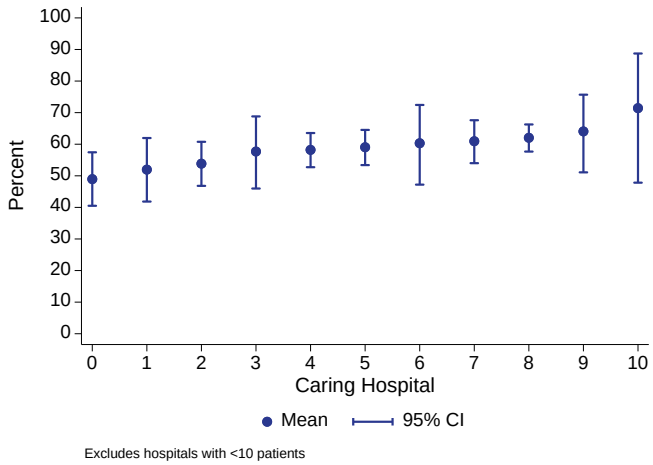
Figures 4.44 and 4.45 show the proportions of patients with calcium between 2.1-2.4mmol/L and phosphate between 0.8-1.6mmol/L respectively at the time of the annual survey. Note that the calcium is not corrected for albumin.

Figure 4.44.1 - % Haemodialysis Patients with Calcium 2.1-2.4 mmol/L - Australia 31 December 2020



Excludes hospitals with <10 patients

Figure 4.44.2 - % Haemodialysis Patients with Calcium 2.1-2.4 mmol/L - New Zealand 31 December 2020



Excludes hospitals with <10 patients

Figure 4.45.1 - % Haemodialysis Patients with Phosphate 0.8-1.6 mmol/L - Australia 31 December 2020

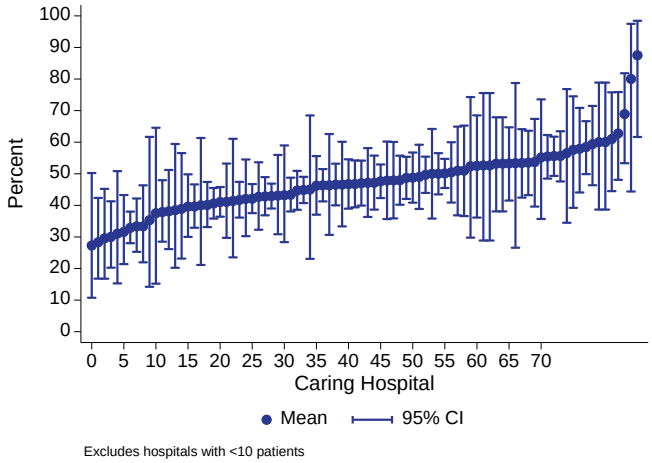
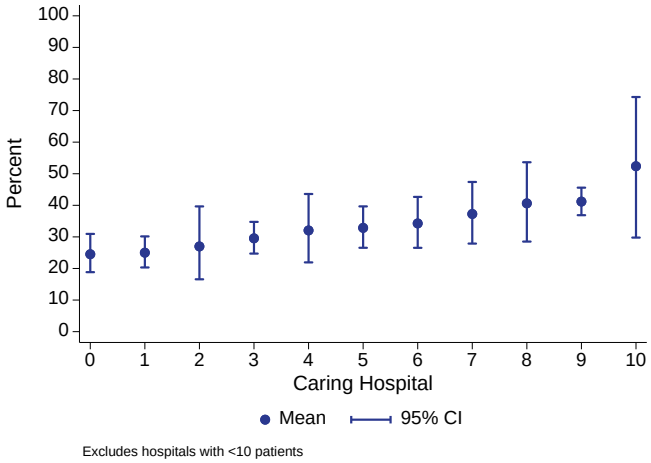


Figure 4.45.2 - % Haemodialysis Patients with Phosphate 0.8-1.6 mmol/L - New Zealand 31 December 2020



Urea Reduction Ratio

Figure 4.46 shows the distribution of urea reduction ratio (URR) by country over 2018-2020. Figure 4.47 presents the 2020 data stratified by vascular access type.

Figure 4.46 - Urea Reduction Ratio - HD Three Sessions Per Week

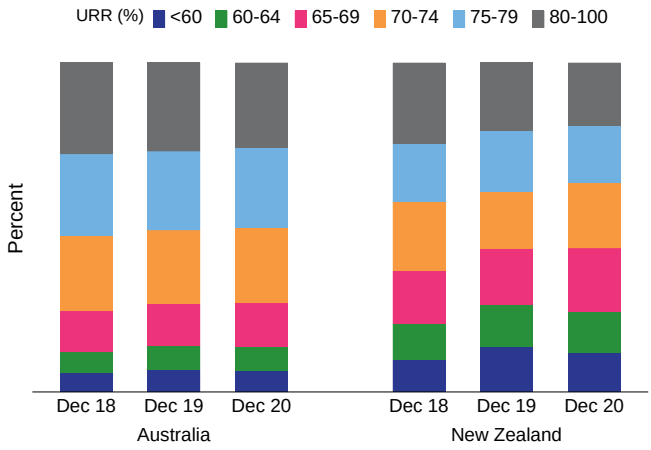


Figure 4.47 - Urea Reduction Ratio - By Type of Access, 2020 HD Three Sessions Per Week

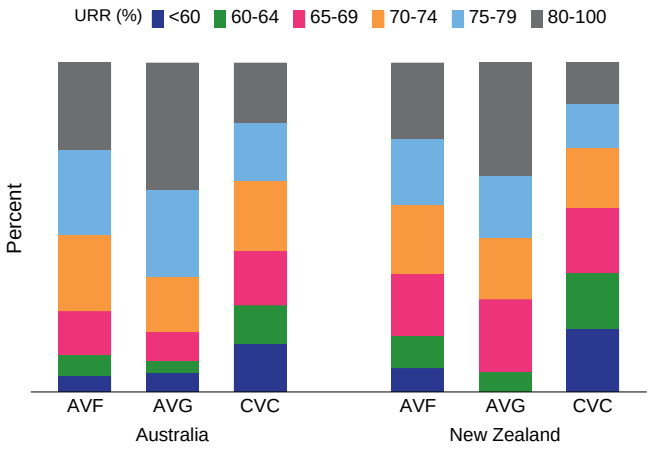


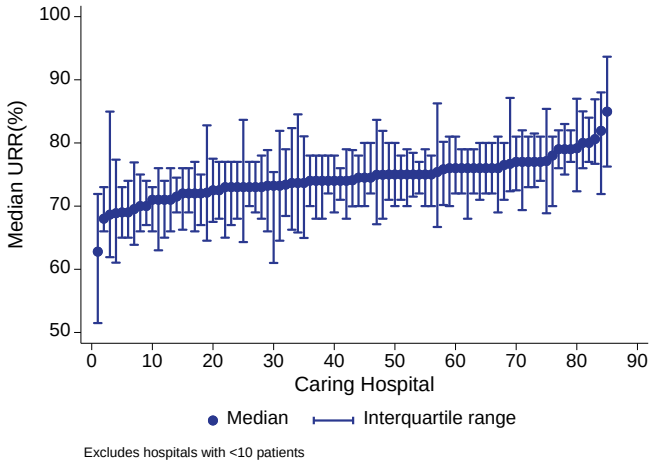
Table 4.19 presents URR by dialysis session duration. In general, as expected, the proportion of patients with a URR >70% typically increases with longer session duration.

Table 4.19 Urea Reduction Ratio - Prevalent Patients Three Sessions per Week - December 2020

Country	Hours per Session	Urea Reduction Ratio %		
		≤70	>70	Total
Australia	**<4 hours**	184 (42.3%)	251 (57.7%)	**435**
	4 hours	1358 (32.5%)	2823 (67.5%)	**4181**
	>4-5 hours	1315 (27.7%)	3437 (72.3%)	**4752**
	>5 hours	101 (30.3%)	232 (69.7%)	**333**
	Total	**2958 (30.5%)**	**6743 (69.5%)**	**9701**
New Zealand	**<4 hours**	6 (31.6%)	13 (68.4%)	**19**
	4 hours	198 (42.4%)	269 (57.6%)	**467**
	>4-5 hours	477 (48.3%)	510 (51.7%)	**987**
	>5 hours	57 (43.2%)	75 (56.8%)	**132**
	Total	**738 (46.0%)**	**867 (54.0%)**	**1605**

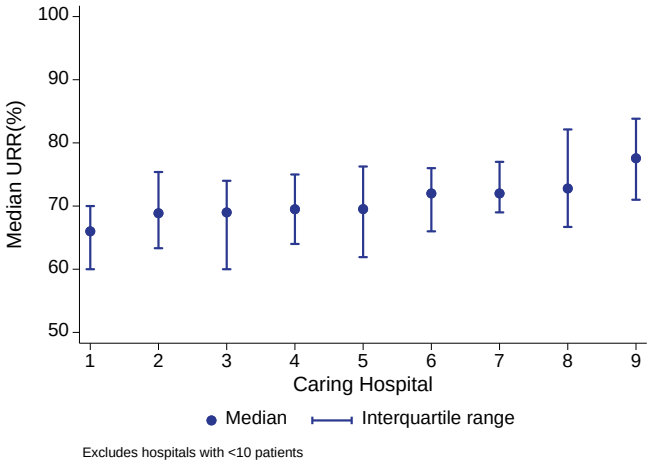
Figure 4.48 shows the distribution of median URR by treating hospital for patients dialysing three times per week. In Australia the median ranged from 63-85%, and in New Zealand it ranged from 66-78%.

Figure 4.48.1 - Median URR in Haemodialysis Patients - Three Sessions Per Week Australia 31 December 2020



Excludes hospitals with <10 patients

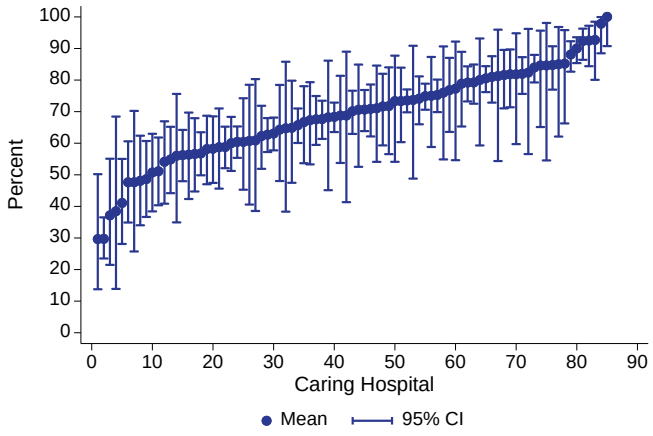
Figure 4.48.2 - Median URR in Haemodialysis Patients - Three Sessions Per Week New Zealand 31 December 2020



Excludes hospitals with <10 patients

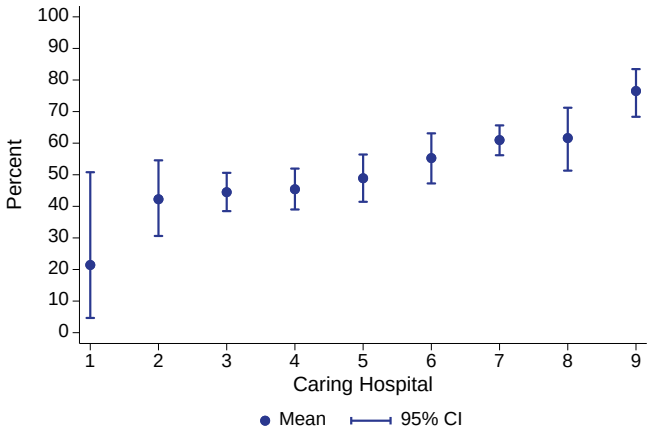
Figure 4.49 shows the proportion of patients with a URR >70%. In Australia this proportion ranged from 30-100%, and in New Zealand from 21-77%.

Figure 4.49.1 - % Haemodialysis Patients with URR>70% - Three Sessions Per Week Australia 31 December 2020



Excludes hospitals with <10 patients

Figure 4.49.2 - % Haemodialysis Patients with URR>70% - Three Sessions Per Week New Zealand 31 December 2020



Excludes hospitals with <10 patients