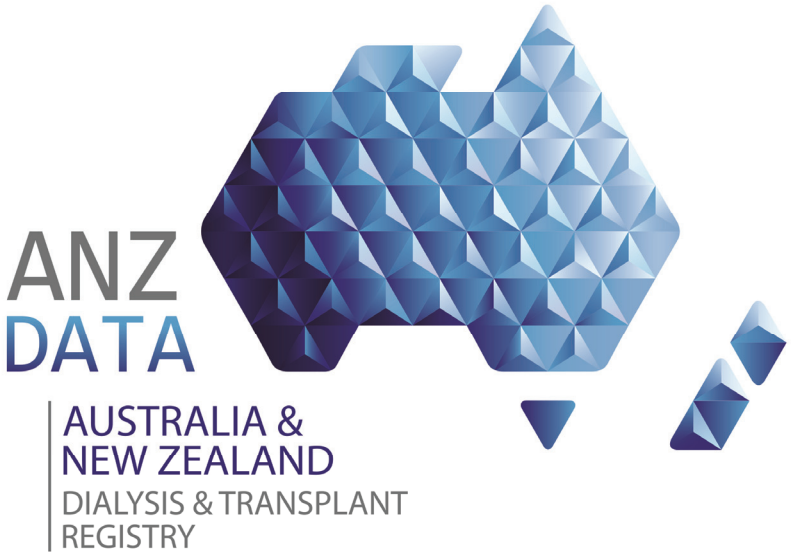
Chapter 4

Haemodialysis



2016

ANZDATA Registry

39th Annual Report

Data to 31-Dec-2015

Stock and Flow

Table 4.1 presents the stock and flow of haemodialysis patients in Australia and New Zealand over 2011-2015. The number of incident patients in each country remains approximately constant, in contrast to ongoing strong growth in prevalent numbers. Table 4.2 presents incident and prevalent patients by age group, and incident patients by primary renal disease. In both countries diabetic nephropathy is the leading cause of ESKD leading to haemodialysis.

Figures 4.1 - 4.4 present the age distribution of incident and prevalent haemodialysis patients in Australia and New Zealand.

Table 4.1 Stock and Flow of Haemodialysis Patients in Australia and New Zealand 2011 - 2015

Country	Event	2011	2012	2013	2014	2015
Australia	Patients new to HD	2202	2192	2180	2181	2195
	First dialysis treatment	1865	1835	1811	1840	1807
	Previous dialysis (PD)	323	336	357	325	364
	Failed transplant	0	0	0	0	0
	Transplanted	522	545	549	569	567
	Deaths	1250	1263	1331	1350	1353
	Never transplanted	1175	1183	1244	1276	1264
	Previous transplant	75	80	87	74	89
	Transfer to PD	410	435	392	403	352
	Patients dialysing at 31 December	9003	9279	9518	9706	9947
	Patients dialysis at home at 31 December	1008	1096	1135	1171	1165
	% of all home dialysis (HD and PD) patients	33%	33%	33%	32%	32%
New Zealand	Patients new to HD	411	420	430	438	395
	First dialysis treatment	319	333	356	345	293
	Previous dialysis (PD)	88	84	73	90	98
	Failed transplant	0	0	0	0	0
	Transplanted	65	45	61	70	75
	Deaths	232	228	227	224	275
	Never transplanted	222	221	215	216	263
	Previous transplant	10	7	12	8	12
	Transfer to PD	144	134	158	139	124
	Patients dialysing at 31 December	1599	1694	1760	1862	1883
	Patients dialysis at home at 31 December	434	474	478	492	482
	% of all home dialysis (HD and PD) patients	35%	38%	36%	38%	38%

Table 4.2.1 Stock and Flow Australia 2011 - 2015						
		2011	2012	2013	2014	2015
New Patients*	00-14 years	15 (1%)	21 (1%)	17 (1%)	13 (1%)	8 (0%)
	15-24 years	46 (2%)	43 (2%)	55 (3%)	45 (2%)	41 (2%)
	25-34 years	86 (4%)	111 (5%)	94 (4%)	103 (5%)	97 (4%)
	35-44 years	197 (9%)	177 (8%)	174 (8%)	180 (8%)	182 (8%)
	45-54 years	333 (15%)	371 (17%)	330 (15%)	346 (16%)	348 (16%)
	55-64 years	492 (22%)	498 (23%)	500 (23%)	516 (24%)	468 (21%)
	65-74 years	538 (24%)	511 (23%)	537 (25%)	496 (23%)	594 (27%)
	75-84 years	431 (20%)	395 (18%)	420 (19%)	429 (20%)	408 (19%)
	≥85 years	64 (3%)	65 (3%)	53 (2%)	53 (2%)	49 (2%)
	Total	2202 (17%)	2192 (17%)	2180 (17%)	2181 (17%)	2195 (17%)
Patients Dialysing	00-14 years	10 (0%)	11 (0%)	14 (0%)	10 (0%)	9 (0%)
	15-24 years	112 (1%)	111 (1%)	106 (1%)	105 (1%)	106 (1%)
	25-34 years	288 (3%)	303 (3%)	308 (3%)	333 (3%)	327 (3%)
	35-44 years	735 (8%)	730 (8%)	736 (8%)	745 (8%)	754 (8%)
	45-54 years	1344 (15%)	1366 (15%)	1438 (15%)	1480 (15%)	1510 (15%)
	55-64 years	1954 (22%)	2029 (22%)	2021 (21%)	2058 (21%)	2090 (21%)
	65-74 years	2149 (24%)	2247 (24%)	2316 (24%)	2315 (24%)	2430 (24%)
	75-84 years	1989 (22%)	2038 (22%)	2125 (22%)	2168 (22%)	2204 (22%)
	≥85 years	422 (5%)	444 (5%)	454 (5%)	492 (5%)	517 (5%)
	Total	9003 (16%)	9279 (16%)	9518 (17%)	9706 (17%)	9947 (18%)
Primary Renal Disease*		3 (0%)	1 (0%)	4 (0%)	6 (0%)	111 (5%)
	Analgesic Nephropathy	28 (1%)	33 (2%)	27 (1%)	16 (1%)	16 (1%)
	Diabetic Nephropathy	802 (36%)	855 (39%)	823 (38%)	846 (39%)	865 (39%)
	Glomerulonephritis	482 (22%)	436 (20%)	404 (19%)	445 (20%)	383 (17%)
	Hypertension	319 (14%)	241 (11%)	262 (12%)	223 (10%)	239 (11%)
	Miscellaneous	280 (13%)	362 (17%)	396 (18%)	365 (17%)	331 (15%)
	Polycystic Disease	127 (6%)	112 (5%)	127 (6%)	133 (6%)	114 (5%)
	Reflux Nephropathy	51 (2%)	57 (3%)	39 (2%)	44 (2%)	35 (2%)
	Total	2202 (17%)	2192 (17%)	2180 (17%)	2181 (17%)	2195 (17%)
	Uncertain	110 (5%)	95 (4%)	98 (4%)	103 (5%)	101 (5%)

* New patients receiving first haemodialysis treatment

Table 4.2.2 Stock and Flow New Zealand 2011 - 2015						
		2011	2012	2013	2014	2015
New Patients*	00-14 years	15 (1%)	21 (1%)	17 (1%)	13 (1%)	8 (0%)
	15-24 years	46 (2%)	43 (2%)	55 (3%)	45 (2%)	41 (2%)
	25-34 years	86 (4%)	111 (5%)	94 (4%)	103 (5%)	97 (4%)
	35-44 years	197 (9%)	177 (8%)	174 (8%)	180 (8%)	182 (8%)
	45-54 years	333 (15%)	371 (17%)	330 (15%)	346 (16%)	348 (16%)
	55-64 years	492 (22%)	498 (23%)	500 (23%)	516 (24%)	468 (21%)
	65-74 years	538 (24%)	511 (23%)	537 (25%)	496 (23%)	594 (27%)
	75-84 years	431 (20%)	395 (18%)	420 (19%)	429 (20%)	408 (19%)
	≥85 years	64 (3%)	65 (3%)	53 (2%)	53 (2%)	49 (2%)
	Total	2202 (17%)	2192 (17%)	2180 (17%)	2181 (17%)	2195 (17%)
Patients Dialysing	00-14 years	10 (0%)	11 (0%)	14 (0%)	10 (0%)	9 (0%)
	15-24 years	112 (1%)	111 (1%)	106 (1%)	105 (1%)	106 (1%)
	25-34 years	288 (3%)	303 (3%)	308 (3%)	333 (3%)	327 (3%)
	35-44 years	735 (8%)	730 (8%)	736 (8%)	745 (8%)	754 (8%)
	45-54 years	1344 (15%)	1366 (15%)	1438 (15%)	1480 (15%)	1510 (15%)
	55-64 years	1954 (22%)	2029 (22%)	2021 (21%)	2058 (21%)	2090 (21%)
	65-74 years	2149 (24%)	2247 (24%)	2316 (24%)	2315 (24%)	2430 (24%)
	75-84 years	1989 (22%)	2038 (22%)	2125 (22%)	2168 (22%)	2204 (22%)
	≥85 years	422 (5%)	444 (5%)	454 (5%)	492 (5%)	517 (5%)
	Total	9003 (16%)	9279 (16%)	9518 (17%)	9706 (17%)	9947 (18%)
Primary Renal Disease*		3 (0%)	1 (0%)	4 (0%)	6 (0%)	111 (5%)
	Analgesic Nephropathy	28 (1%)	33 (2%)	27 (1%)	16 (1%)	16 (1%)
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	Hypertension	319 (14%)	241 (11%)	262 (12%)	223 (10%)	239 (11%)
	Miscellaneous	280 (13%)	362 (17%)	396 (18%)	365 (17%)	331 (15%)
	Polycystic Disease	127 (6%)	112 (5%)	127 (6%)	133 (6%)	114 (5%)
	Reflux Nephropathy	51 (2%)	57 (3%)	39 (2%)	44 (2%)	35 (2%)
	Total	2202 (17%)	2192 (17%)	2180 (17%)	2181 (17%)	2195 (17%)
	Uncertain	110 (5%)	95 (4%)	98 (4%)	103 (5%)	101 (5%)

* New patients receiving first haemodialysis treatment

Figure 4.1

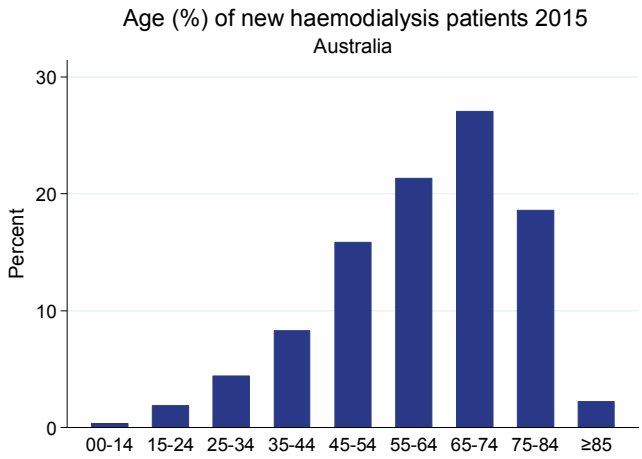


Figure 4.2

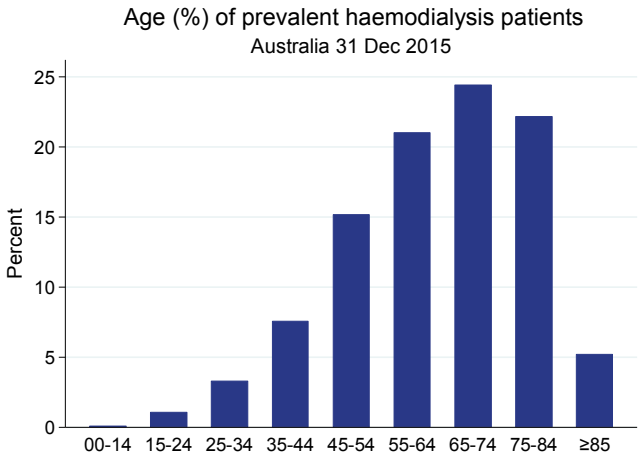


Figure 4.3

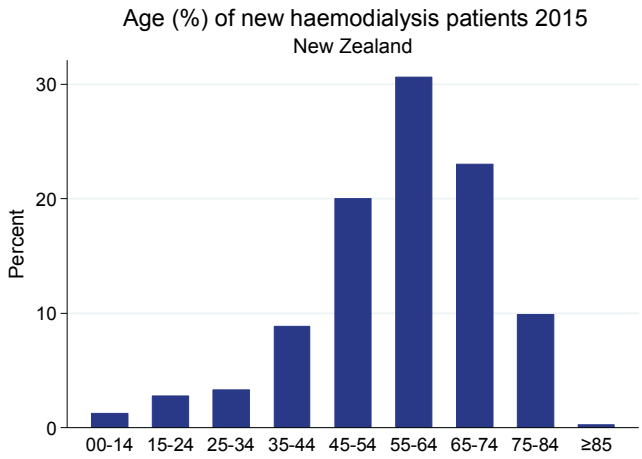


Figure 4.4

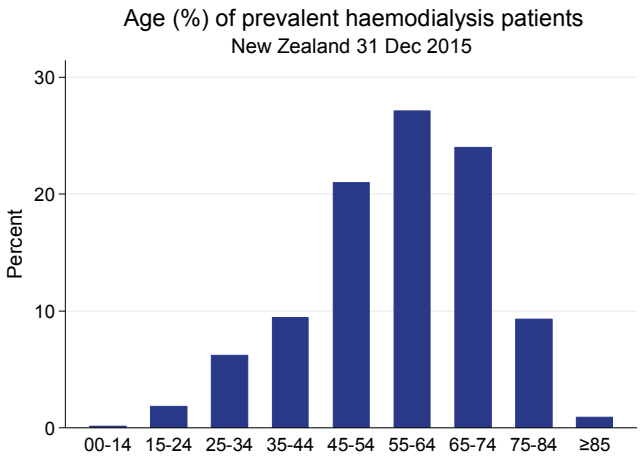


Table 4.3 shows the blood flow rates by year and country. Flows of 300-349mL/min are the most common in each country. Table 4.4 presents the same data by vascular access type; the distribution of blood flow rates is similar within each type of access, although slightly lower rates are seen in patients dialysing with a central venous catheter (CVC). The overall distribution of blood flow rates over 2013-15 is shown in figure 4.5.

Table 4.3 Blood Flow Rates (m/L/minute) 2011-2015

Country	Year	Total Patients		CVV HD Excluded *	NR**	<200	200-249	250-299	300-349	350-399	400+
Australia	2011	9003	8949	0	54	28	270	1256	5219	1898	278
	2012	9279	9087	0	192	45	233	1292	5366	1864	287
	2013	9518	9405	4	113	33	222	1317	5666	1917	246
	2014	9706	9427	0	279	49	203	1412	5708	1836	219
	2015	9947	9352	4	595	48	212	1425	5863	1614	186
New Zealand	2011	1599	1596	0	3	4	106	332	912	224	18
	2012	1694	1670	0	24	7	116	384	872	258	33
	2013	1760	1755	0	5	3	106	400	956	256	34
	2014	1862	1840	0	22	3	108	411	1013	263	42
	2015	1881	1843	0	38	6	105	412	1064	229	27

* CVV HD Patients excluded from Total. ** Not Reported

Table 4.4 Blood Flow Rate by Type of Access December 2015

	Australia				New Zealand			
Blood Flow Rate	AVF	AVG	CVC*	NR**	AVF	AVG	CVC*	NR**
<200	29 (0.4%)	1 (0.2%)	18 (1.4%)	0 (0.0%)	6 (0.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
200-249	118 (1.6%)	13 (2.2%)	78 (6.1%)	3 (0.5%)	67 (5.1%)	3 (3.4%)	35 (8.1%)	0 (0.0%)
250-299	939 (12.6%)	120 (20.0%)	354 (27.6%)	12 (1.9%)	220 (16.7%)	28 (31.8%)	160 (37.2%)	4 (8.7%)
300-349	4725 (63.6%)	351 (58.6%)	753 (58.8%)	34 (5.4%)	778 (59.0%)	54 (61.4%)	229 (53.3%)	3 (6.5%)
350-399	1434 (19.3%)	106 (17.7%)	70 (5.5%)	4 (0.6%)	219 (16.6%)	3 (3.4%)	6 (1.4%)	1 (2.2%)
400+	175 (2.4%)	7 (1.2%)	4 (0.3%)	0 (0.0%)	27 (2.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
NR**	8 (0.1%)	1 (0.2%)	4 (0.3%)	582 (91.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	38 (82.6%)
Total	**7428**	**599**	**1281**	**635**	**1319**	**88**	**430**	**46**

* CVV HD Patients excluded from Total.
** Not Reported

Figure 4.5.1

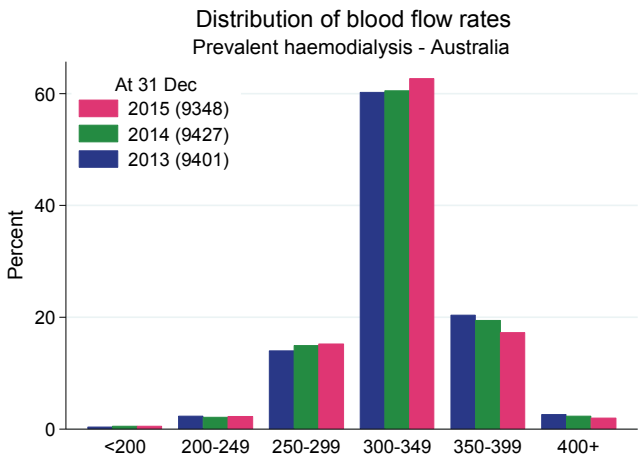


Figure 4.5.2

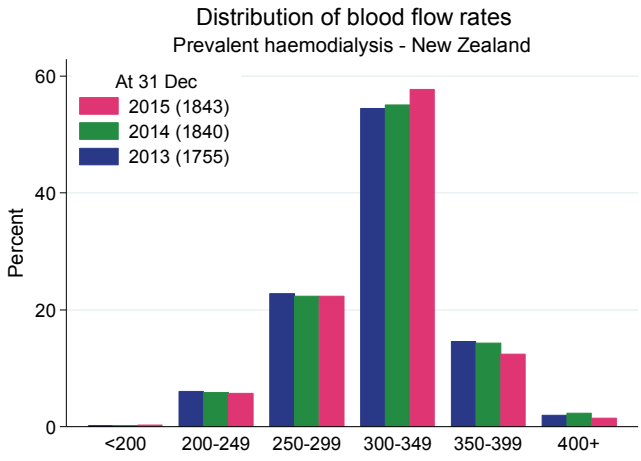


Table 4.5 shows the number of weekly sessions, and hours per session, at 31 December 2015. In each country the large majority are dialysing for ≤3 sessions per week, and for between 4-5 hours per session. Figures 4.6 and 4.7 show HD frequency and session length respectively over 2013-2015. Figure 4.8 combines sessions and session length to show the total number of weekly hours of HD over 2013-2015. New Zealand patients receive slightly more total hours of weekly HD compared with Australian patients.

Table 4.5 Duration and Number of Sessions per Week - December 2015

Country	Sessions per week	Hours of Each Treatment						Not Reported	Total
		<4	4	4.5	5	5.5	>5.5		
Australia	≤3	379 (4.4)	3414 (39.7)	1996 (23.2)	2444 (28.4)	136 (1.6)	226 (2.6)	0 (0.0)	8595
	3.1-4.9	35 (5.4)	130 (20.2)	55 (8.5)	136 (21.1)	27 (4.2)	262 (40.6)	0 (0.0)	645
	5+	40 (32.5)	39 (31.7)	2 (1.6)	6 (4.9)	2 (1.6)	34 (27.6)	0 (0.0)	123
	Not Reported	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	584 (100.0)	584
	Total	454 (4.6)	3583 (36.0)	2053 (20.6)	2586 (26.0)	165 (1.7)	522 (5.2)	584 (5.9)	9947
New Zealand	≤3	31 (2.0)	454 (28.7)	454 (28.7)	530 (33.5)	48 (3.0)	65 (4.1)	0 (0.0)	1582
	3.1-4.9	9 (3.6)	41 (16.5)	31 (12.4)	98 (39.4)	5 (2.0)	65 (26.1)	0 (0.0)	249
	5+	6 (42.9)	4 (28.6)	0 (0.0)	3 (21.4)	0 (0.0)	1 (7.1)	0 (0.0)	14
	Not Reported	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	38 (100.0)	38
	Total	46 (2.4)	499 (26.5)	485 (25.8)	631 (33.5)	53 (2.8)	131 (7.0)	38 (2.0)	1883

Intermediate durations are rounded up, e.g. 4.25 is included in 4.5.

Figure 4.6

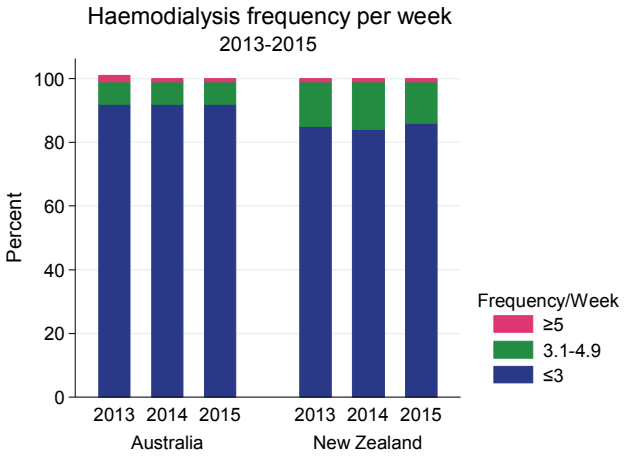


Figure 4.7

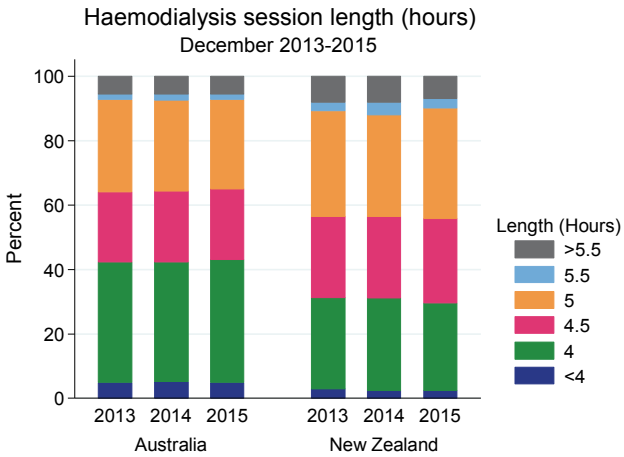
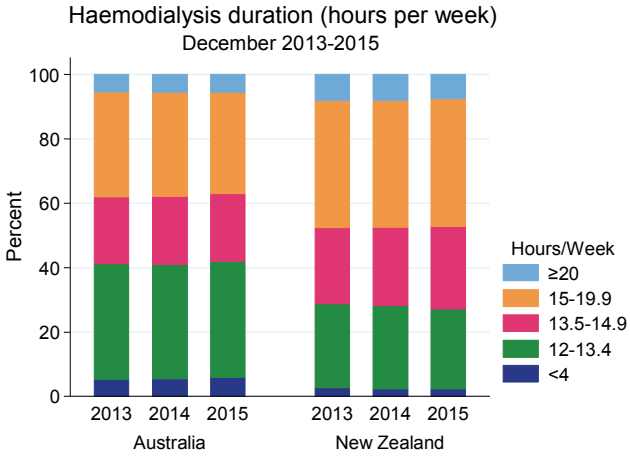


Figure 4.8



Figures 4.9-4.11 show trends in dialysis prescription. The proportion of patients dialysing five days or more per week continues to fall in both countries. Amongst the patients dialysing three times per week, the previously increasing proportion dialysing 4.5 hours or longer seems to have plateaued as has the proportion dialysing >12 hours per week. Tables 4.6-4.8 present these same data for 2012-2015 by state and country.

Figure 4.9

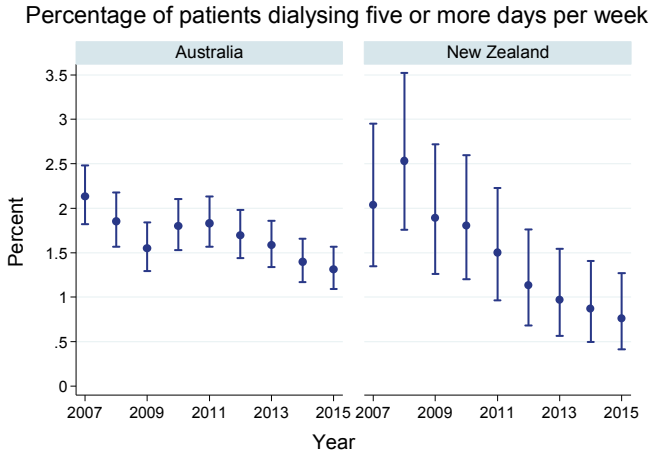


Figure 4.10

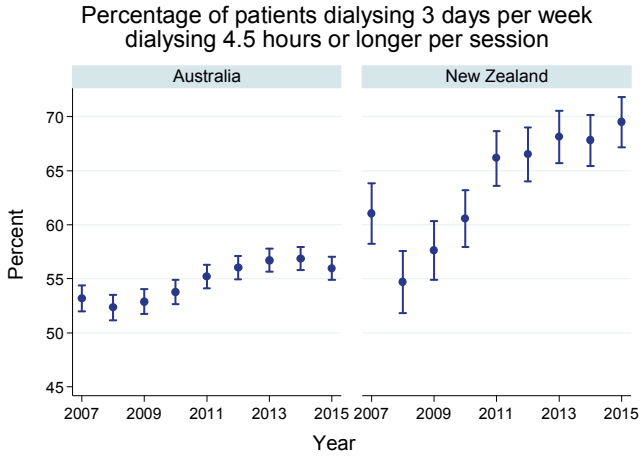


Figure 4.11

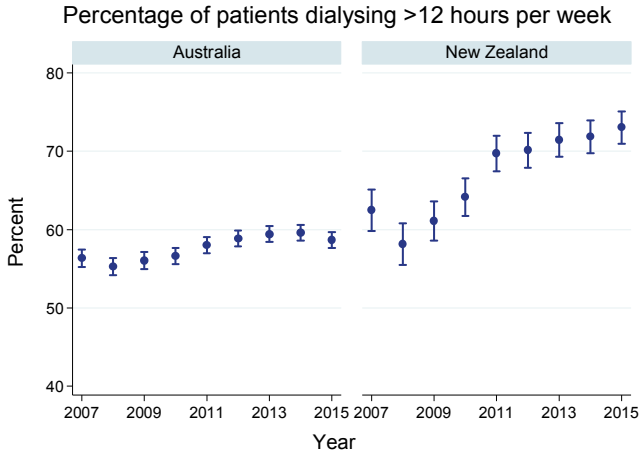


Table 4.6 Haemodialysis ≥5 Sessions per Week By Australian State and Country

Year	Australia							New Zealand
	QLD	NSW/ACT	VIC	TAS	SA	NT	WA	
2015	48 (2.7%)	15 (0.5%)	43 (1.8%)	3 (1.6%)	7 (1.1%)	1 (0.2%)	6 (0.8%)	14 (0.8%)
2014	44 (2.5%)	20 (0.6%)	48 (2.0%)	3 (1.6%)	6 (1.0%)	2 (0.4%)	9 (1.0%)	16 (0.9%)
2013	52 (3.0%)	19 (0.6%)	54 (2.3%)	4 (2.3%)	4 (0.6%)	1 (0.2%)	15 (1.7%)	17 (1.0%)
2012	55 (3.3%)	21 (0.7%)	48 (2.1%)	3 (1.6%)	11 (1.9%)	3 (0.6%)	13 (1.5%)	19 (1.1%)

Table 4.7 Haemodialysis ≥4.5 Hours per Session - Three Sessions per Week By Australian State and Country

Year	Australia							New Zealand
	QLD	NSW/ACT	VIC	TAS	SA	NT	WA	
2015	894 (56.6%)	1931 (70.3%)	1029 (49.3%)	105 (65.2%)	178 (30.1%)	371 (72.3%)	187 (26.3%)	1090 (69.5%)
2014	871 (57.4%)	2046 (73.0%)	1034 (48.9%)	100 (62.9%)	171 (29.2%)	375 (73.8%)	219 (28.0%)	1045 (67.8%)
2013	910 (59.8%)	2064 (74.7%)	983 (46.2%)	99 (66.0%)	145 (25.2%)	343 (71.6%)	239 (29.3%)	1001 (68.1%)
2012	828 (58.8%)	1968 (73.7%)	955 (45.4%)	110 (67.9%)	134 (24.4%)	350 (77.1%)	229 (28.0%)	942 (66.5%)

Table 4.8 Haemodialysis >12 Hours per Week By Australian State and Country

Year	Australia							New Zealand
	QLD	NSW/ACT	VIC	TAS	SA	NT	WA	
2015	1078 (59.6%)	2163 (70.5%)	1265 (53.9%)	131 (67.9%)	217 (34.6%)	388 (73.3%)	251 (31.9%)	1348 (73.1%)
2014	1084 (61.0%)	2271 (73.4%)	1270 (53.5%)	128 (67.4%)	204 (33.0%)	383 (73.7%)	281 (32.8%)	1325 (71.9%)
2013	1096 (62.2%)	2318 (74.8%)	1230 (51.7%)	122 (68.9%)	174 (28.0%)	348 (71.9%)	303 (34.3%)	1255 (71.5%)
2012	1010 (61.0%)	2226 (74.8%)	1178 (50.4%)	128 (69.9%)	162 (27.3%)	357 (77.3%)	290 (32.8%)	1166 (70.2%)

Table 4.9 shows the dialysis membranes in use at the end of 2015. Nearly all patients in both countries were dialysing using high-flux membranes. Table 4.10 and figure 4.12 provide further information on dialysis type and surface area. The use of haemodiafiltration has increased strongly in both countries since 2008 (Figure 4.12).

Table 4.9 Dialysis Membrane Use - December 2015

Country	Dialyser Membrane Type	Flux	Square Metres						Total
			<1.0	1.0-1.4	1.5-1.7	1.8-1.9	≥2.0	Unreported	
AUS	Acrylonitrile Smsc	High Flux	.	4	3	.	1	.	8
	Cellulose Acetate	Low Flux	2	.	.	.	1	.	3
	Cellulose Triacetate	High Flux	.	.	2	26	23	.	51
	Cuprophan	Low Flux	.	.	1	.	.	.	1
	Cuprophan	Mid Flux	.	.	1	.	.	.	1
	Haemophan	Low Flux	3	.	.	.	.	.	3
	Helixone Plus	High Flux	.	313	.	2679	2805	.	5797
	Helixone Plus	Low Flux	5	.	.	.	.	.	5
	Polyamix	High Flux	1	30	469	.	1556	.	2056
	Polyamix	Low Flux	.	1	11	.	2	.	14
	Polyethersulfone	High Flux	.	.	14	12	138	.	164
	Polynephron	High Flux	.	3	12	41	226	.	282
	Polysulphone	High Flux	.	.	.	5	.	.	5
	Polysulphone	Low Flux	.	.	.	8	6	.	14
	Polysulphone Helixone	High Flux	.	.	.	1	8	.	9
	Polysulphone-Helixone	High Flux	.	23	.	108	106	.	237
	Polysynthane	Low Flux	.	.	.	.	1	.	1
	Purima	Mid Flux	.	.	10	.	.	.	10
	Revaclear	High Flux	.	161	.	.	.	.	161
	Revaclear Max	High Flux	.	.	.	534	.	.	534
	Unreported	Unreported	.	.	.	.	.	591	591
	Total		**11**	**535**	**523**	**3414**	**4873**	**591**	**9947**
NZ	Acrylonitrile Smsc	High Flux	.	1	.	.	.	.	1
	Helixone Plus	High Flux	.	210	.	209	471	.	890
	Polyamix	High Flux	.	1	2	.	29	.	32
	Polyamix	Low Flux	.	2	27	.	70	.	99
	Polysulphone	High Flux	.	.	.	2	.	.	2
	Polysulphone	Low Flux	.	2	.	60	87	.	149
	Polysulphone Helixone	High Flux	.	.	.	1	.	.	1
	Polysulphone-Helixone	High Flux	.	12	.	86	167	.	265
	Revaclear	High Flux	.	27	.	.	.	.	27
	Revaclear Max	High Flux	.	.	.	369	.	.	369
	Unreported	Unreported	.	.	.	.	.	48	48
	Total		**.**	**255**	**29**	**727**	**824**	**48**	**1883**

Table 4.10 Number of Patients at end of 2015 by HD Modality									
	NT	NSW/ACT	VIC	QLD	SA	WA	TAS	NZ	Total
Haemodialysis	569	2464	2173	1276	429	746	186	1480	9323
Haemofiltration	0	12	0	3	1	4	0	2	22
Haemodiafiltration	16	703	247	580	213	290	6	394	2449
Total	585	3179	2420	1859	643	1040	192	1876	11794

Figure 4.12

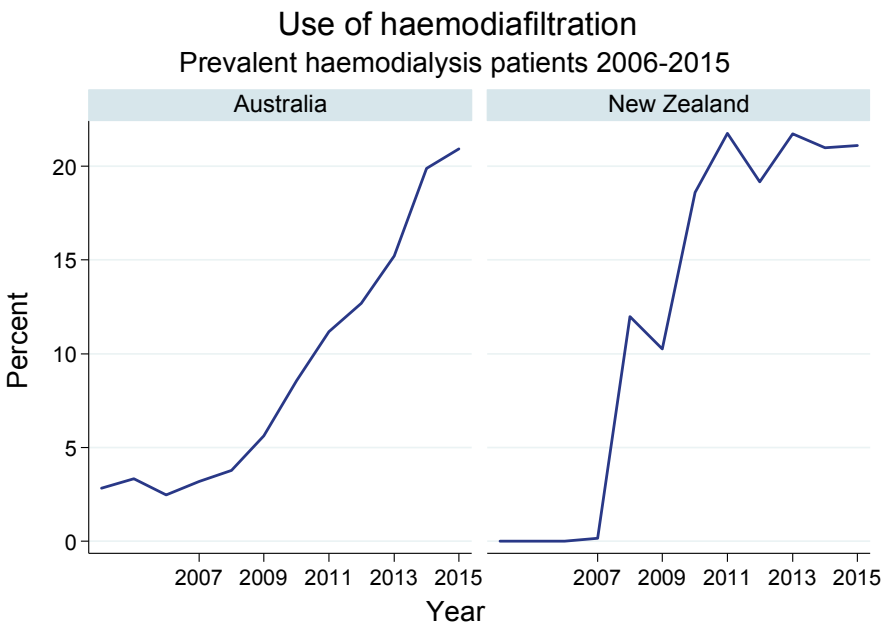


Figure 4.13.1

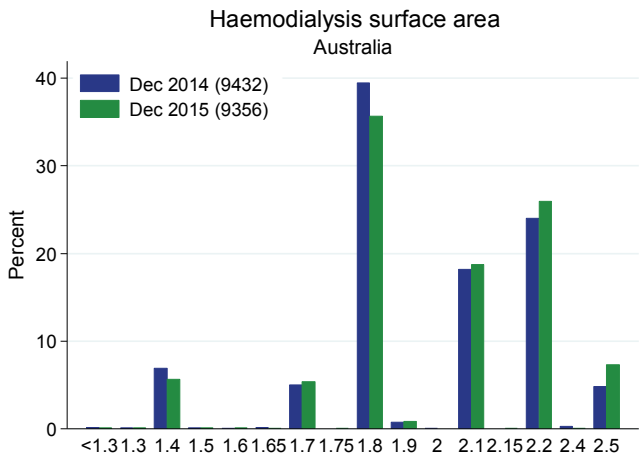
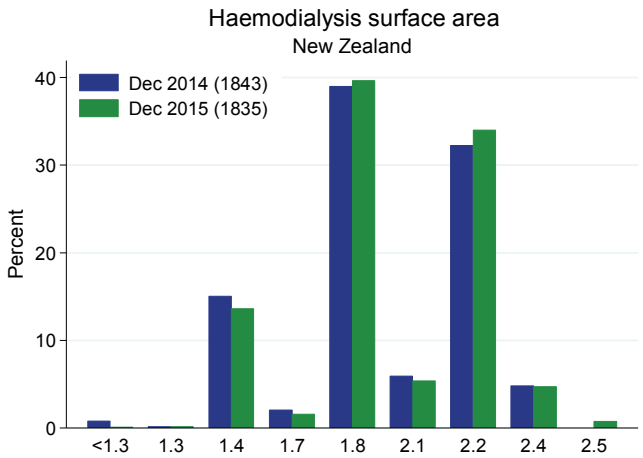


Figure 4.13.2



Anaemia

Figure 4.14 shows the mean haemoglobin (Hb) in haemodialysis patients over the last eight years. In both countries the mean Hb has fallen substantially. Figure 4.15 shows the distribution of haemoglobin in haemodialysis patients over the last 3 years, and figure 4.16 presents the same data stratified by the presence or absence of coronary artery disease.

Figure 4.14

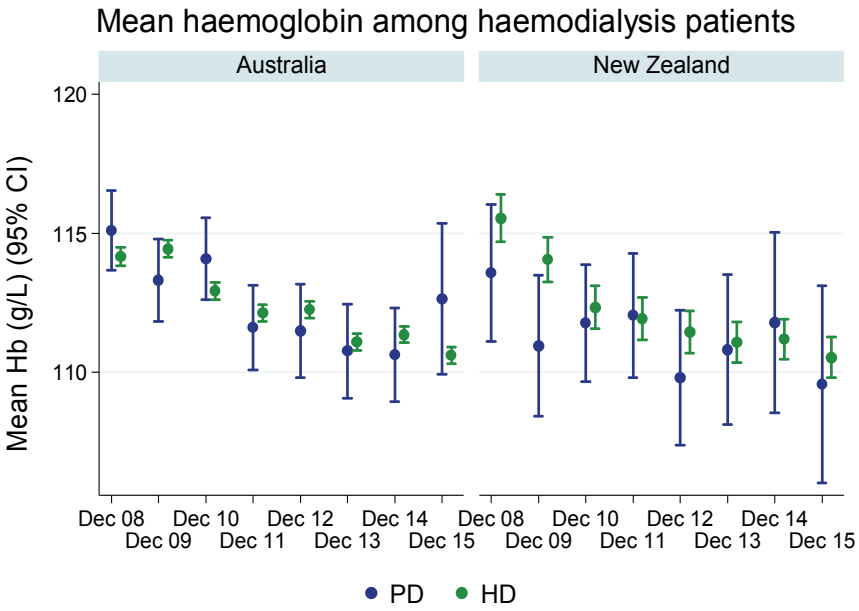


Figure 4.15

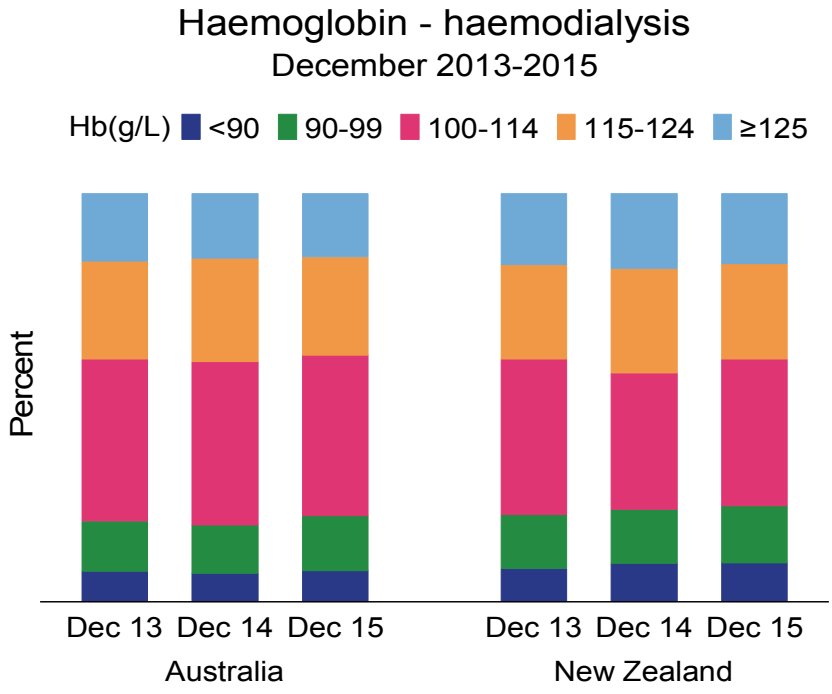


Figure 4.16.1

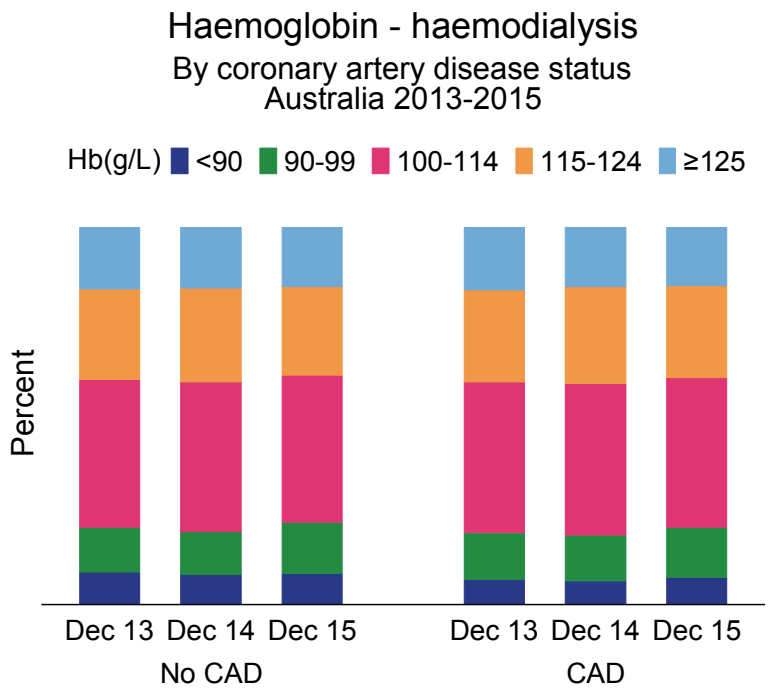


Figure 4.16.2

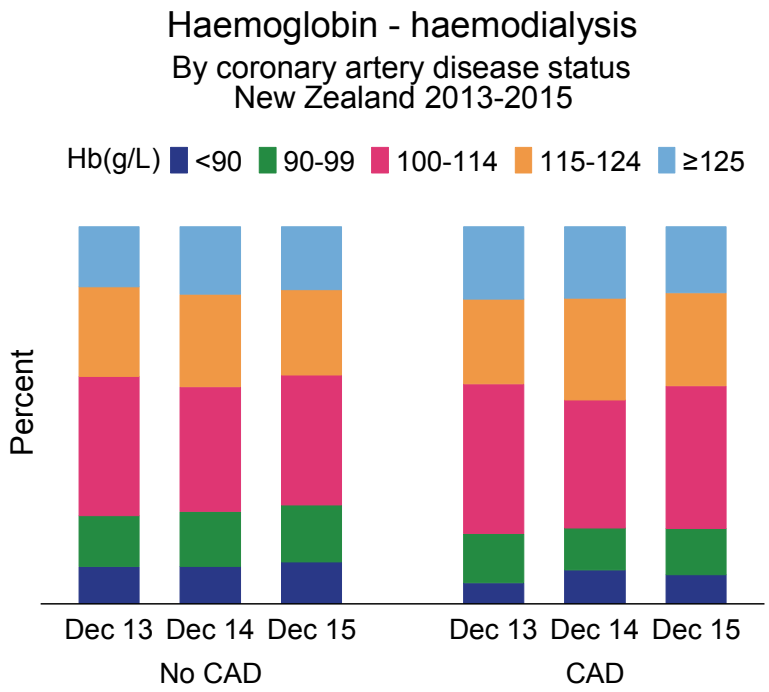


Figure 4.17 shows the variation in Hb between treating hospitals; median Hb ranged from 105 to 120g/L in Australia and 105-119g/L in New Zealand. Figure 4.18 shows the proportion of patients with Hb between 110-129g/L; the proportion ranged from 32-75% in Australia and 32-59% in New Zealand.

Figure 4.17.1

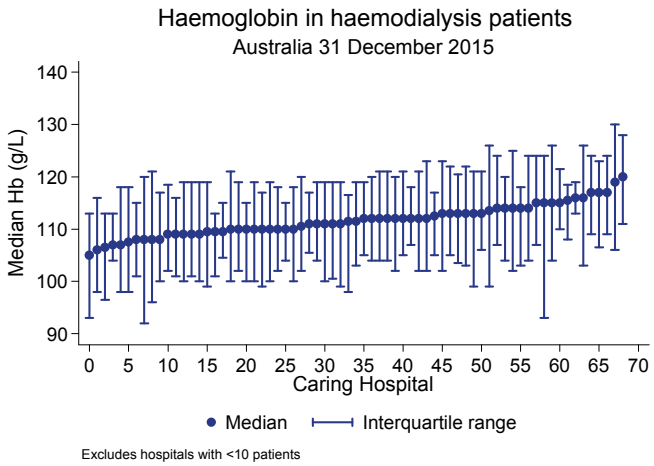


Figure 4.17.2

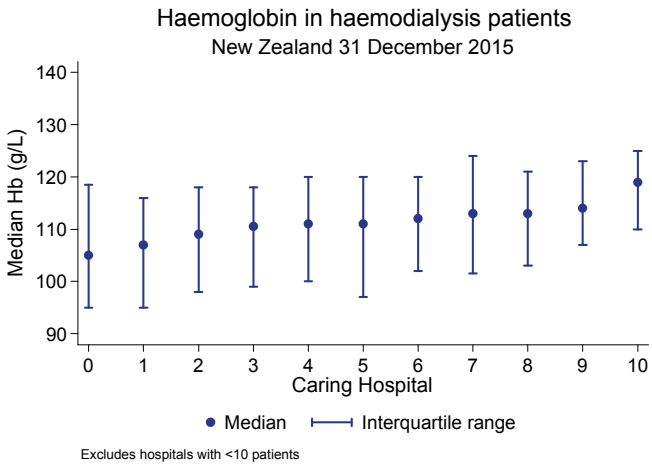


Figure 4.18.1

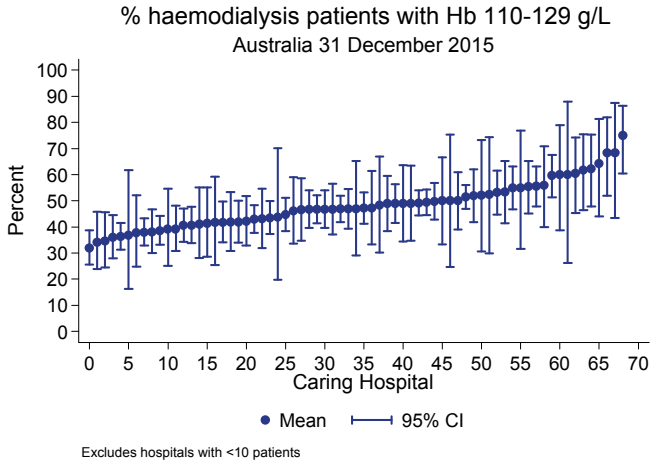


Figure 4.18.2

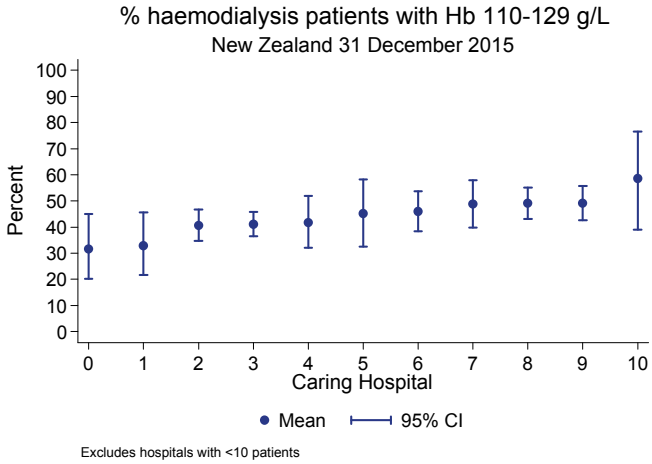


Figure 4.19 shows the distribution of ferritin in HD patients over 2013-15. The proportion of patients with ferritin between 200-500µg/L ranged from 4-75% in Australia and 24-49% in New Zealand (figure 4.20). Figures 4.21-4.22 present equivalent data for transferrin saturation.

Figure 4.19

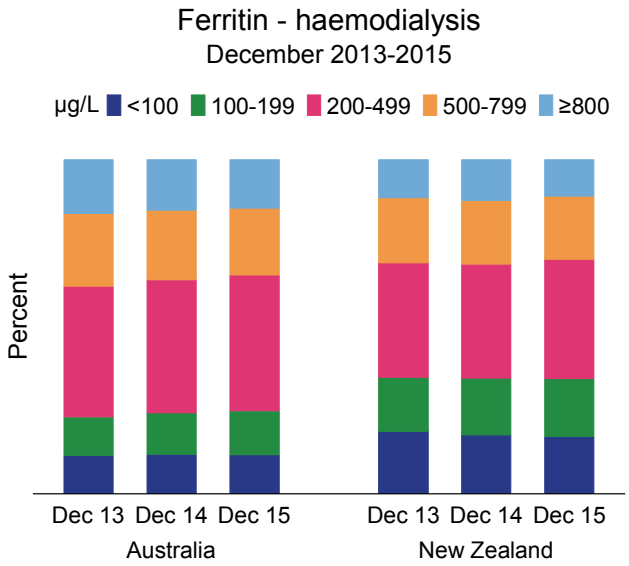


Figure 4.20.1

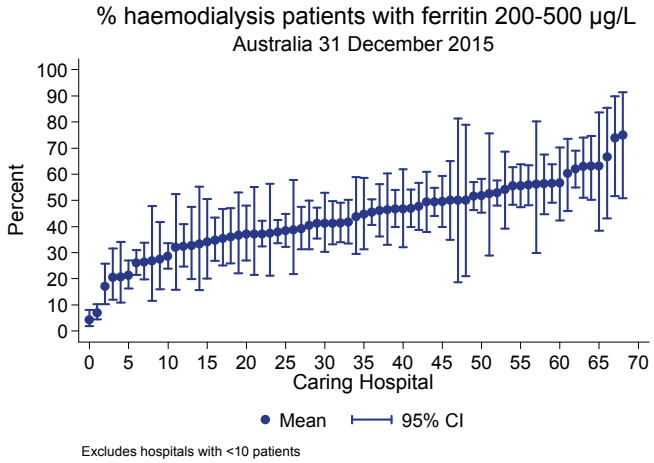


Figure 4.20.2

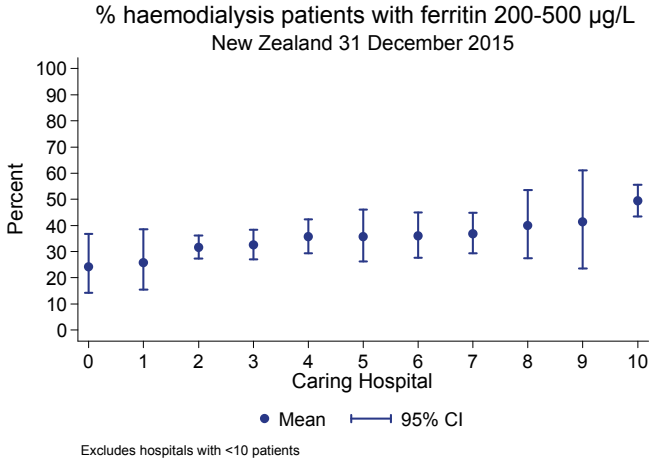


Figure 4.21

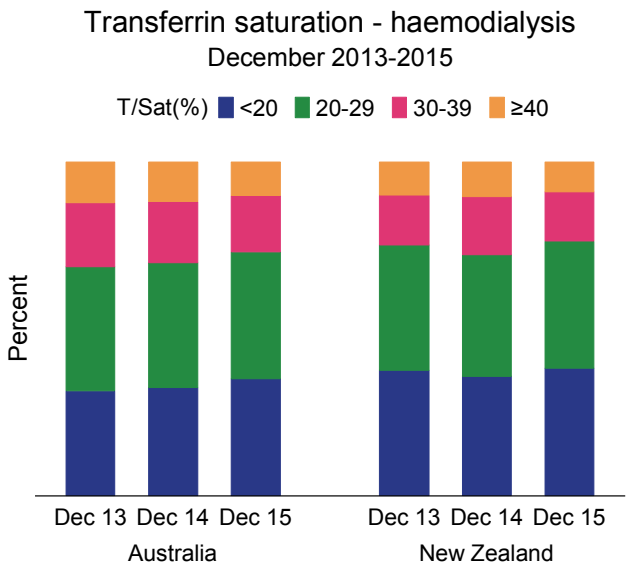


Figure 4.22.1

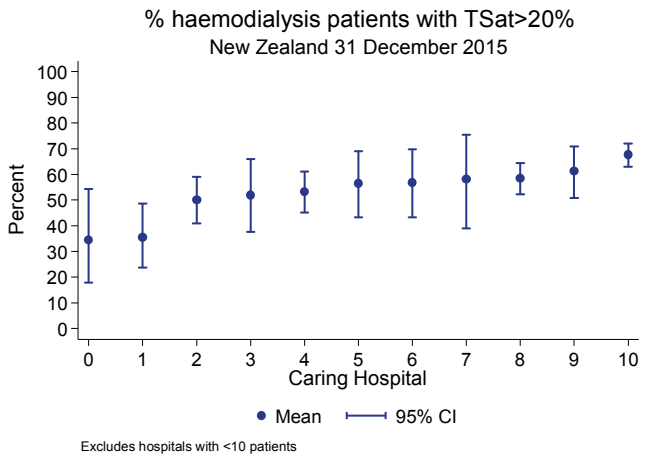
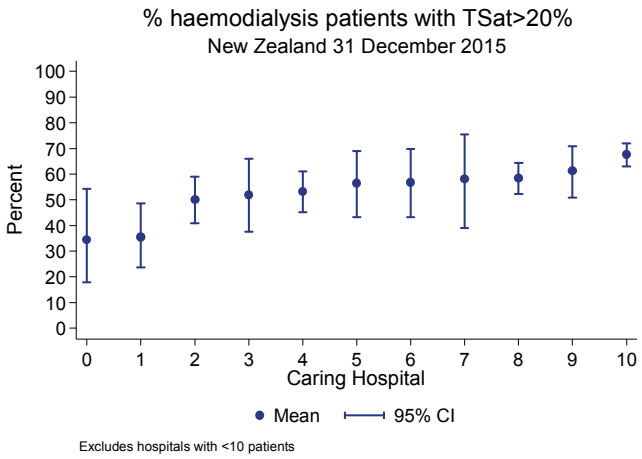
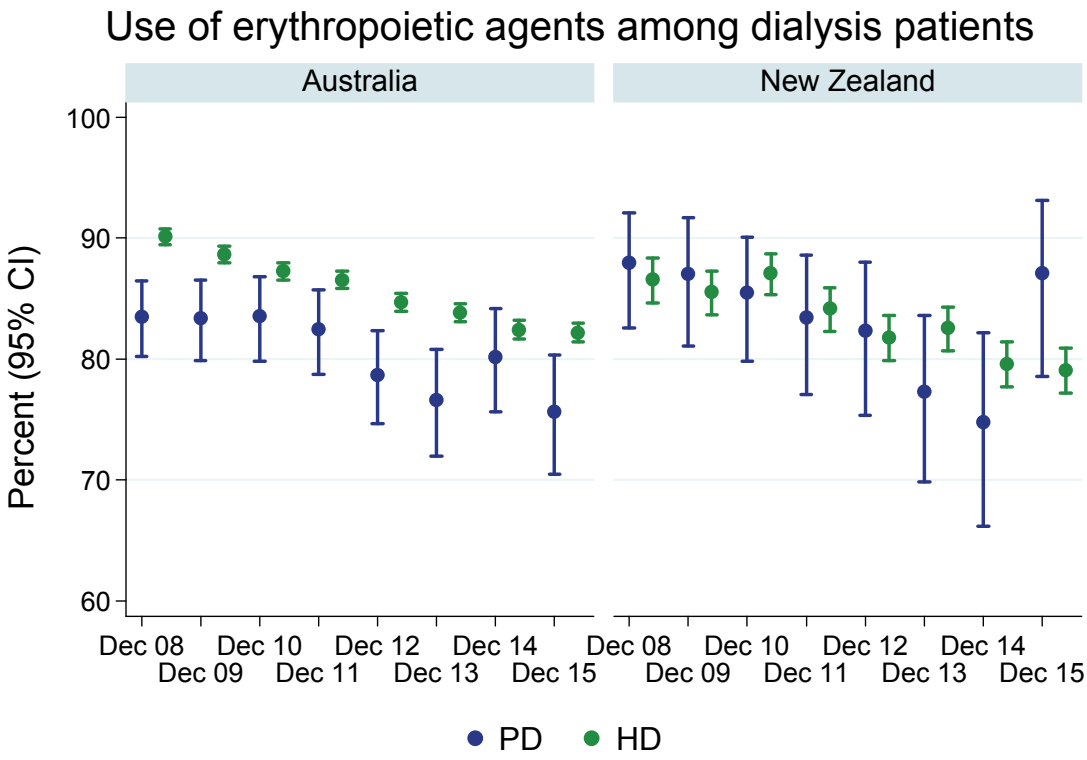


Figure 4.22.2



The use of erythropoietic agents has been falling in both HD and PD patients in both countries, although the majority of dialysis patients still receive them (figure 4.23).

Figure 4.23



Biochemistry

Figures 4.24-4.29 present the distribution of calcium, phosphate and calcium-phosphate product. These numbers remain stable compared with previous years.

Figure 4.24

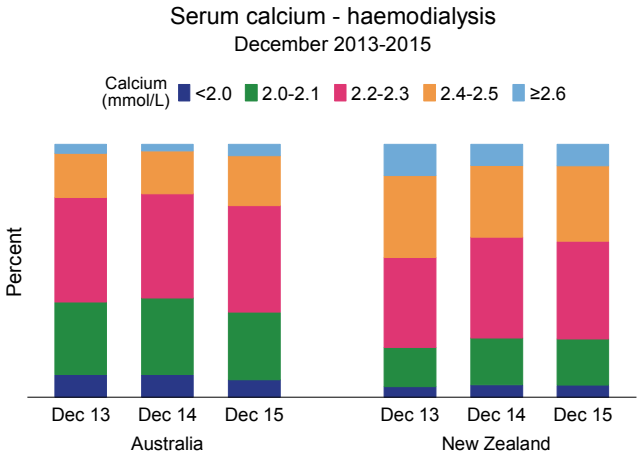


Figure 4.25.1

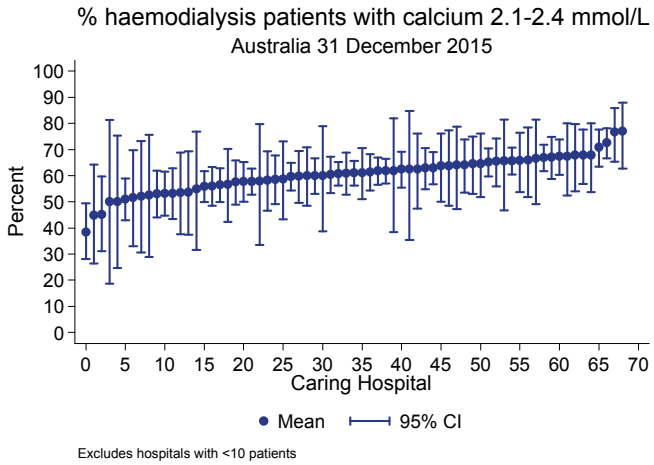


Figure 4.25.2

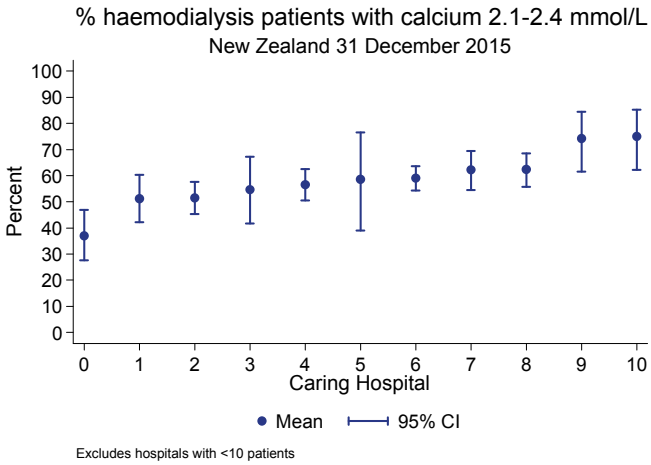


Figure 4.26

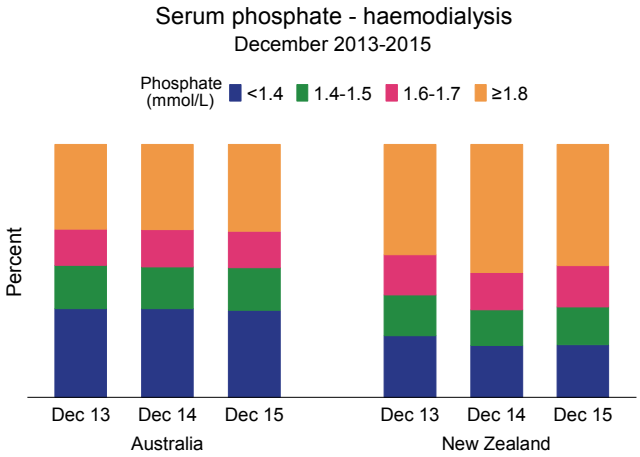


Figure 4.27.1

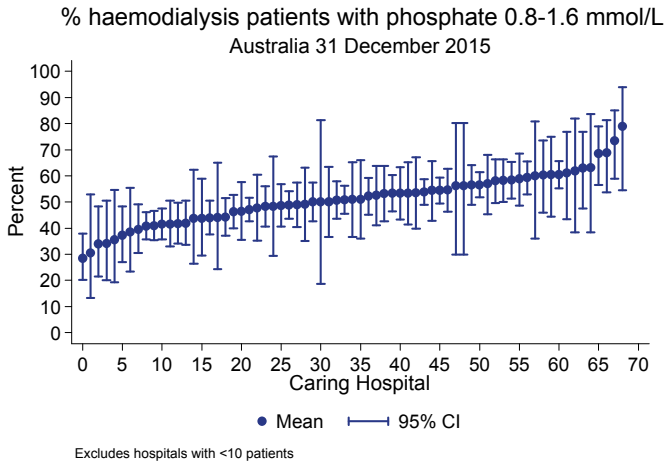


Figure 4.27.2

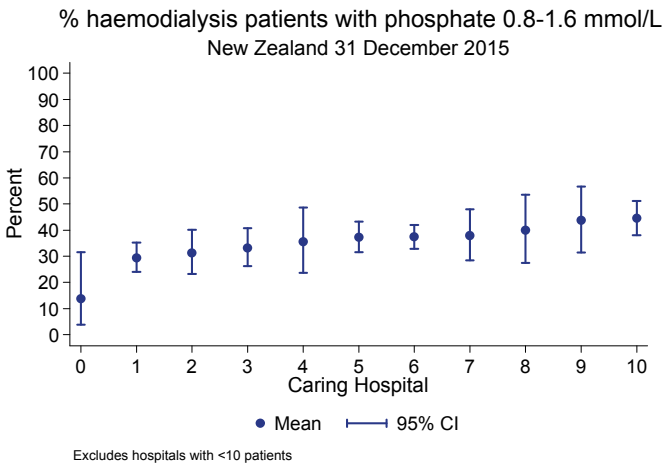


Figure 4.28

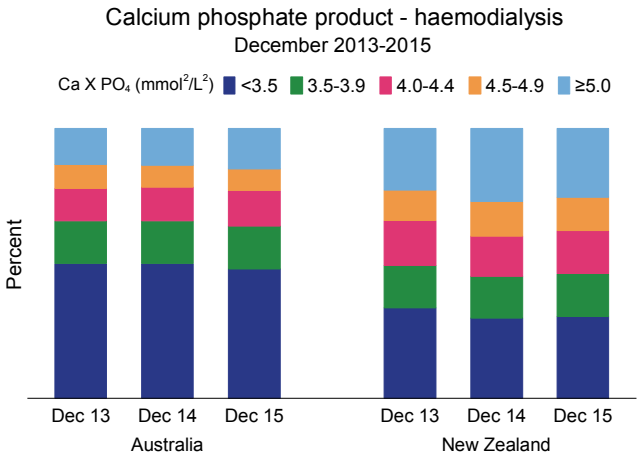


Figure 4.29.1

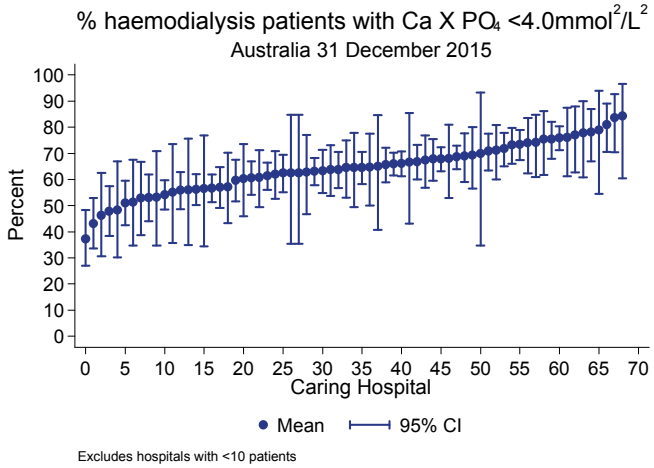
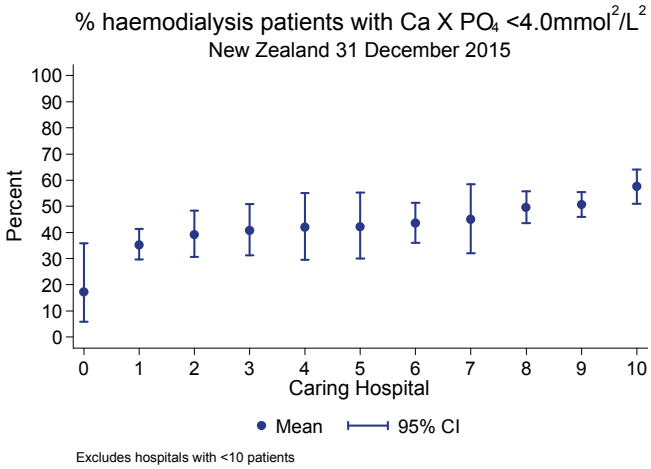


Figure 4.29.2



Dialysis Adequacy

Figures 4.30-4.33 and table 4.11 present the urea reduction ratio (URR) of patients dialysing three times per week.

Figure 4.30 shows the distribution of URR by country over 2013-15; there is little change from year to year, and clearances are lower in New Zealand than in Australia. Figure 4.31 presents the 2015 data stratified by vascular access type.

Figure 4.30

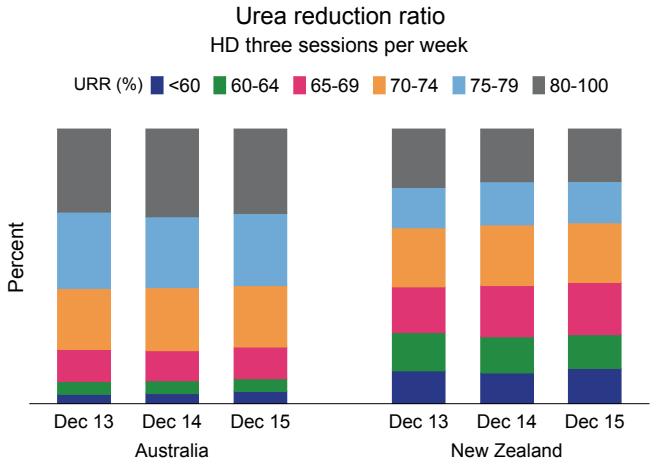


Figure 4.31

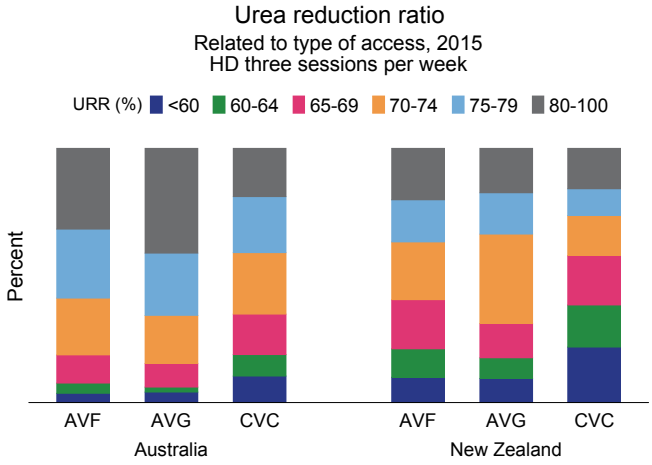


Table 4.11 presents URR by dialysis session duration. In general, as expected, the proportion of patients with a URR ≥65% typically increases with longer session duration.

Table 4.11 Urea Reduction Ratio - Prevalent Patients Three Sessions per Week - December 2015

Country	Hours per Session	Urea Reduction Ratio %		Total
		<65	≥65	
Australia	<4 hours	56 (17.8%)	259 (82.2%)	315
	4 hours	296 (9.6%)	2798 (90.4%)	3094
	>4-5 hours	327 (7.9%)	3833 (92.1%)	4160
	>5 hours	40 (13.2%)	264 (86.8%)	304
	Total	719 (9.1%)	7154 (90.9%)	7873
New Zealand	<4 hours	9 (36.0%)	16 (64.0%)	25
	4 hours	115 (27.8%)	298 (72.2%)	413
	>4-5 hours	212 (24.5%)	655 (75.5%)	867
	>5 hours	13 (15.3%)	72 (84.7%)	85
	Total	349 (25.1%)	1041 (74.9%)	1390

Figure 4.32 shows the distribution of median URR by treating hospital for patients dialysing three times per week. In Australia the median ranged from 67-86%, and in New Zealand it ranged from 68-83%. Figure 4.33 shows the proportion of patients with a URR >70%. In Australia this proportion ranged from 45-100%, and in New Zealand from 40-87%.

Figure 4.32.1

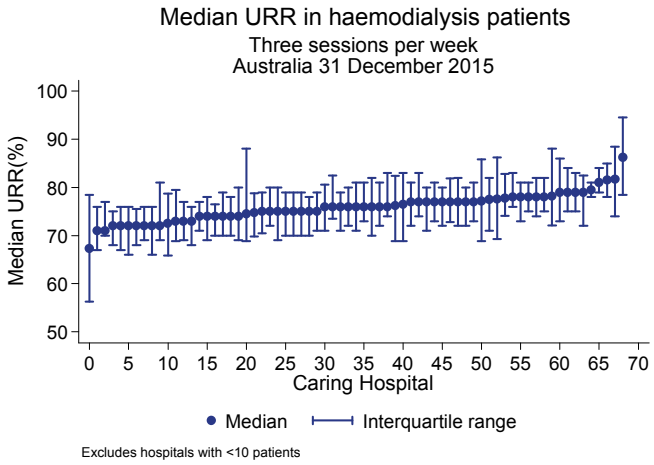


Figure 4.32.2

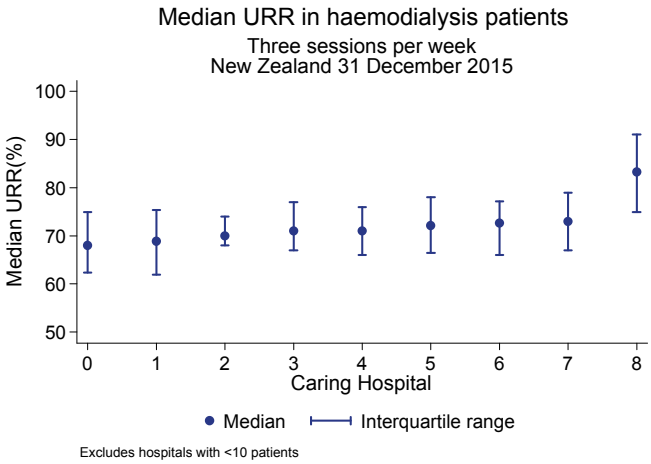


Figure 4.33.1

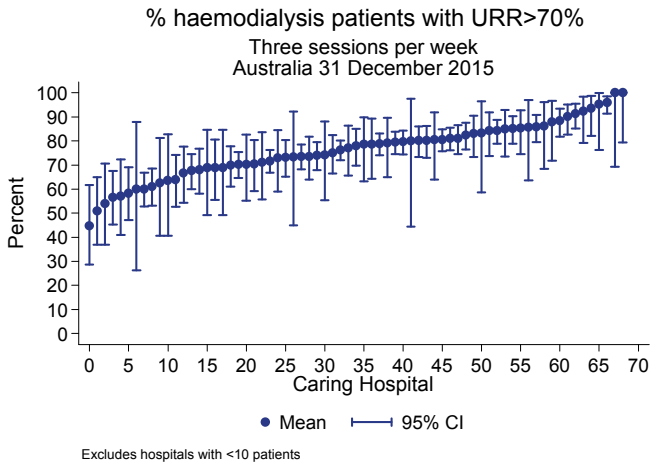
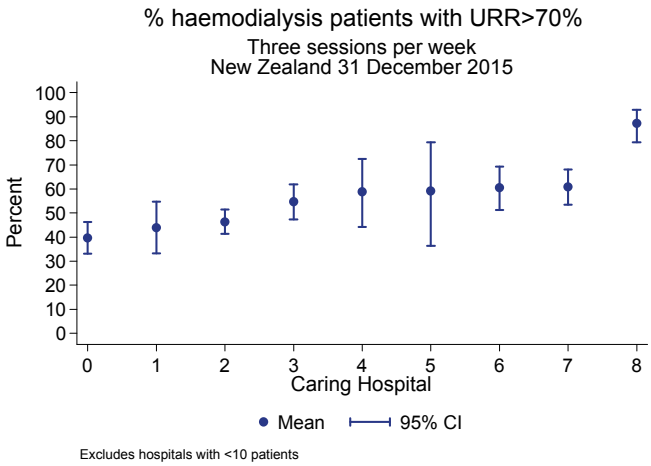


Figure 4.33.2



Vascular Access

Incident Patients

Figures 4.34 to 4.40 and table 4.12

The majority of patients commence haemodialysis with a catheter; tunnelled catheters are more common than non-tunnelled. Female, young (age <25 years) patients and those patients who were first seen by nephrologists <3 months before starting haemodialysis ("late referrals") were less likely to start with an AVF or AVG.

In both Australian and New Zealand indigenous peoples had similar or decreased rates of AVF or AVG at the commencement of dialysis.

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 4.34

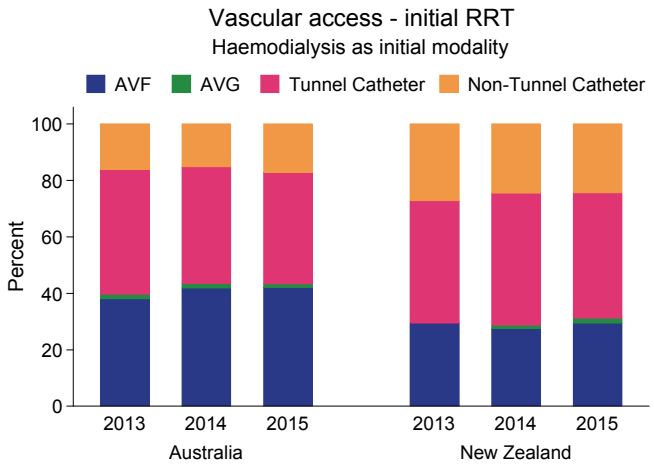


Figure 4.35

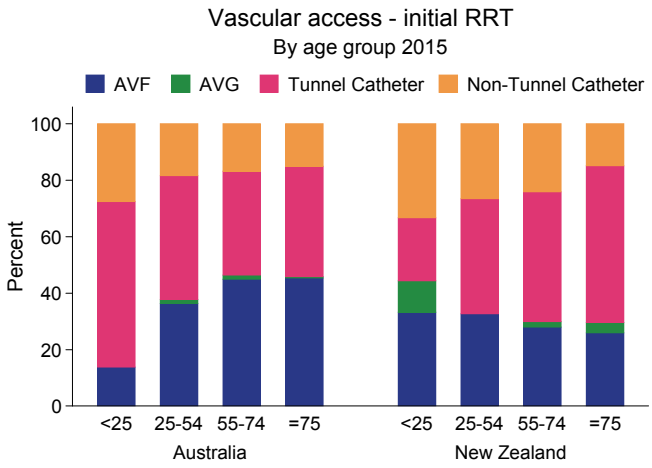


Figure 4.36.1

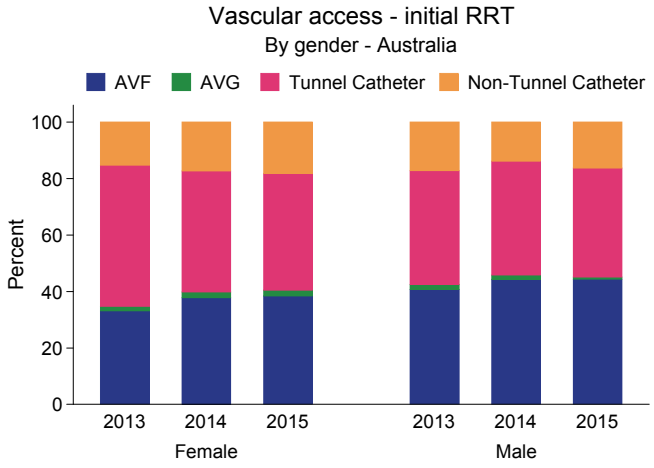


Figure 4.36.2

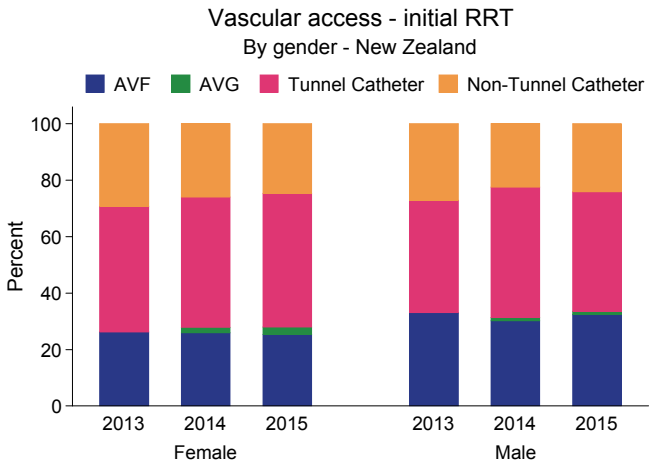


Figure 4.37

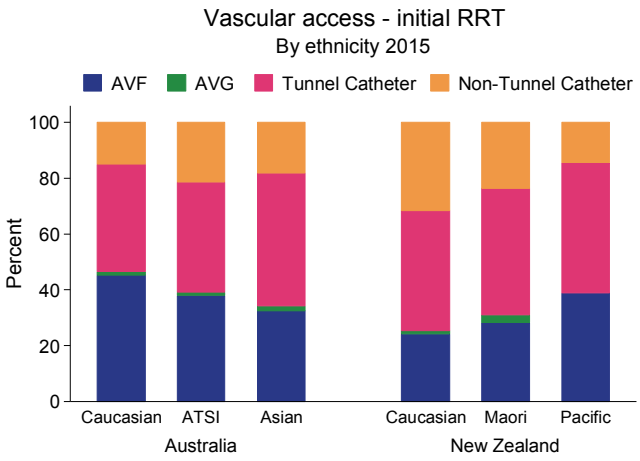


Figure 4.38.1

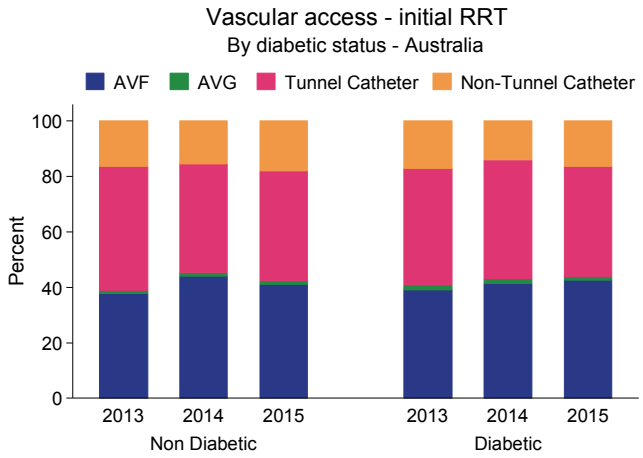


Figure 4.38.2

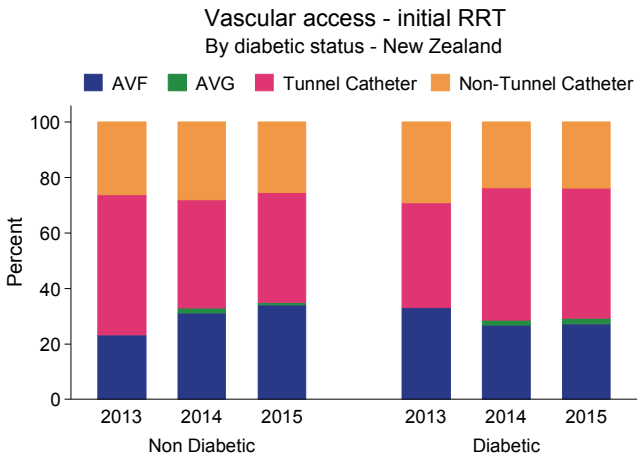


Figure 4.39

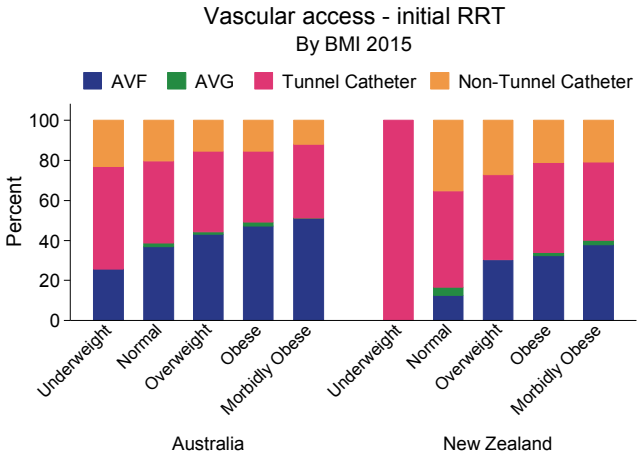


Figure 4.40.1

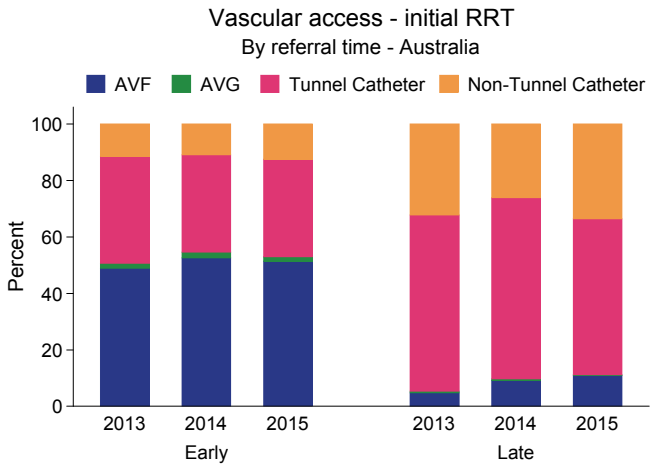


Figure 4.40.2

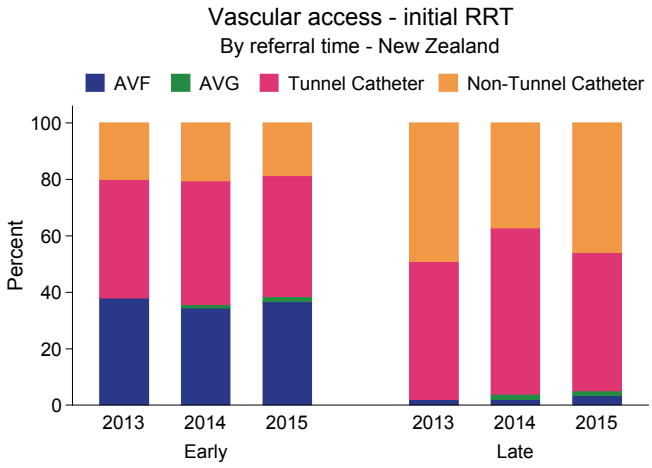


Table 4.12 Incident Vascular Access 2013 - 2015

Initial State/ Country	2013		2014		2015	
	AVF/AVG	CVC	AVF/AVG	CVC	AVF/AVG	CVC
QLD	128 (44%)	165 (56%)	127 (46%)	147 (54%)	138 (46%)	164 (54%)
NSW/ACT	152 (36%)	275 (64%)	161 (40%)	241 (60%)	224 (42%)	313 (58%)
VIC	173 (45%)	213 (55%)	181 (45%)	220 (55%)	184 (44%)	237 (56%)
TAS	12 (48%)	13 (52%)	16 (47%)	18 (53%)	14 (37%)	24 (63%)
SA	40 (36%)	72 (64%)	69 (63%)	40 (37%)	77 (60%)	51 (40%)
NT	17 (27%)	45 (73%)	30 (36%)	54 (64%)	45 (38%)	72 (62%)
WA	42 (34%)	80 (66%)	56 (39%)	87 (61%)	82 (38%)	135 (62%)
NZ	**77 (30%)**	**179 (70%)**	**79 (31%)**	**180 (69%)**	**90 (31%)**	**198 (69%)**

Figure 4.41 shows the proportion of patients in each hospital starting haemodialysis with an AVF/AVG, arranged from the lowest to the highest. In Australia, this ranged widely from 18-69%. The corresponding range in New Zealand was 12-45%. This wide variation reflects differences in practices, protocols, resources and patient case-mix among centres.

Figure 4.41.1

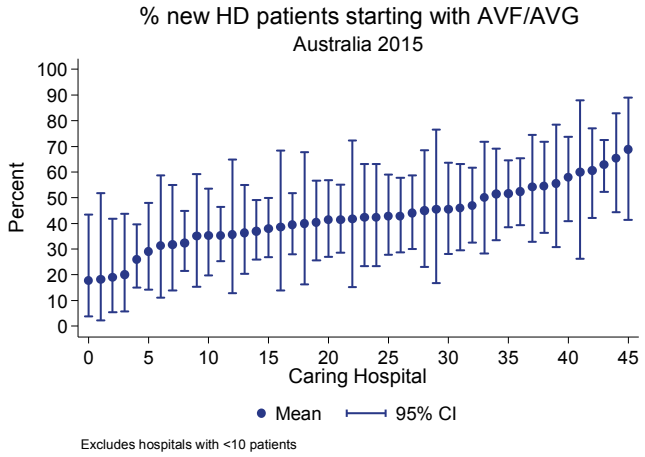
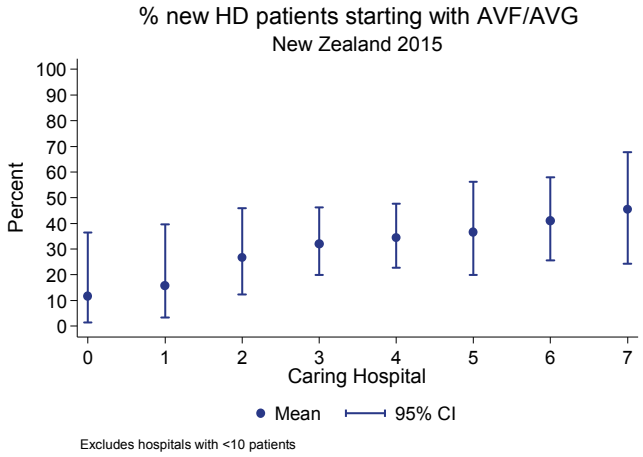


Figure 4.41.2



Prevalent Patients

Figures 4.42 to 4.49 and table 4.13

These show dialysis access among prevalent (rather than incident) patients (those receiving haemodialysis at 31 December 2015).

In both Australia and New Zealand, the proportions of patients dialysing with AV grafts and fistulae at 31 December are stable.

Female patients in both countries, young (age <25 years) in Australia and old (age ≥75 years) patients in New Zealand were less likely to be dialysing with an AVF or AVG.

In Australia indigenous people were more likely to be dialysing with an AVF. In New Zealand, Māori and Pacific people were more likely to dialyse with an AVF. Patients on home haemodialysis have the highest rate of AVF use in both Australia and New Zealand.

Figure 4.42

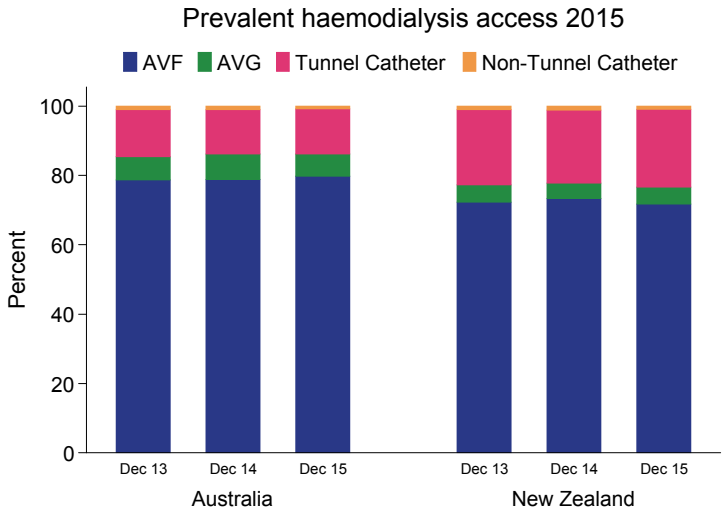


Figure 4.43

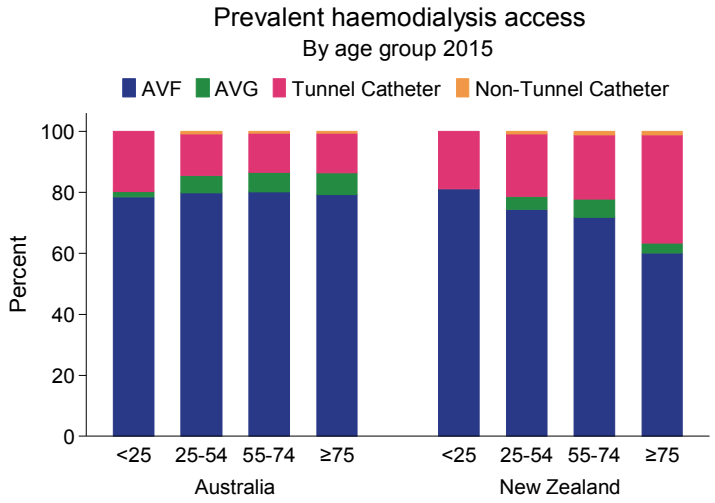


Figure 4.44.1

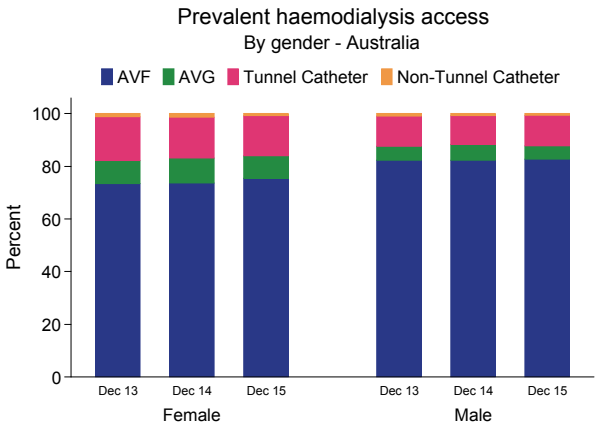


Figure 4.44.2

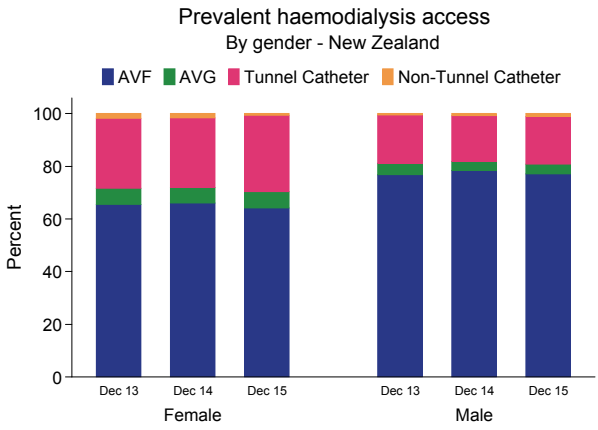


Figure 4.45

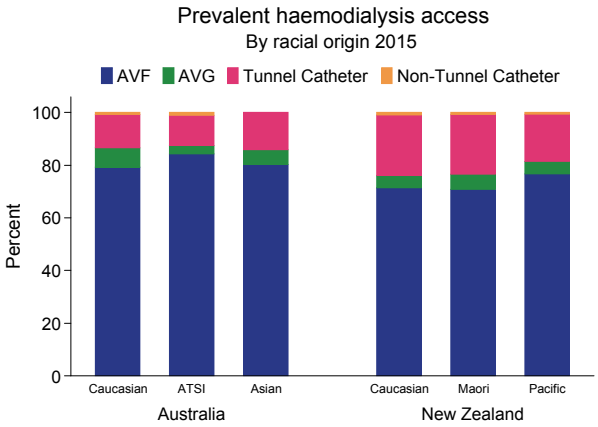


Figure 4.46.1

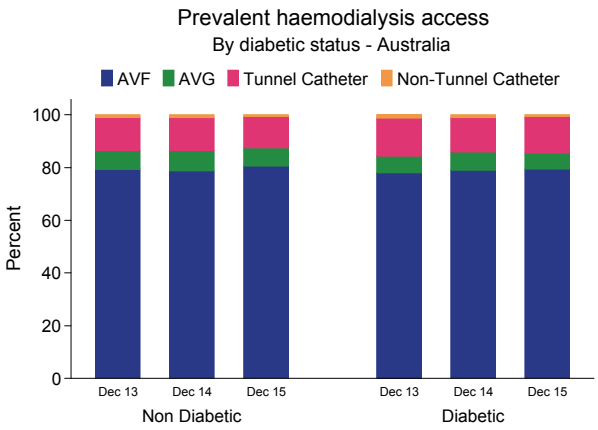


Figure 4.46.2

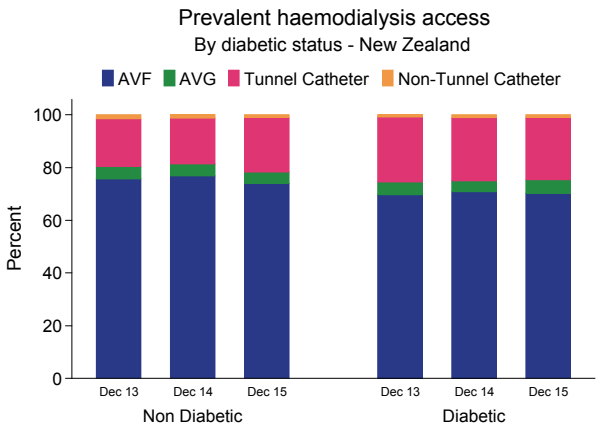


Figure 4.47

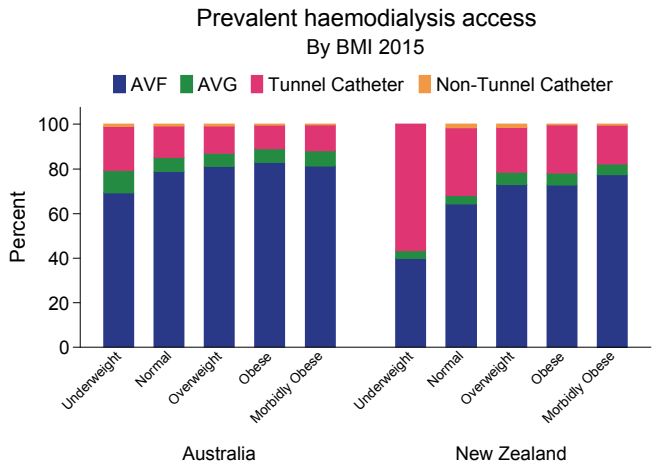


Figure 4.48

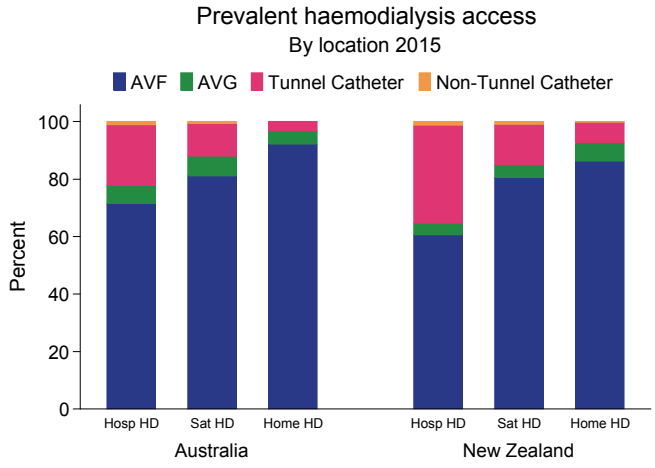


Table 4.13 Prevalent Vascular Access at 31 December

State/Country	2013		2014		2015	
	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC
QLD	1541 (87%)	221 (13%)	1563 (88%)	208 (12%)	1587 (88%)	211 (12%)
NSW/ACT	2572 (83%)	527 (17%)	2603 (84%)	487 (16%)	2583 (85%)	463 (15%)
VIC	2095 (88%)	283 (12%)	2080 (88%)	293 (12%)	2047 (88%)	288 (12%)
TAS	149 (84%)	28 (16%)	157 (83%)	33 (17%)	152 (79%)	41 (21%)
SA	572 (92%)	49 (8%)	581 (94%)	39 (6%)	575 (92%)	53 (8%)
NT	406 (84%)	78 (16%)	446 (86%)	75 (14%)	459 (87%)	68 (13%)
WA	699 (79%)	189 (21%)	682 (80%)	167 (20%)	628 (80%)	157 (20%)
New Zealand	1355 (77%)	398 (23%)	1428 (78%)	408 (22%)	1407 (77%)	430 (23%)

Figure 4.49 shows the proportion of haemodialysis patients at each state or hospital dialysing with an AVF/AVG on 31st December 2015, arranged from the lowest to the highest. In Australia, the hospital proportions varied widely from 69-100%. The corresponding range in New Zealand was 46-89%

Figure 4.49.1

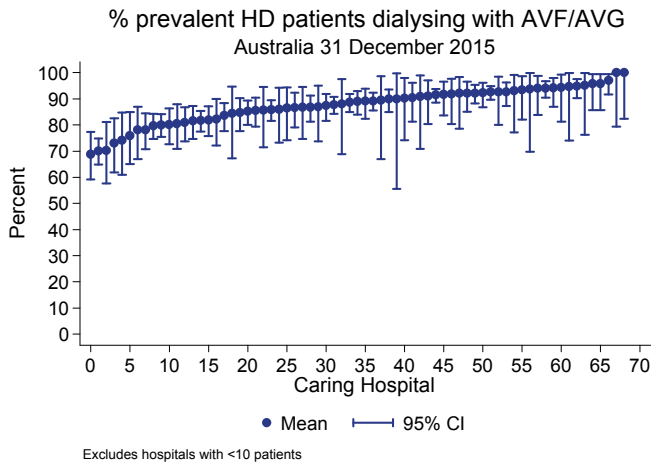
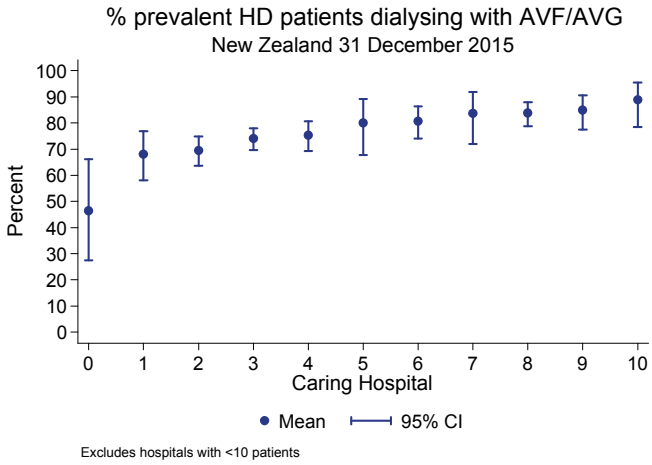


Figure 4.49.2



Survival

Table 4.14 and figure 4.50 present unadjusted haemodialysis patient survival by era and country, censored at transplantation. There has been very little change over eras. Table 4.15 and figure 4.51 present the same data stratified by age, and table 4.16 and figure 4.52 present the same data by diabetic status.

Table 4.14 Patient Survival - 90 Days after HD Start - Censored for Transplant 2004 - 2015
% [95% Confidence Interval]

Country	Years	Survival				Number Patients
		6 months	1 year	3 years	5 years	
Australia	2004-2006	96 [95, 97]	89 [88, 90]	68 [67, 70]	50 [48, 51]	4223
	2007-2009	96 [95, 96]	90 [89, 91]	70 [69, 72]	53 [52, 55]	4705
	2010-2012	96 [96, 97]	91 [90, 92]	71 [70, 73]	54 [52, 56]	4909
	2013-2015	97 [96, 97]	91 [90, 92]	-	-	4554
New Zealand	2004-2006	97 [95, 98]	91 [89, 93]	71 [67, 75]	51 [47, 55]	704
	2007-2009	96 [94, 97]	91 [89, 93]	71 [68, 75]	54 [49, 58]	793
	2010-2012	97 [96, 98]	93 [91, 95]	74 [70, 77]	55 [50, 59]	797
	2013-2015	97 [95, 98]	93 [91, 95]	-	-	816

Figure 4.50.1

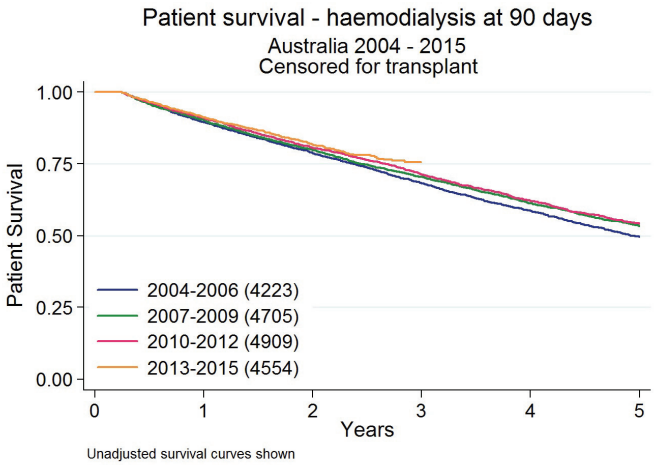


Figure 4.50.2

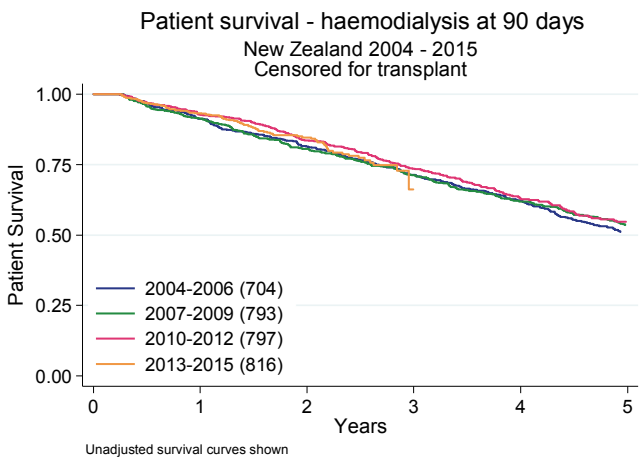


Table 4.15 Patient Survival on Haemodialysis at 90 Days By Age Group Censored for Transplant 2004 - 2015 % [95% Confidence Interval]

Country	Age Group	Survival				Number Patients
		6 months	1 year	3 years	5 years	
Australia	<40 years	99 [98, 99]	97 [96, 98]	88 [86, 90]	80 [76, 82]	1735
	40-59 years	98 [98, 98]	95 [94, 95]	82 [80, 83]	68 [66, 70]	5807
	60-74 years	96 [95, 96]	89 [88, 90]	68 [67, 70]	50 [49, 52]	6680
	>=75 years	94 [93, 95]	85 [84, 86]	55 [54, 57]	33 [31, 35]	4169
New Zealand	<40 years	99 [98, 100]	97 [94, 98]	84 [79, 89]	76 [69, 82]	383
	40-59 years	97 [96, 98]	94 [93, 96]	80 [77, 82]	63 [59, 66]	1331
	60-74 years	96 [94, 97]	90 [88, 92]	66 [63, 69]	45 [41, 49]	1111
	>=75 years	94 [90, 96]	84 [79, 88]	48 [41, 55]	21 [15, 28]	285

Figure 4.51.1

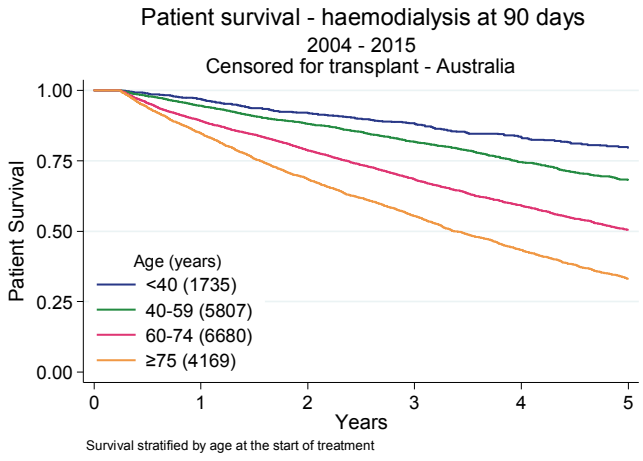


Figure 4.51.2

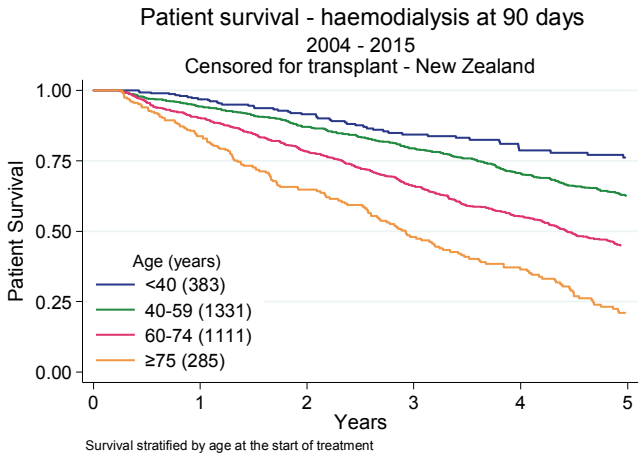


Table 4.16 Patient Survival - Diabetic / Non Diabetic - on Haemodialysis at 90 Days
Censored for Transplant 2004 - 2015
% [95% Confidence Interval]

Country	Diabetes	Survival				Number Patients
		6 months	1 year	3 years	5 years	
Australia	Non diabetic	96 [96, 96]	90 [90, 91]	71 [70, 72]	54 [52, 55]	11655
	Diabetic	97 [96, 97]	91 [90, 92]	70 [68, 71]	51 [50, 53]	6736
New Zealand	Non diabetic	97 [95, 97]	93 [91, 94]	76 [73, 78]	58 [54, 61]	1521
	Diabetic	97 [96, 98]	92 [90, 93]	69 [66, 72]	49 [46, 53]	1589

Figure 4.52.1

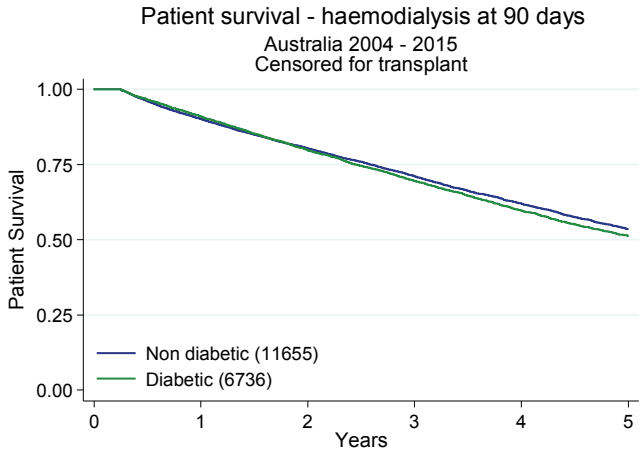


Figure 4.52.2

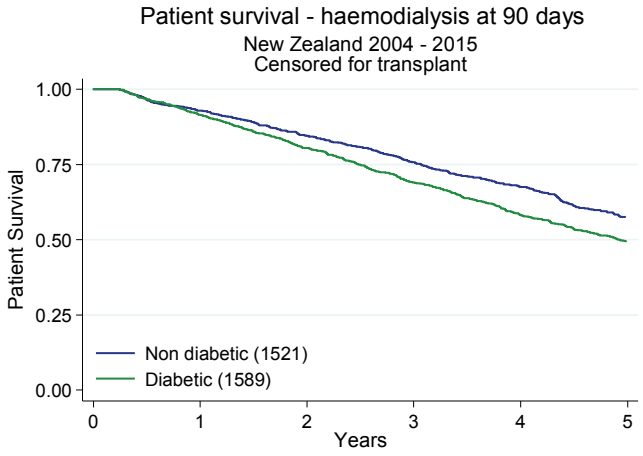


Figure 4.53 presents survival curves by era, adjusted for a number of demographic and clinical characteristics. After adjustment for these confounders, survival appears to be improving slightly with time.

Figure 4.53.1

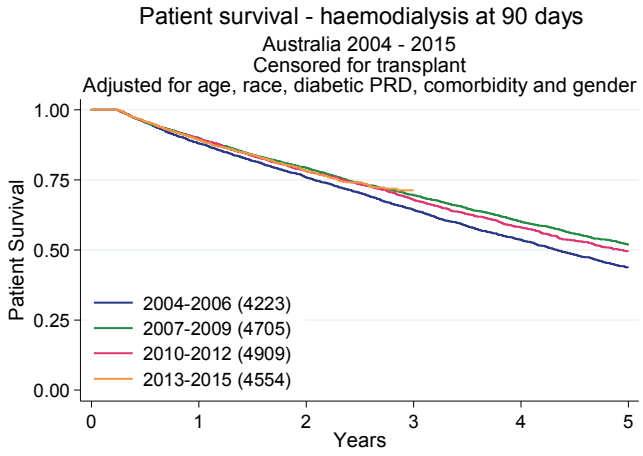
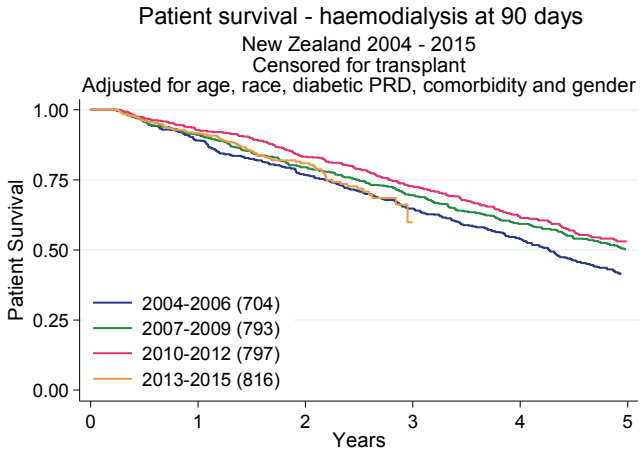


Figure 4.53.2



Home Haemodialysis

The distribution of patients receiving home haemodialysis by state and country is shown in Figure 4.54. As can be appreciated, numbers are greatest in New South Wales and in New Zealand, with substantial numbers also in Victoria and Queensland.

The distribution of prevalent home haemodialysis patients by age group is shown in Figure 4.55. Table 4.17 shows the prevalence of home haemodialysis amongst patients aged 65 and older.

Figure 4.54

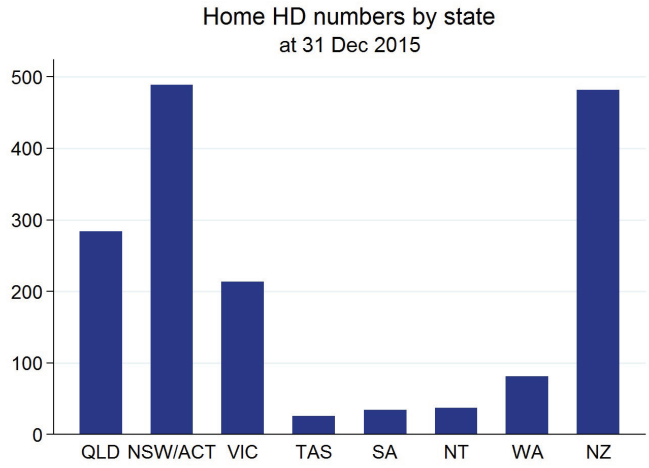


Figure 4.55

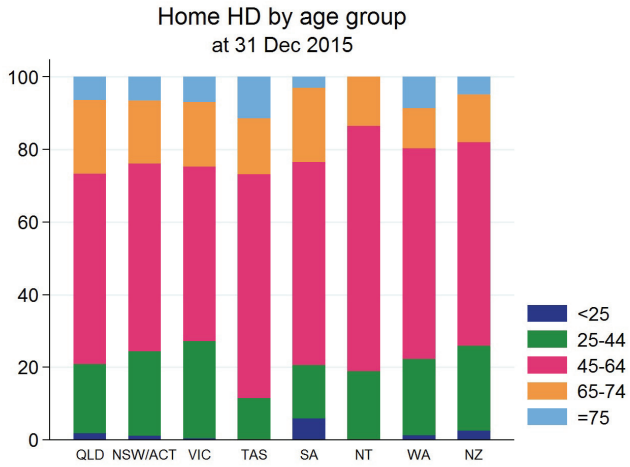


Table 4.17 Number (%) of Prevalent Dialysis Patients aged ≥65 years Treated with Home Haemodialysis 2011- 2015					
Country/State	**2011**	**2012**	**2013**	**2014**	**2015**
Australia	**301 (4.7%)**	**359 (5.4%)**	**347 (5.0%)**	**369 (5.2%)**	**369 (5.0%)**
QLD	48 (4.9%)	63 (6.3%)	66 (6.3%)	79 (7.3%)	76 (6.7%)
NSW/ACT	107 (5.3%)	120 (5.6%)	119 (5.4%)	121 (5.3%)	117 (5.0%)
VIC	47 (3.2%)	55 (3.6%)	50 (3.1%)	53 (3.2%)	53 (3.1%)
TAS	4 (4.0%)	6 (5.4%)	6 (5.5%)	7 (6.4%)	7 (5.9%)
SA	4 (1.0%)	11 (2.7%)	10 (2.3%)	5 (1.2%)	8 (1.9%)
NT	2 (3.4%)	3 (4.5%)	4 (5.6%)	5 (6.3%)	5 (4.7%)
WA	11 (2.2%)	15 (2.9%)	12 (2.4%)	14 (2.5%)	16 (2.8%)
New Zealand	**78 (9.5%)**	**86 (10.1%)**	**80 (8.9%)**	**85 (8.9%)**	**87 (9.0%)**

The trends in numbers treated with home HD for different age groups are illustrated in figure 4.56. The Y axes for individual graphs vary – the absolute numbers in the age groups 25 to 64 years are substantially greater than among older patients. However, there has been strong growth in the older age groups in the last few years.

Figure 4.56.1

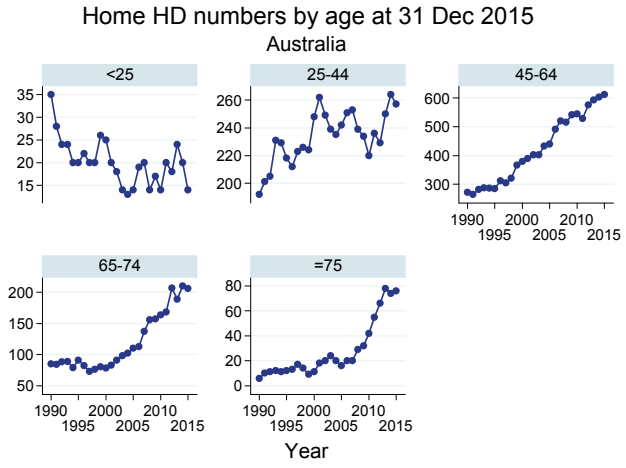
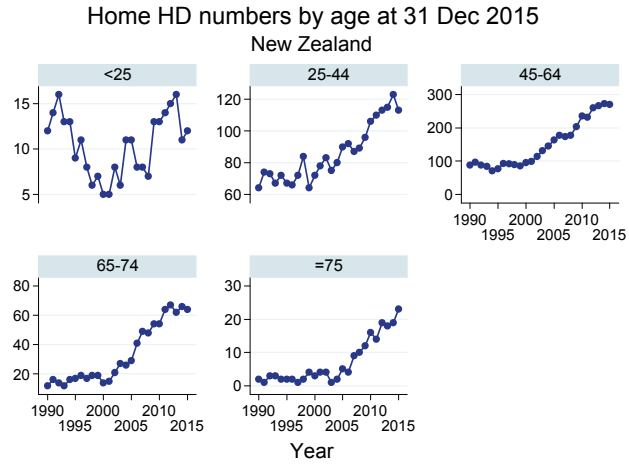


Figure 4.56.2



The following figures explore the concept of technique failure as applied to home haemodialysis. Each treatment episode can end in a variety of ways. Changes to another dialysis modality (either institutional haemodialysis or peritoneal dialysis) for 30 or more days are considered a “failure”, as is death. Follow-up is censored at transplantation, or 31 Dec 2015. When death of a patient is counted as a censoring event (rather than “failure”), the differences between the age groups become less apparent (figure 4.59)

Figure 4.57

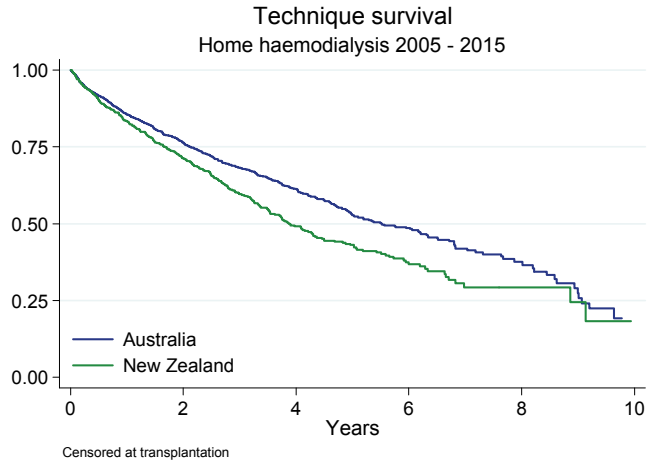


Figure 4.58

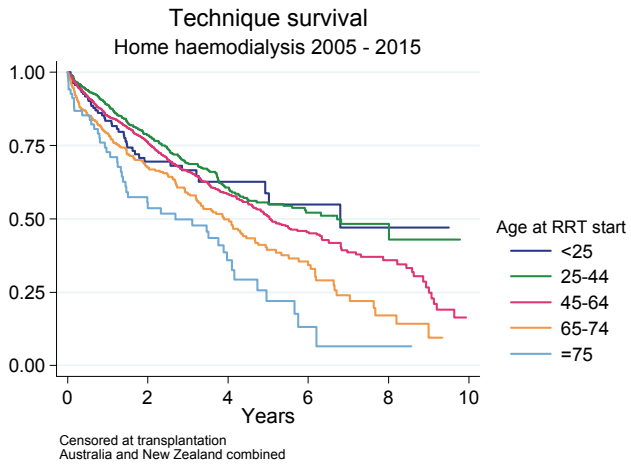


Figure 4.59.1

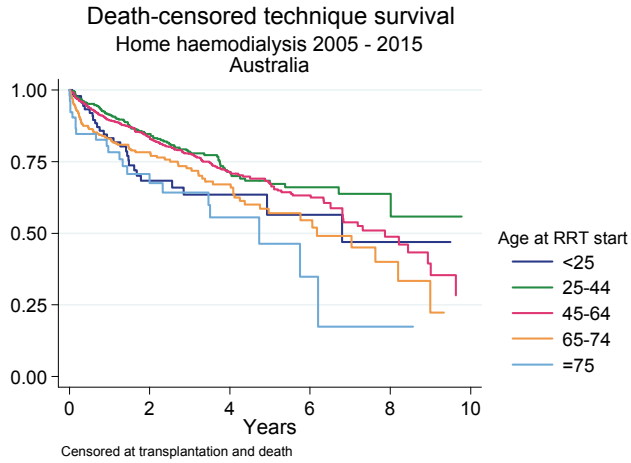
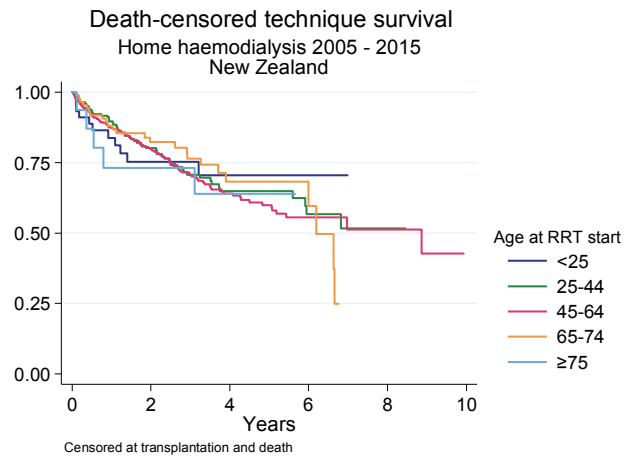


Figure 4.59.2



Suggested Citation:

ANZDATA Registry. 39th Report, Chapter 4: Haemodialysis. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at: http://www.anzdata.org.au

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