CHAPTER 5

HAEMODIALYSIS
(including home haemodialysis)

Kevan Polkinghorne
Aarti Gulyani
Stephen McDonald
Kylie Hurst

2012 Annual Report—35th Edition

STOCK AND FLOW

AUSTRALIA

The annual stock and flow of HD patients during the period 2007-2011 is shown in Figures 5.1, 5.2 and 5.3.

There were 8,929 patients receiving HD treatment at 31st December 2011, an increase of 4%; of these 22% were hospital based, 50% were in satellite centres and 9% at home. Home haemodialysis is presented in detail from page 5.36.

A total of 1,811 patients received HD for the first time during the year, a slight increase from previous years.

The proportion of all HD patients in each age group is shown in Figure 5.7. There were 2,400 people ≥ 75 years receiving haemodialysis, including 422 people ≥ 85 years, a rise of 7% from 2010, following a 21% rise for the previous year.

There were 517 transplant operations to people receiving HD treatment, 6% of all HD patients dialysing and 12% of those patients < 65 years.

There were 1,220 deaths in 2011.

Figure 5.1

Stock and Flow of Haemodialysis Patients
2007 - 2011

	2007	2008	2009	2010	2011
Australia					
Patients new to HD	2020	2153	2070	2036	2141
First Dialysis Treatment	1729	1792	1717	1722	1811
Previous Dialysis (PD)	268	321	314	279	297
Failed Transplant	23	40	39	35	33
Transplanted	405	535	495	550	517
Deaths	1163	1201	1226	1149	1220
Never Transplanted	1084	1138	1150	1081	1145
Previous Transplant	79	63	76	68	75
Transfer to PD	436	488	428	367	371
Patients Dialysing (HD) at 31 December	7593	7924	8251	8595	8929
Patients Dialysing (HD) at Home at 31 December	949	951	977	974	972
% of all Home Dialysis (HD and PD) Patients	31%	30%	31%	32%	32%
New Zealand					
Patients new to HD	380	394	429	398	403
First Dialysis Treatment	311	320	360	333	313
Previous Dialysis (PD)	57	66	59	58	80
Failed Transplant	12	8	10	7	10
Transplanted	60	69	61	47	62
Deaths	177	236	205	205	229
Never Transplanted	167	219	192	182	219
Previous Transplant	10	17	13	23	10
Transfer to PD	146	158	118	162	123
Patients Dialysing (HD) at 31 December	1325	1343	1481	1553	1591
Patients Dialysing (HD) at Home at 31 December	327	331	378	424	433
% of all Home Dialysis (HD and PD) Patients	31%	30%	32%	34%	36%

NEW ZEALAND

The annual stock and flow of HD patients during the period 2007-2011 is shown in Figures 5.1, 5.4 and 5.5.

There were 1,591 patients receiving treatment at 31st December 2011, a continuation of the trend from 2008-2010.

Hospital based HD (44%), satellite HD (29%) and home HD (27%) have all remained the same for the past three years.

New Zealand is continued on page 4-5.

Figure 5.2

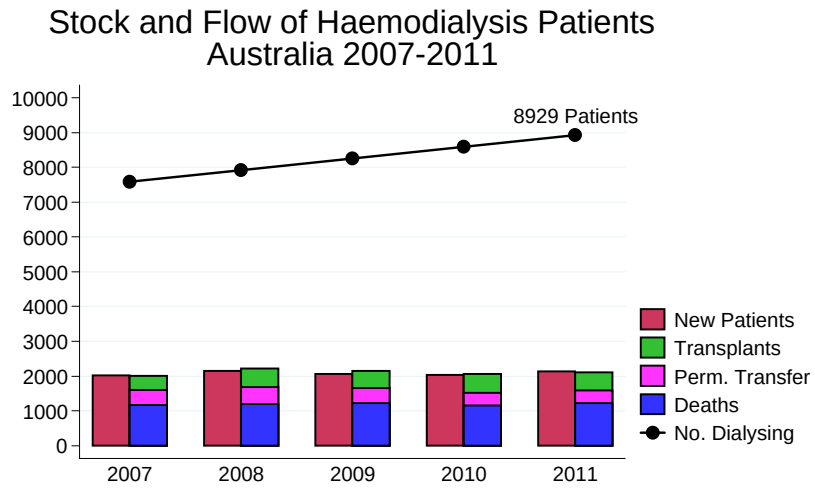


Figure 5.3

Stock and Flow of Haemodialysis Patients
Australia 2007 - 2011 Number (%)

Age Groups	2007	2008	2009	2010	2011
New Patients *					
00-14 years	9 (0%)	13 (1%)	9 (0%)	14 (1%)	17 (1%)
15-24 years	45 (2%)	42 (2%)	45 (2%)	43 (2%)	43 (2%)
25-34 years	94 (5%)	101 (5%)	88 (4%)	78 (4%)	81 (4%)
35-44 years	187 (9%)	173 (8%)	178 (9%)	172 (8%)	196 (9%)
45-54 years	315 (16%)	345 (16%)	313 (15%)	314 (15%)	323 (15%)
55-64 years	437 (22%)	448 (21%)	447 (22%)	441 (22%)	478 (22%)
65-74 years	484 (24%)	542 (25%)	516 (25%)	482 (24%)	522 (24%)
75-84 years	405 (20%)	432 (20%)	416 (20%)	408 (20%)	418 (20%)
>=85 years	44 (2%)	57 (3%)	58 (3%)	84 (4%)	63 (3%)
Total	**2020 (100%)**	**2153 (100%)**	**2070 (100%)**	**2036 (100%)**	**2141 (100%)**
Patients Dialysing					
00-14 years	5 (0%)	10 (0%)	9 (0%)	10 (0%)	12 (0%)
15-24 years	98 (1%)	88 (1%)	91 (1%)	99 (1%)	108 (1%)
25-34 years	305 (4%)	290 (4%)	292 (4%)	291 (3%)	285 (3%)
35-44 years	737 (10%)	693 (9%)	695 (8%)	694 (8%)	725 (8%)
45-54 years	1211 (16%)	1275 (16%)	1316 (16%)	1314 (15%)	1335 (15%)
55-64 years	1619 (21%)	1721 (22%)	1781 (22%)	1861 (22%)	1931 (22%)
65-74 years	1803 (24%)	1895 (24%)	1985 (24%)	2064 (24%)	2133 (24%)
75-84 years	1602 (21%)	1685 (21%)	1772 (21%)	1871 (22%)	1978 (22%)
>=85 years	213 (3%)	267 (3%)	310 (4%)	391 (5%)	422 (5%)
Total	**7593 (100%)**	**7924 (100%)**	**8251 (100%)**	**8595 (100%)**	**8929 (100%)**
Primary Renal Disease *					
Glomerulonephritis	484 (24%)	463 (22%)	506 (24%)	426 (21%)	477 (22%)
Analgesic Nephropathy	46 (2%)	46 (2%)	40 (2%)	38 (2%)	27 (1%)
Hypertension	319 (16%)	322 (15%)	288 (14%)	285 (14%)	326 (15%)
Polycystic Disease	127 (6%)	125 (6%)	123 (6%)	136 (7%)	122 (6%)
Reflux Nephropathy	56 (3%)	59 (3%)	61 (3%)	43 (2%)	49 (2%)
Diabetic Nephropathy	642 (32%)	748 (35%)	686 (33%)	741 (36%)	774 (36%)
Miscellaneous	215 (11%)	233 (11%)	231 (11%)	250 (12%)	252 (12%)
Uncertain	131 (6%)	157 (7%)	135 (7%)	117 (6%)	114 (5%)
Total	**2020 (100%)**	**2153 (100%)**	**2070 (100%)**	**2036 (100%)**	**2141 (100%)**

* New patients receiving first haemodialysis treatment

Figure 5.4

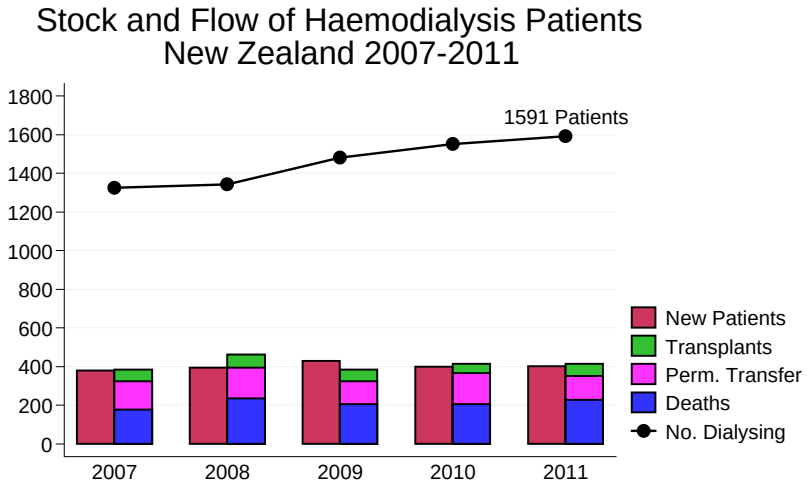


Figure 5.5

Stock and Flow of Haemodialysis Patients
New Zealand 2007 - 2011 Number (%)

Age Groups	2007	2008	2009	2010	2011
New Patients *					
00-14 years	3 (1%)	5 (1%)	2 (0%)	1 (0%)	1 (0%)
15-24 years	21 (6%)	19 (5%)	10 (2%)	12 (3%)	15 (4%)
25-34 years	17 (4%)	15 (4%)	24 (6%)	12 (3%)	19 (5%)
35-44 years	45 (12%)	34 (9%)	54 (13%)	40 (10%)	44 (11%)
45-54 years	63 (17%)	84 (21%)	89 (21%)	97 (24%)	78 (19%)
55-64 years	100 (26%)	117 (30%)	103 (24%)	112 (28%)	105 (26%)
65-74 years	88 (23%)	89 (23%)	93 (22%)	82 (21%)	100 (25%)
75-84 years	39 (10%)	30 (8%)	51 (12%)	39 (10%)	38 (9%)
>=85 years	4 (1%)	1 (0%)	3 (1%)	3 (1%)	3 (1%)
Total	**380 (100%)**	**394 (100%)**	**429 (100%)**	**398 (100%)**	**403 (100%)**
Patients Dialysing					
00-14 years	3 (0%)	3 (0%)	3 (0%)	4 (0%)	1 (0%)
15-24 years	39 (3%)	38 (3%)	41 (3%)	45 (3%)	40 (3%)
25-34 years	80 (6%)	76 (6%)	90 (6%)	89 (6%)	90 (6%)
35-44 years	160 (12%)	149 (11%)	162 (11%)	165 (11%)	172 (11%)
45-54 years	261 (20%)	275 (20%)	309 (21%)	329 (21%)	331 (21%)
55-64 years	364 (27%)	373 (28%)	403 (27%)	431 (28%)	448 (28%)
65-74 years	297 (22%)	293 (22%)	316 (21%)	323 (21%)	343 (22%)
75-84 years	108 (8%)	126 (9%)	146 (10%)	152 (10%)	147 (9%)
>=85 years	13 (1%)	10 (1%)	11 (1%)	15 (1%)	19 (1%)
Total	**1325 (100%)**	**1343 (100%)**	**1481 (100%)**	**1553 (100%)**	**1591 (100%)**
Primary Renal Disease *					
Glomerulonephritis	89 (23%)	72 (18%)	97 (23%)	89 (22%)	98 (24%)
Analgesic Nephropathy	3 (1%)	1 (0%)	1 (0%)		2 (0%)
Hypertension	43 (11%)	33 (8%)	43 (10%)	38 (10%)	41 (10%)
Polycystic Disease	15 (4%)	14 (4%)	18 (4%)	13 (3%)	19 (5%)
Reflux Nephropathy	8 (2%)	9 (2%)	3 (1%)	6 (2%)	8 (2%)
Diabetic Nephropathy	163 (43%)	204 (52%)	212 (49%)	205 (52%)	173 (43%)
Miscellaneous	47 (12%)	46 (12%)	41 (10%)	36 (9%)	39 (10%)
Uncertain	12 (3%)	15 (4%)	14 (3%)	11 (3%)	23 (6%)
Total	**380 (100%)**	**394 (100%)**	**429 (100%)**	**398 (100%)**	**403 (100%)**

* New patients receiving first haemodialysis treatment

Figure 5.6

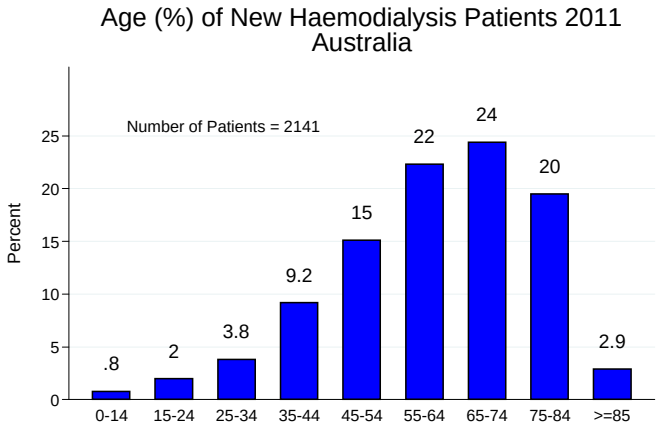
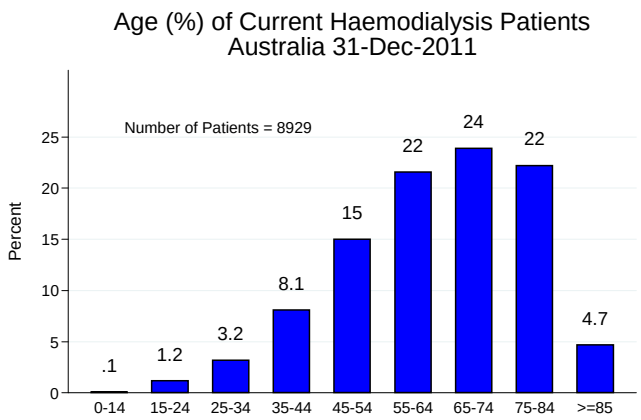


Figure 5.7



NEW ZEALAND (continued from page 5-2)

There were 403 patients who received HD for the first time in 2011, similar to previous years. Seventy eight percent were having their initial dialysis treatment, 20% were previously dialysing with peritoneal dialysis and 2% were failed transplants.

The modal age group for new HD patients was 55-64 years (26%), 9% were <35 years and 35% ≥ 65 years (Figures 5.5 and 5.8). The age distribution of the prevalent HD population was similar (Figure 5.10).

There were 62 HD patients who received transplants in 2011 (47 in 2010). Four patients ≥ 65 years were transplanted.

There were 229 deaths in 2011.

Figure 5.8

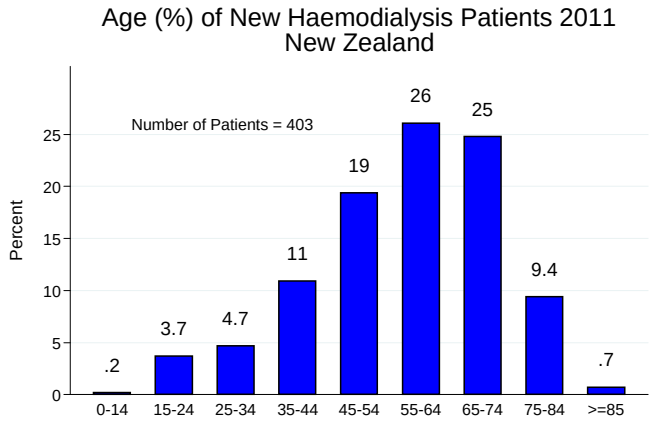
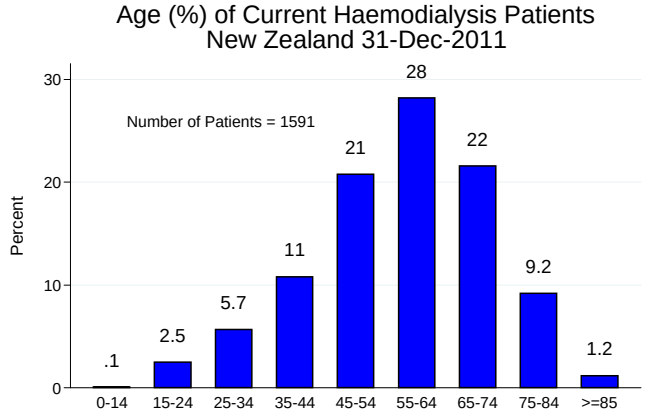


Figure 5.9



AUSTRALIA

Blood flow rates in Australia showed a similar picture in 2011 and continued to slowly rise. The proportion receiving a prescribed blood flow rate of 300 mls/minute or higher was 83% in 2011.

Only 3.4% (298 patients) were prescribed < 250 mls/minute.

Blood flow rates are lower in patients dialysing using central venous catheters than in those using AVFs or AVGs (Figure 5.11).

NEW ZEALAND

In December 2011, 72% of patients were prescribed 300 mls/minute or higher.

There were 7% using < 250 mls/minute, many of these were receiving long hour HD.

Figure 5.10

Blood Flow Rates (mls/minute) 2007 - 2011

Country		No. Pts	*CVV HD excluded	NR **	Mls/Minute					
					<200	200-249	250-299	300-349	350-399	>400
Aust	December 2011	8844	0	85	28	270	1242	5163	1867	274
	December 2010	8581	3	11	39	296	1226	4983	1721	316
	December 2009	8250	1	0	47	293	1208	4742	1629	331
	December 2008	7923	0	1	52	350	1282	4340	1590	309
	December 2007	7589	2	2	36	344	1400	4036	1479	294
NZ	December 2011	1588	0	3	4	107	330	906	222	19
	December 2010	1553	0	0	5	96	393	768	259	32
	December 2009	1480	1	0	4	94	368	680	300	34
	December 2008	1343	0	0	6	101	426	553	232	25
	December 2007	1325	0	0	6	87	381	545	278	28

Figure 5.11

Blood Flow Rate by Type of Access
December 2011

Blood Flow Rate	Australia				New Zealand			
	AVF	AVG	CVC*	NR**	AVF	AVG	CVC	NR**
<200	10 (.1%)	1 (.1%)	17 (1.5%)	0	3 (.3%)	0	1 (.3%)	0
200-249	174 (2.5%)	34 (4.9%)	62 (5.3%)	0	64 (5.5%)	3 (3.8%)	40 (11.5%)	0
250-299	840 (12%)	98 (14.2%)	302 (25.9%)	2 (2.2%)	190 (16.4%)	25 (31.3%)	114 (32.9%)	1 (33.3%)
300-349	4051 (58%)	421 (61.1%)	684 (58.7%)	7 (7.9%)	671 (57.8%)	49 (61.3%)	186 (53.6%)	0
350-399	1653 (23.7%)	119 (17.3%)	93 (8%)	2 (2.2%)	213 (18.3%)	3 (3.8%)	6 (1.7%)	0
>=400	253 (3.6%)	15 (2.2%)	5 (.4%)	1 (1.1%)	19 (1.6%)	0	0	0
NR**	5 (.1%)	1 (.1%)	2 (.2%)	77 (86.5%)	1 (.1%)	0	0	2 (66.7%)
Total	**6986 (100%)**	**689 (100%)**	**1165 (100%)**	**89 (100%)**	**1161 (100%)**	**80 (100%)**	**347 (100%)**	**3 (100%)**

* Number of patients having C.V.V. HD not included. NR** - Not Reported

Figure 5.12

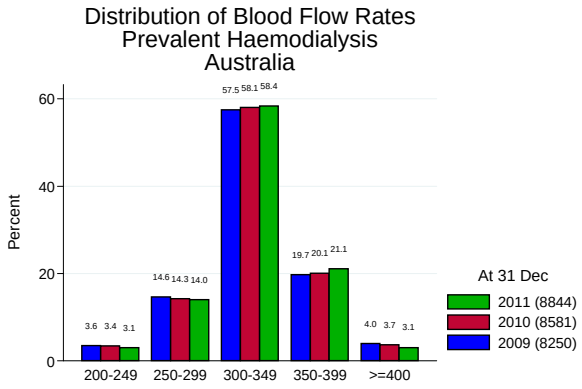


Figure 5.13

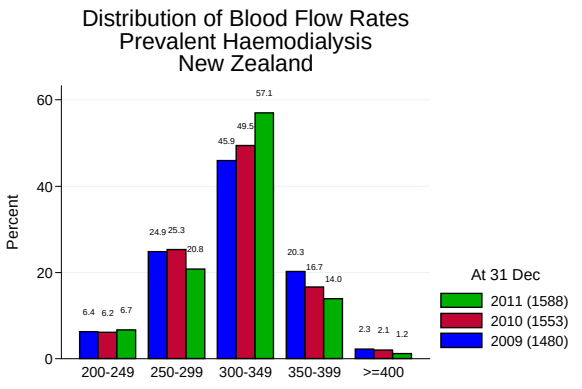


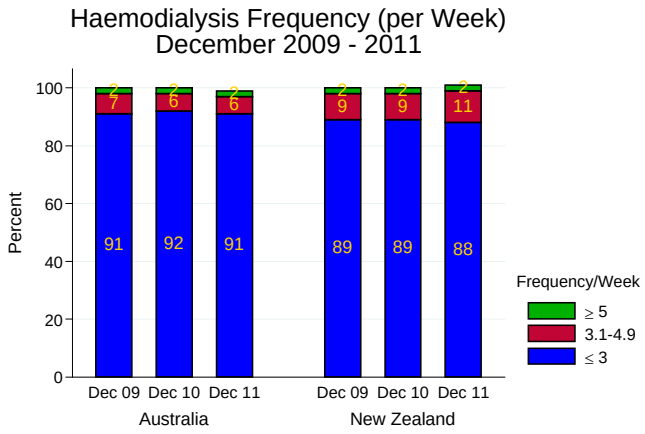
Figure 5.14

Duration and Number of Sessions Per Week
December 2011

Sessions Per week	Hours of Each Treatment							Total
	<4	4	4.5	5	5.5	>5.5	Not Reported	
Australia								
3.1-4.9	42 (7.6%)	78 (14.1%)	46 (8.3%)	126 (22.7%)	17 (3.1%)	245 (44.2%)		**554 (100%)**
<=3	361 (4.4%)	3264 (40.2%)	1807 (22.2%)	2369 (29.1%)	129 (1.6%)	195 (2.4%)	2 (0%)	**8127 (100%)**
>=5	70 (42.4%)	43 (26.1%)	3 (1.8%)	5 (3%)	1 (.6%)	43 (26.1%)		**165 (100%)**
Not reported				1 (1.2%)			82 (98.8%)	**83 (100%)**
Total	**473 (5.3%)**	**3385 (37.9%)**	**1856 (20.8%)**	**2501 (28%)**	**147 (1.6%)**	**483 (5.4%)**	**84 (.9%)**	**8929 (100%)**
New Zealand								
3.1-4.9	8 (4.7%)	31 (18.3%)	18 (10.7%)	59 (34.9%)	10 (5.9%)	43 (25.4%)		**169 (100%)**
<=3	20 (1.4%)	455 (32.6%)	346 (24.8%)	473 (33.9%)	34 (2.4%)	67 (4.8%)		**1395 (100%)**
>=5	9 (37.5%)	7 (29.2%)	2 (8.3%)	2 (8.3%)	1 (4.2%)	3 (12.5%)		**24 (100%)**
Not reported				1 (33.3%)			2 (66.7%)	**3 (100%)**
Total	**37 (2.3%)**	**493 (31%)**	**366 (23%)**	**535 (33.6%)**	**45 (2.8%)**	**113 (7.1%)**	**2 (.1%)**	**1591 (100%)**

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

Figure 5.15



Frequent and Long Haemodialysis

(Figures 5.14 - 5.23)

The proportions of those dialysing > 3 times per week in Australia has plateaued, with no change from 2009. In New Zealand the proportion dialysing more than three times per week continues to increase. The proportions dialysing ≥ 4.5 hours per session has slowly increased. As a result, the proportions dialysing more than the “standard” 12 hours per week continue to rise.

In 2011, 57% and 70% of HD patients were dialysing ≥ 13.5 hours per week in Australia and New Zealand respectively. Figures 5.16-5.20 show these from several perspectives.

Figure 5.16

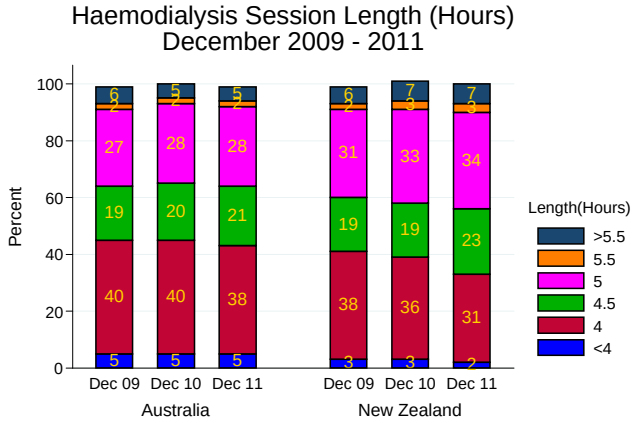


Figure 5.17

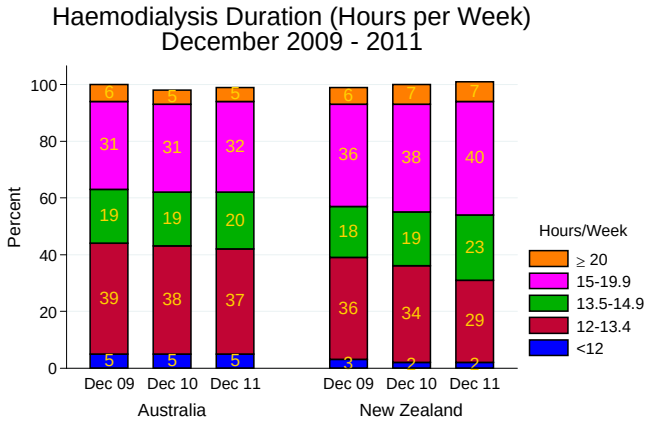


Figure 5.18

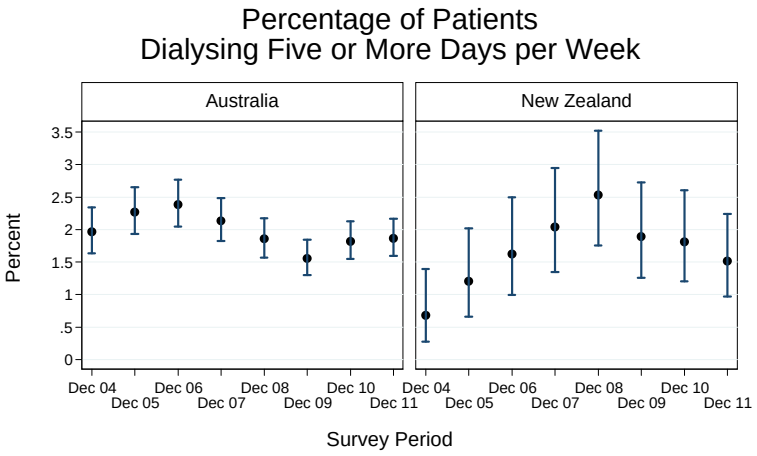


Figure 5.19

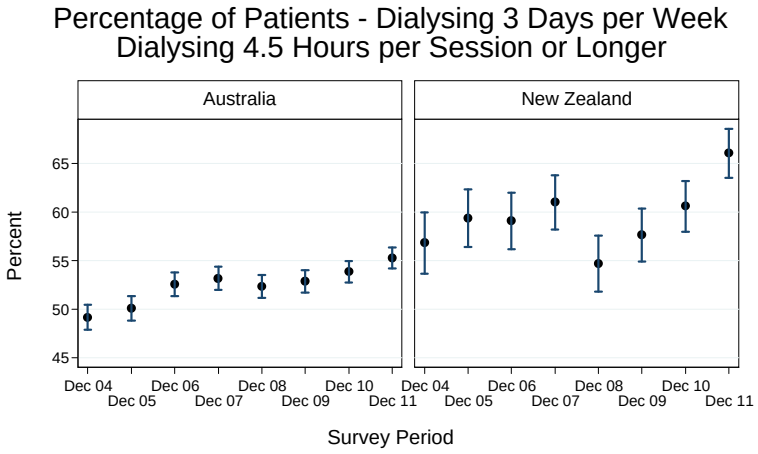
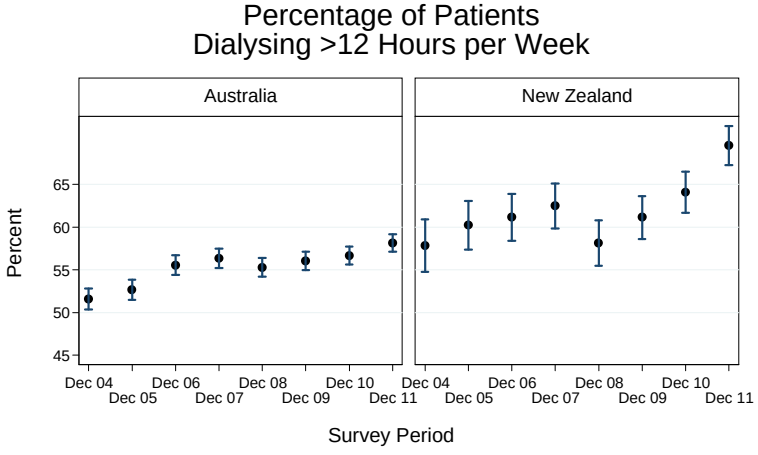


Figure 5.20



Dialysis frequency and session length vary among the Australian jurisdictions. Patients in Queensland and Victoria are more likely to dialyse more frequently, while patients in New South Wales/ACT and the Northern Territory tend to dialyse longer per session on average (Figures 5.21 - 5.23).

Figure 5.21

Haemodialysis Percentage ≥ 5 Sessions per Week
By Australian State and Country

	Australia							New Zealand
	Qld	NSW/ACT	Vic	Tas	SA	NT	WA	
Dec-11	61 (3.7%)	24 (.8%)	50 (2.2%)	2 (1.3%)	7 (1.2%)	3 (.7%)	18 (2.1%)	24 (1.5%)
Dec-10	52 (3.2%)	25 (.9%)	48 (2.2%)	3 (2.1%)	8 (1.4%)	5 (1.2%)	15 (1.9%)	28 (1.8%)
Dec-09	41 (2.6%)	28 (1%)	40 (1.9%)	2 (1.4%)	7 (1.3%)	-	10 (1.3%)	28 (1.9%)
Dec-08	51 (3.5%)	25 (1%)	46 (2.2%)	2 (1.5%)	10 (2%)	1 (.3%)	12 (1.6%)	34 (2.5%)

Figure 5.22

Haemodialysis Percentage ≥ 4.5 Hours Per Session
Three Sessions per Week
By Australian State and Country

	Australia							New Zealand
	Qld	NSW/ACT	Vic	Tas	SA	NT	WA	
Dec-11	840 (51.2%)	1917 (65.9%)	889 (38.6%)	100 (63.3%)	133 (22.2%)	318 (72.6%)	213 (24.3%)	916 (57.6%)
Dec-10	829 (51.1%)	1857 (65.9%)	757 (34%)	79 (54.1%)	138 (24.5%)	300 (74.8%)	201 (25%)	827 (53.4%)
Dec-09	788 (50.3%)	1746 (64.5%)	663 (31.2%)	81 (54.7%)	132 (24.4%)	305 (79.6%)	192 (24.7%)	753 (50.9%)
Dec-08	727 (49.3%)	1734 (66.1%)	642 (30.9%)	55 (41%)	105 (21.4%)	278 (76.8%)	176 (22.9%)	651 (48.5%)

Figure 5.23

Haemodialysis Percentage >12 Hours per Week
By Australian State and Country

	Australia							New Zealand
	Qld	NSW/ACT	Vic	Tas	SA	NT	WA	
Dec-11	1006 (61.3%)	2176 (74.8%)	1087 (47.1%)	112 (70.9%)	160 (26.8%)	328 (74.9%)	272 (31%)	1105 (69.5%)
Dec-10	996 (61.4%)	2080 (73.8%)	959 (43%)	92 (63%)	167 (29.6%)	310 (77.3%)	255 (31.7%)	993 (64.1%)
Dec-09	964 (61.5%)	1988 (73.4%)	873 (41.1%)	92 (62.2%)	161 (29.8%)	308 (80.4%)	238 (30.7%)	905 (61.1%)
Dec-08	893 (60.5%)	1950 (74.4%)	841 (40.5%)	64 (47.8%)	131 (26.7%)	285 (78.7%)	215 (28%)	781 (58.2%)

OUTCOMES AMONG HAEMODIALYSIS PATIENTS

In Australia, there has been little change in haemodialysis patient survival over time, after adjusting for age, diabetes status, sex, race and comorbidities.

In New Zealand, recent cohorts have slightly better survival. Unadjusted survivals are shown in Figures 5.24-5.26.

In both countries, diabetes status and age have marked effects on haemodialysis patient survival. (Figures 5.24 - 5.34).

Note: For all tables and graphs the times indicated are from the 90th day and not the first treatment.

Figure 5.24

Haemodialysis at 90 Days Patient Survival
Censored for Transplant 2000 - 2011
% [95% Confidence Interval]

	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
2000-2002	3144	96 [96, 97]	90 [89, 91]	68 [67, 70]	50 [48, 52]
2003-2005	3783	96 [95, 97]	90 [88, 90]	67 [66, 69]	48 [47, 50]
2006-2008	4454	96 [95, 96]	90 [89, 91]	69 [67, 70]	52 [50, 53]
2009-2011	4137	96 [96, 97]	91 [90, 92]	-	-
New Zealand					
2000-2002	567	97 [95, 98]	93 [90, 95]	71 [67, 75]	47 [42, 51]
2003-2005	655	97 [95, 98]	90 [88, 93]	70 [66, 73]	48 [44, 52]
2006-2008	693	97 [95, 98]	92 [89, 93]	69 [65, 72]	50 [45, 55]
2009-2011	735	97 [96, 98]	94 [92, 95]	-	-

Figure 5.25

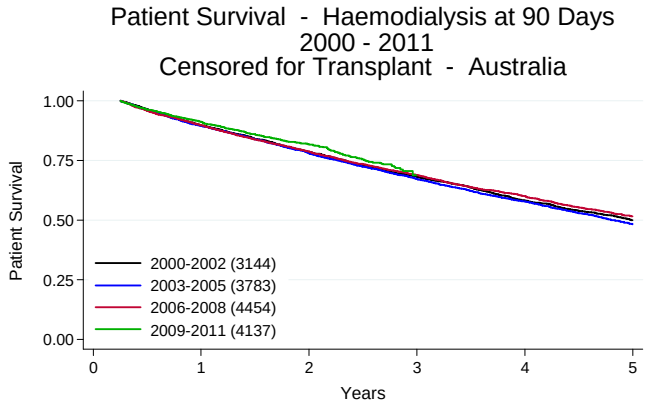
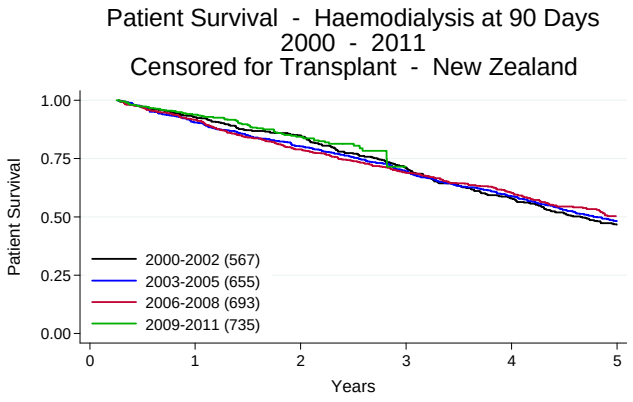


Figure 5.26



Figures 5.27- 5.28

These figures show survival curves for patients treated with haemodialysis at day 90, adjusted to a median age of 63.1 years for Australia and 57.2 years for New Zealand; non-diabetic primary renal disease; caucasoid race; female gender and no comorbid conditions (lung disease, coronary artery disease, peripheral vascular disease or cerebrovascular disease).

Note: x axis scale refers to time after day 90. PRD = Primary renal disease.

Figure 5.33-5.35 show survival stratified by age at the start of treatment.

Figure 5.27

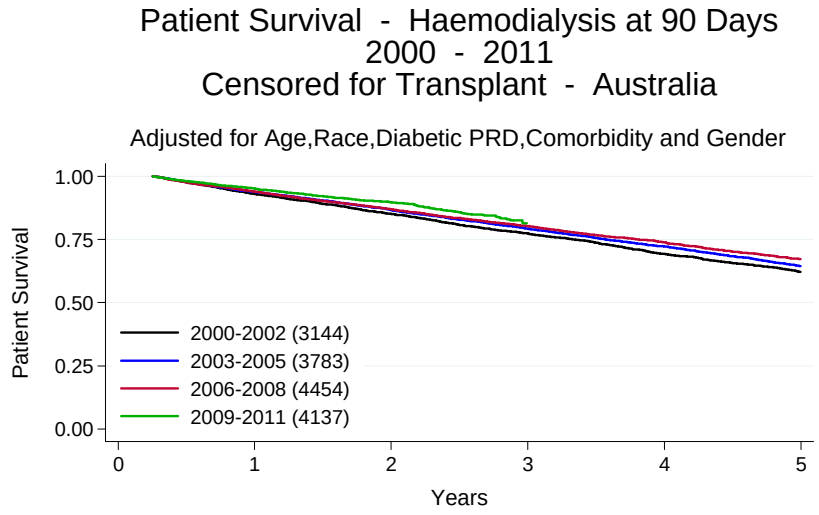


Figure 5.28

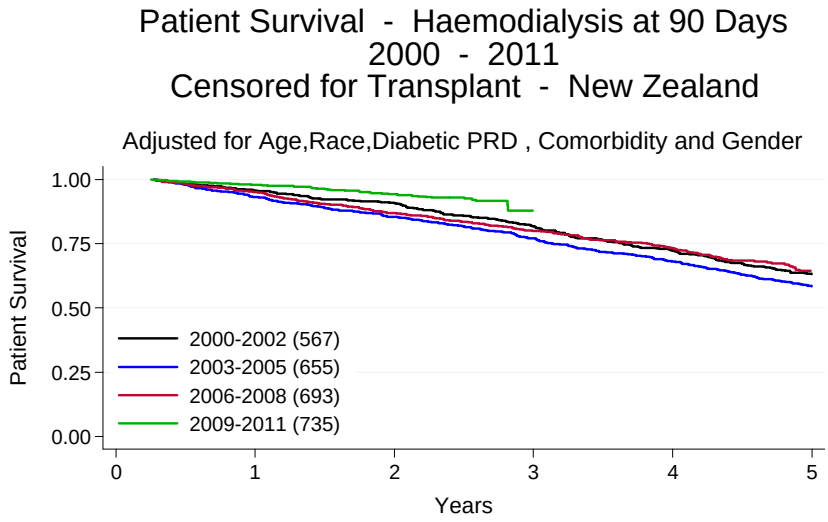


Figure 5.29

Haemodialysis at 90 Days
Patient Survival - Diabetic / Non Diabetic
Censored for Transplant 2000 - 2011
% [95% Confidence Interval]

		Survival			
	No. of Patients	6 months	1 year	3 years	5 years
Australia					
Non Diabetic	10549	96 [96, 96]	90 [89, 90]	70 [69, 71]	52 [51, 53]
Diabetic	4969	97 [96, 97]	90 [89, 91]	67 [65, 68]	46 [44, 48]
New Zealand					
Non Diabetic	1414	97 [96, 98]	92 [90, 93]	74 [71, 76]	54 [51, 58]
Diabetic	1236	97 [96, 98]	92 [90, 94]	68 [65, 70]	43 [40, 47]

Figure 5.30

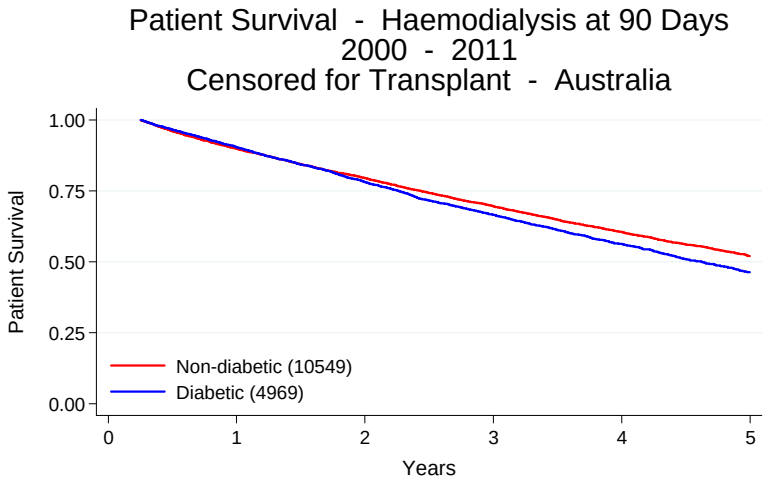


Figure 5.31

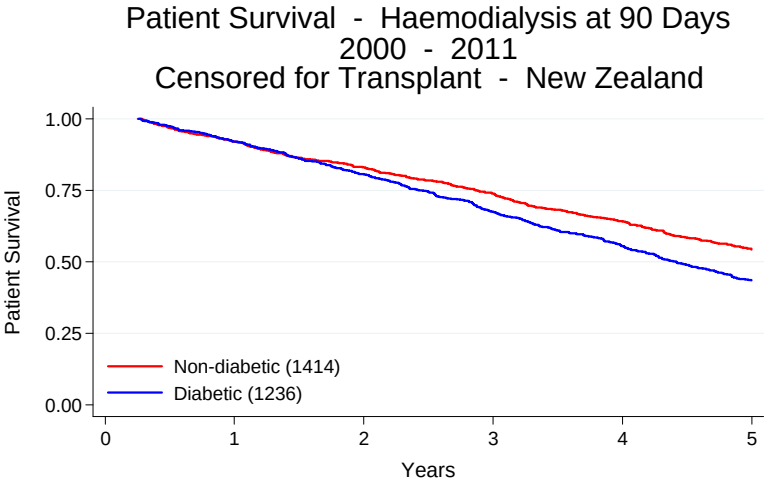


Figure 5.32

Haemodialysis at 90 Days
Patient Survival - By Age Group
Censored for Transplant 2000 - 2011
% [95% Confidence Interval]

Age Groups	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
0-39 years	1599	99 [99, 100]	97 [96, 98]	88 [86, 90]	81 [78, 84]
40-59 years	4910	98 [97, 98]	94 [93, 95]	80 [78, 81]	66 [64, 68]
60-74 years	5531	96 [95, 96]	89 [88, 89]	66 [64, 67]	46 [45, 48]
>=75 years	3478	94 [93, 94]	84 [83, 85]	52 [50, 54]	28 [27, 30]
New Zealand					
0-39 years	361	100 [98, 100]	97 [95, 99]	83 [77, 87]	71 [64, 78]
40-59 years	1130	97 [96, 98]	94 [93, 95]	79 [76, 82]	57 [53, 60]
60-74 years	931	96 [95, 97]	90 [88, 92]	64 [60, 67]	40 [36, 44]
>=75 years	228	95 [91, 97]	81 [76, 86]	43 [35, 50]	18 [12, 25]

Figure 5.33

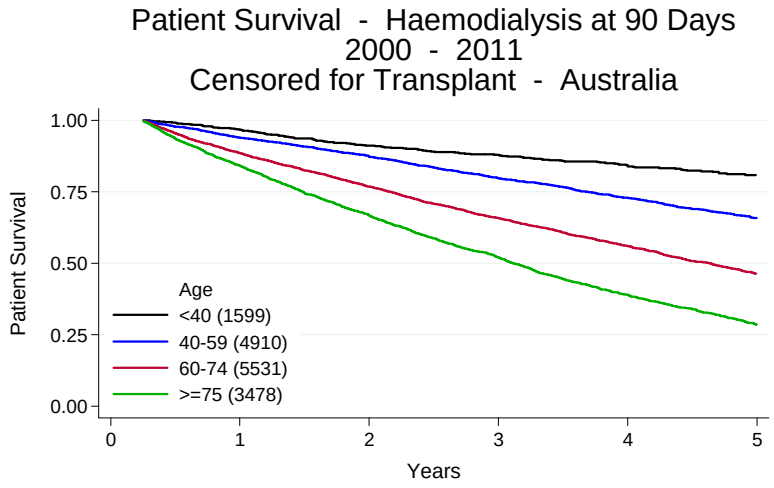
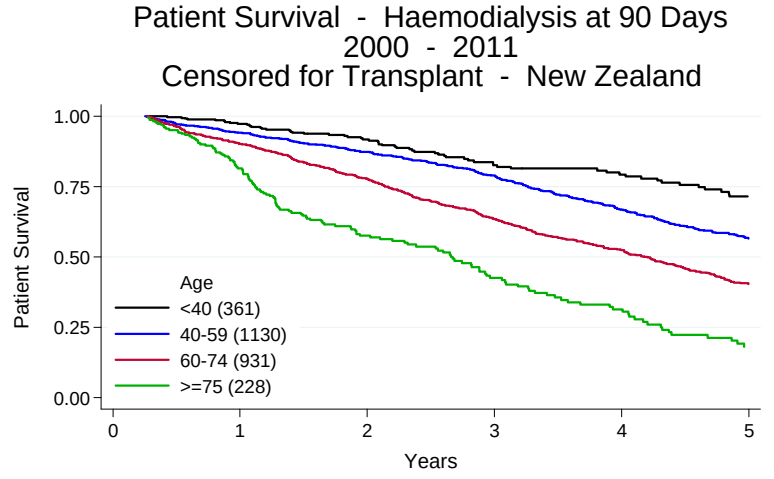


Figure 5.34



Membrane Type and Surface Areas

Australia **Figures** 5.35 - 5.38.

Usage of low flux polysulfone dialysers was 1% in 2011, (2% in December 2010, 5% in 2009 and 2008).While the use of high flux polysulphone continues to decrease (1% in 2011, 2010 and 2009, 1.5% in 2008, 7% in both 2007 and 2006, 9% in 2005 and 39% in 2004.

High flux Polysulphone-Helixone increased to 63% in December 2011 from 57% in 2010, 53% in 2009, 49% in 2008 and 39% in 2007. High flux Polyamix increased to 33% this year from 32% last year and 29% in 2009.

There were 99% of patients receiving dialysis with high flux dialysers in 2011 (96% in 2010, 88% in 2009, 81% in 2008 and 72% in 2007).

New Zealand Figures 5.36 and 5.39.

Low flux polysulphone decreased to 11% in December 2011, from 13% and 19% in December 2010 and 2009 respectively.

There were 77% (1217 patients) reported as receiving dialysis with high flux dialysers in December 2011, an increase from 72% (1104 patients) in 2010 and 62%(911 patients) in 2009.

Figure 5.35

Haemodialyser Membrane Types by Surface Area 31-DEC-2011

Dialyser Membrane Type	Flux	Square Metres					Total
		<1.0	1.0-1.4	1.5-1.7	1.8-1.9	>1.9	
Australia							
Cellulose Triacetate	High	.	.	2	11	41	54
Diacetate	Low	.	.	.	.	1	1
Polyamix	High	5	37	665	.	2205	2912
Polyamix	Low	.	6	25	.	23	54
Polyethersulfone	High	.	.	3	6	91	100
Polynephron	High	.	.	.	.	77	77
Polysulphone	High	1	6	.	7	2	16
Polysulphone	Low	1	3	.	22	43	69
Polysulphone-Helixone	High	2	591	.	3290	1680	5563
Polysynthane	Low	.	.	.	.	1	1
Total		**9**	**643**	**695**	**3336**	**4164**	**8847**
New Zealand							
Polyamix	High	.	3	49	.	440	492
Polyamix	Low	.	3	57	.	130	190
Polysulphone	Low	.	1	.	79	102	182
Polysulphone-Helixone	High	.	363	.	267	95	725
Total		**.**	**370**	**106**	**346**	**767**	**1589**

Figure 5.36

Number of Patients at end of 2011 by HD Modality

	NT	NSW/ACT	VIC	QLD	SA	WA	TAS	NZ	Total
HAEMODIALYSIS-HOLLOW FIBRE DIALYSERS	426	2499	2287	1380	459	680	123	1243	9097
HAEMOFILTRATION	0	0	0	0	0	4	4	3	11
HAEMODIAFILTRATION	9	379	19	262	139	125	31	342	1306
Total	**435**	**2898**	**2306**	**1642**	**598**	**809**	**158**	**1588**	**10434**

Figure 5.37

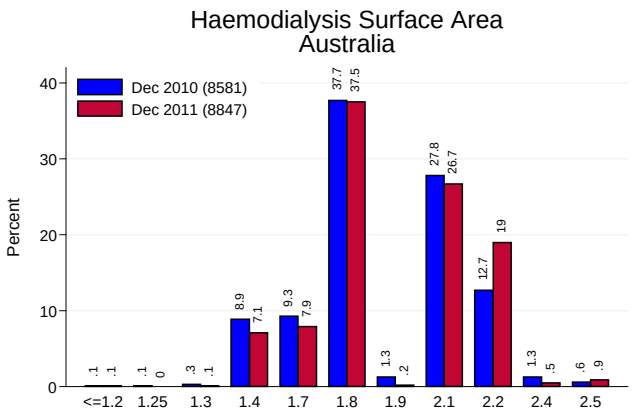
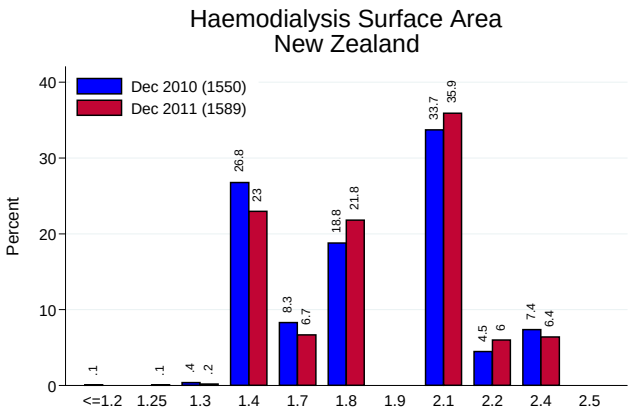


Figure 5.38



ANAEMIA

In Australia, mean haemoglobin and erythropoietic agent use has gradually reduced. Haemodialysis patients had a higher erythropoietic agent usage despite a similar mean haemoglobin compared to peritoneal dialysis patients (Figures 5.39 - 5.40).

In New Zealand, mean haemoglobin has stabilised at 114 g/L. The increase in erythropoietic agent usage seen over 2004-2011 has reached a plateau.

Figure 5.39

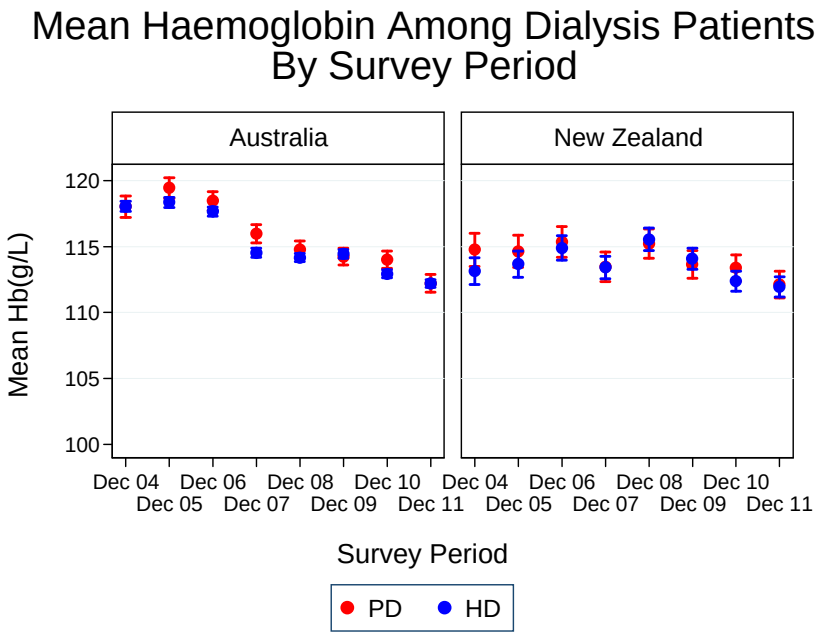
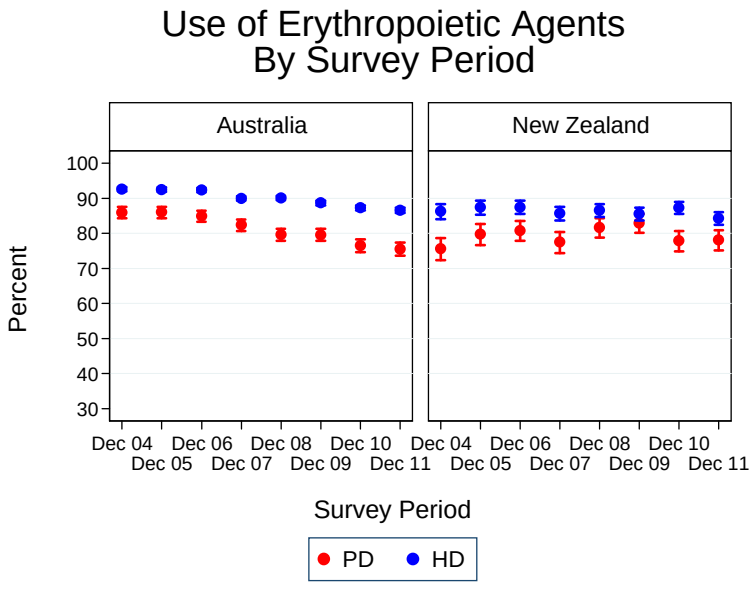


Figure 5.40



HAEMOGLOBIN

In Australia, among patients dialysing at 31 December 2011, haemoglobin is <110 g/L in 41% and ≥140g/L in 3% of haemodialysis patients, which is the same as the previous two years.

In New Zealand, the corresponding percentages are 44% and 4% respectively. Figure 5.42 shows the proportion of patients with proven or likely cardiovascular disease reported as a comorbidity to the Registry, achieving the clinical target of haemoglobin ≤ 120 g/L.

Figure 5.41

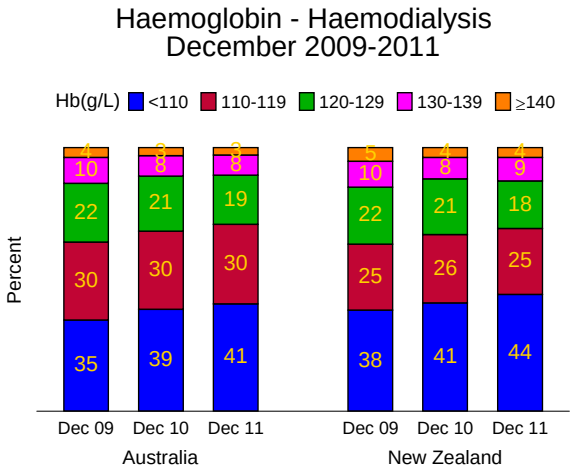
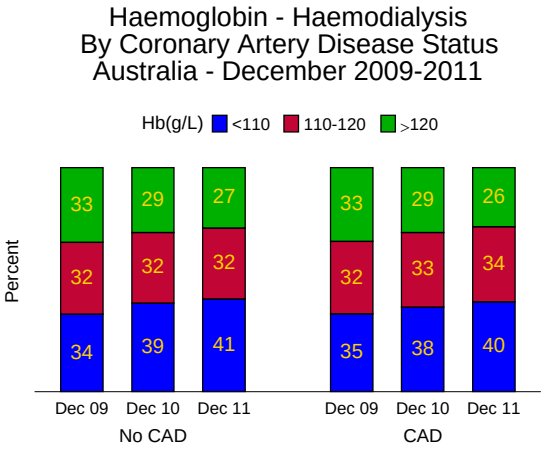
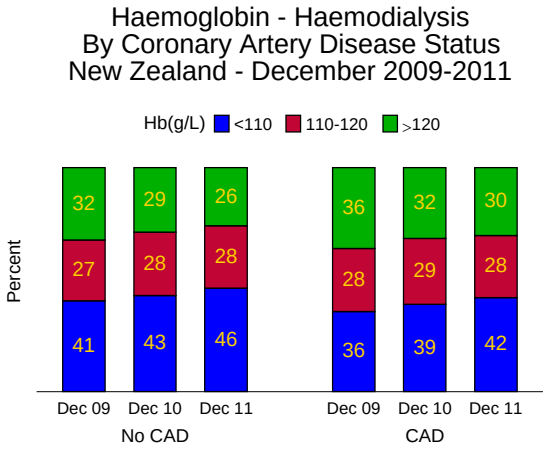


Figure 5.42





HAEMOGLOBIN BY TREATING CENTRE

Figures 5.43- 5.46

The first 2 figures show the median haemoglobin (with inter-quartile range) for individual centres, arranged from lowest to highest. Also shown are the proportion of patients in each centre with a haemoglobin of 110-129 g/L.

In Australia, median haemoglobin for each centre ranged from 105 to 125 g/L for haemodialysis patients and in New Zealand 107-118 g/L.

The proportion of patients in Australia with a haemoglobin of 110-129 g/L in each centre ranged from 30% to 76% for haemodialysis patients and for New Zealand 28% to 55%. For Figures 5.45 and 5.46 the error bars show the 95% confidence intervals.

Figure 5.43

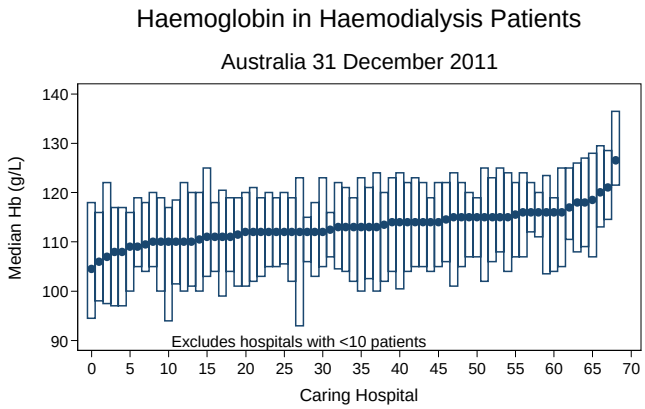


Figure 5.44

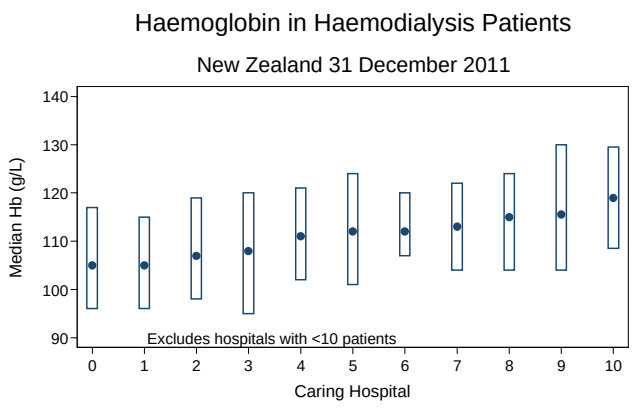


Figure 5.45

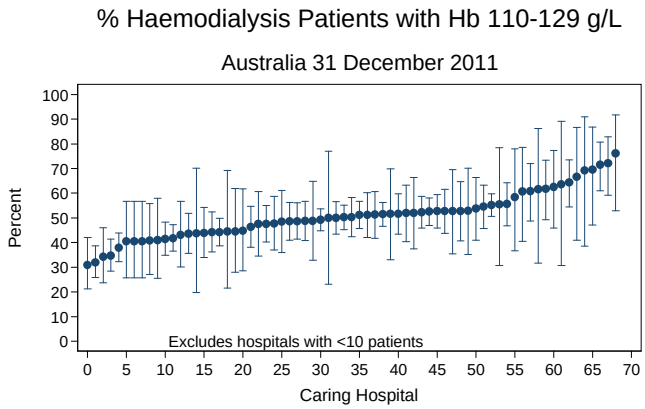
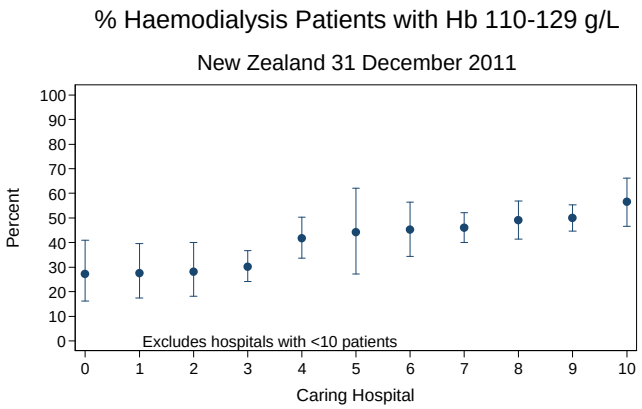


Figure 5.46



FERRITIN AND TRANSFERRIN SATURATION

Figures 5.47 - 5.48

In Australia and New Zealand the proportions of haemodialysis patients with ferritin <200 mcg/L and those with ferritin ≥ 500 mcg/L have been relatively stable.

In both Australia distributions of transferrin saturation have been unchanged for the past three years, while in New Zealand the proportion with a transferrin saturation <20 has increased.

Figure 5.47

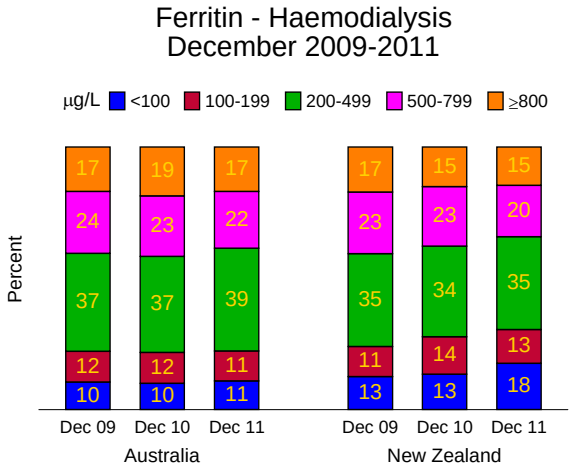
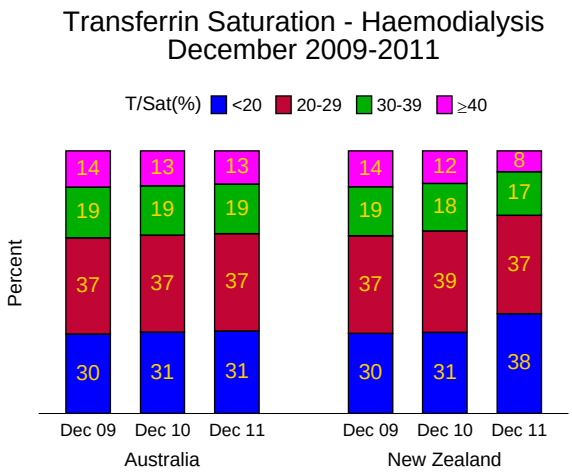


Figure 5.48



FERRITIN BY TREATING CENTRE

Figures 5.49 - 5.52

These figures show the proportions of patients in each centre with ferritin of 200-500 mcg/L and transferrin saturation of >20% respectively, as recommended by the CARI guidelines.

In Australia, the proportions of patients with ferritin within this range in each centre varied widely between 2-72% for haemodialysis patients. Similarly large variations between centres were seen for transferrin saturation, between 26-95%. Again, this large variation probably reflects differences in practices, protocols and patient case-mix among centres.

In New Zealand, the corresponding figures for ferritin were between 21-50% for haemodialysis patients and the corresponding figures for transferrin saturation were between 32-72%. In both countries, significant proportions of patients did not have ferritin and transferrin saturation within the recommended ranges, even in the “best performing” centres.

Figure 5.49

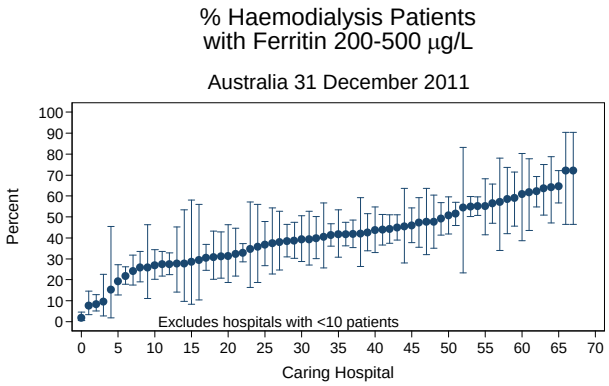


Figure 5.50

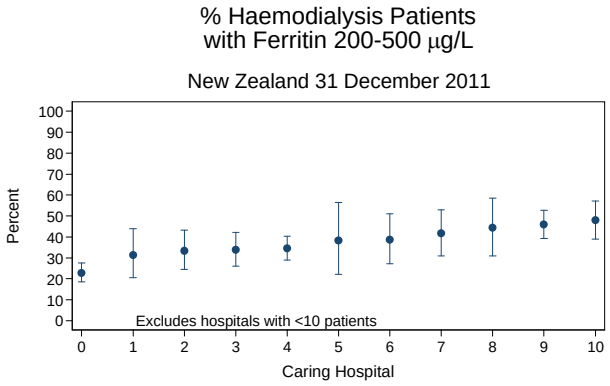


Figure 5.51

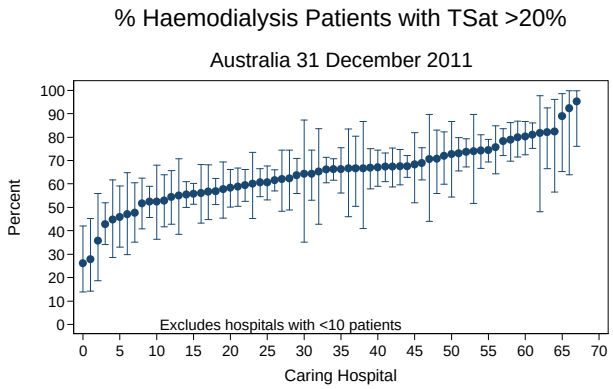
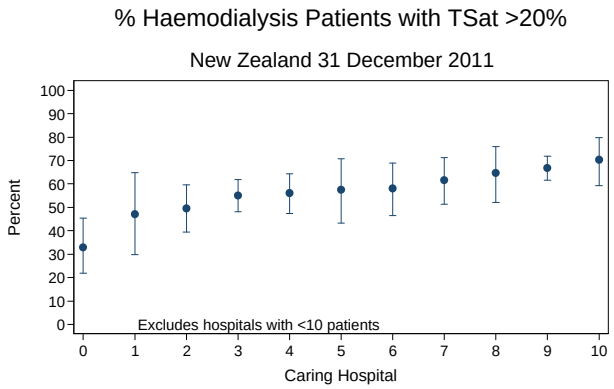


Figure 5.52

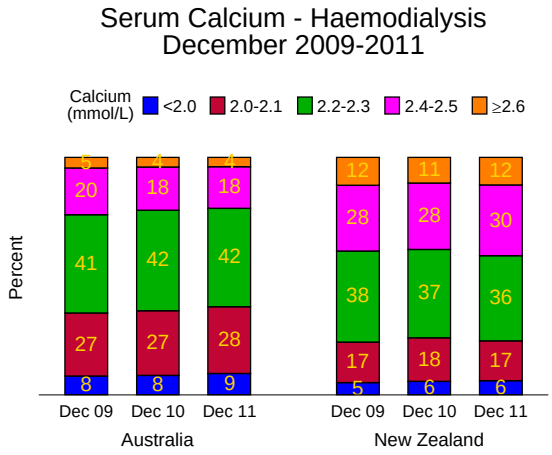


SERUM CALCIUM

Figure 5.53

In Australia the proportions of patients with serum calcium ≥ 2.4 mmol/L has stabilised, while, in New Zealand it has increased marginally. Those with < 2.2 mmol/L have increased slightly in Australia, but remained fairly stable in New Zealand.

Figure 5.53



SERUM CALCIUM BY TREATING CENTRE

Figures 5.54 and 5.55 show the proportions of patients at each centre with serum calcium 2.1 -2.4 mmol/L, as recommended by the CARI guidelines. Note: however, that the values in the guidelines are for corrected total calcium, while those in this report are for uncorrected total calcium.

In Australia, the proportions ranged widely between 25-94% for haemodialysis patients, while in New Zealand the corresponding proportions were 32-70%.

Figure 5.54

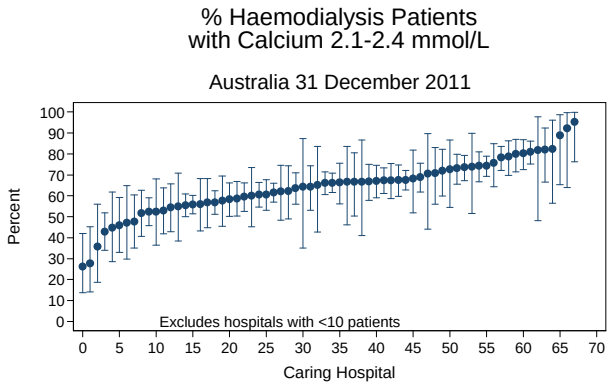
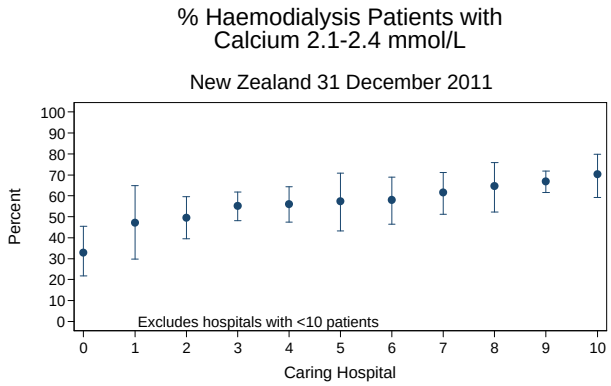


Figure 5.55

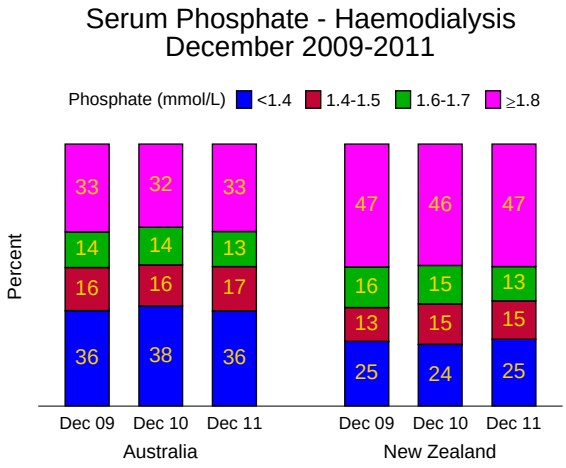


SERUM PHOSPHATE

Figure 5.56

In Australia, the control of serum phosphate has stabilised after a period of steady improvements. In New Zealand, the proportion with serum phosphate > 1.8 mmol/L has largely remained stable.

Figure 5.56



SERUM PHOSPHATE BY TREATING CENTRE

Figures 5.57 - 5.58 show the proportions of patients at each centre with serum phosphate 0.8-1.6 mmol/L, as recommended by the CARI guidelines.

In Australia, the proportions ranged widely between 30-72% for haemodialysis patients and in

New Zealand, the corresponding proportions were 29-65%.

Figure 5.57

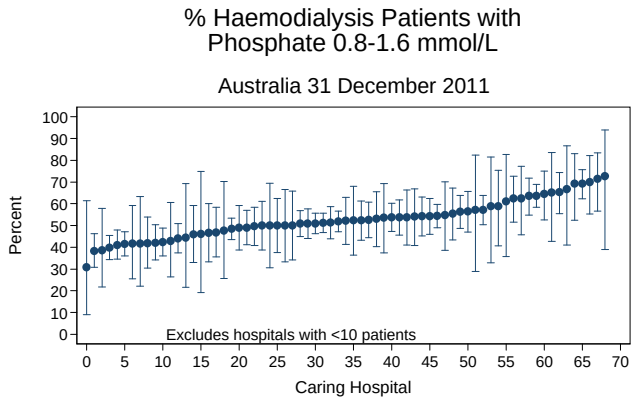
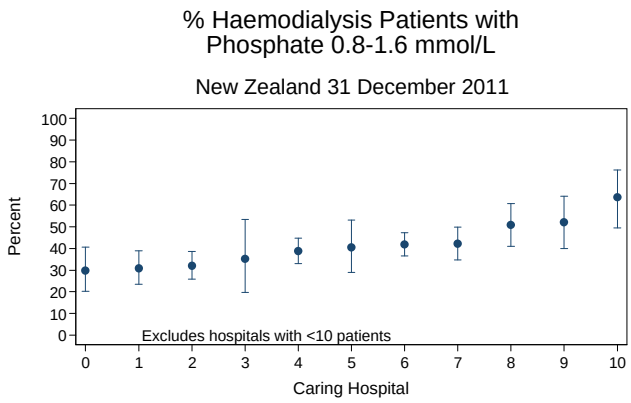


Figure 5.58



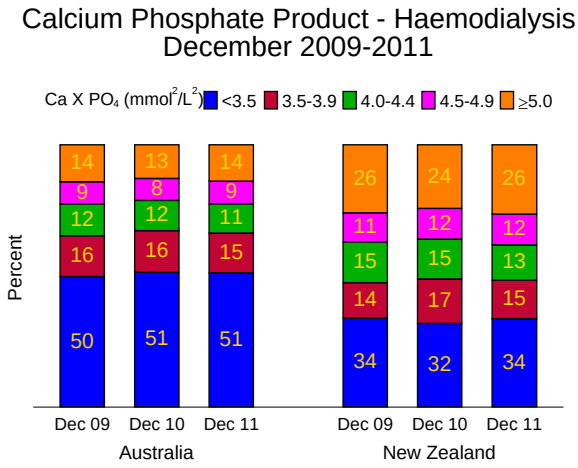
CALCIUM-PHOSPHATE PRODUCT

Figure 5.59

In both Australia and New Zealand, improvements in the calcium-phosphate product seen over the last few years have plateaued.

Overall, the proportion of people with high calcium-phosphate product was substantially higher in New Zealand than Australia.

Figure 5.59



CALCIUM-PHOSPHATE PRODUCT BY TREATING CENTRE

Figures 5.60 - 5.61 show the proportions of patients at each centre with calcium-phosphate product <4.0 mmol^2/L^2, as recommended by the CARI guidelines.

In Australia, the proportions ranged widely between 45-80% for haemodialysis patients while in New Zealand, the corresponding proportions were 35-65%.

Figure 5.60

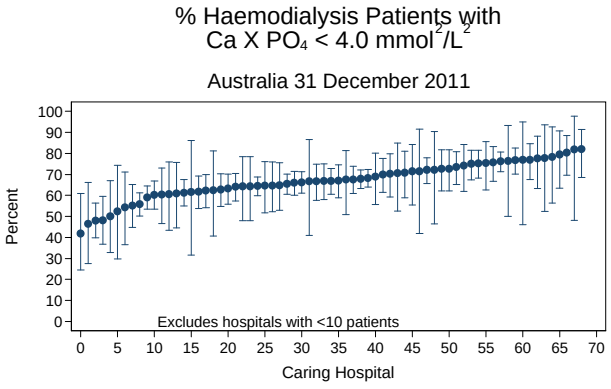
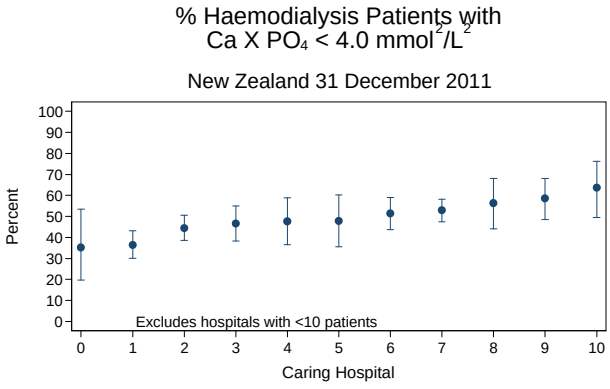


Figure 5.61



UREA REDUCTION RATIO

Figures 5.62 and 5.64

Distributions of URR values have shown an increase in those in higher URR groups the past three years. About 8% and 25% of patients on haemodialysis three times a week have URR <65% in Australia and New Zealand respectively.

URR is highest in patients dialysing with an AV graft and lowest in those using catheters Figure 5.63.Of those with URR < 65%, 14% in Australia and 36% in New Zealand had CVC access.

Figure 5.62

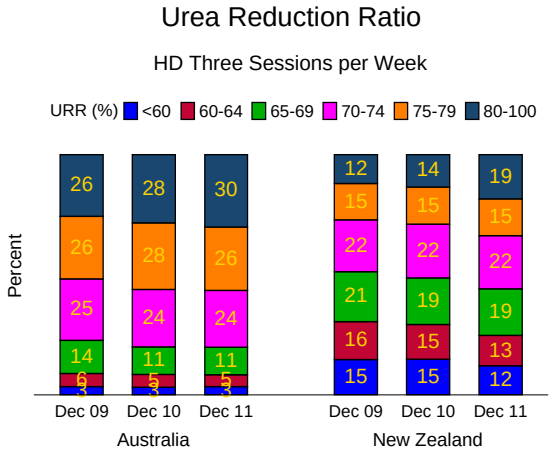


Figure 5.63

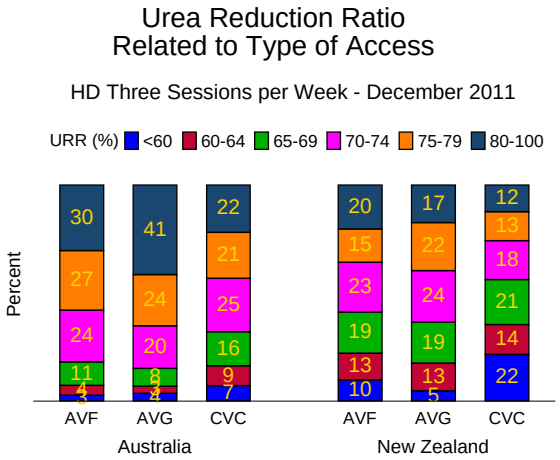


Figure 5.64

Urea Reduction Ratio - Prevalent Patients
Three Sessions per Week - December 2011

Hours per Session	Urea Reduction Ratio %		
	< 65	>=65	Total
Australia			
<4 hours	41 (13.4%)	265 (86.6%)	306
4 hours	266 (8.9%)	2725 (91.1%)	2991
>4-5 hours	282 (7.3%)	3575 (92.7%)	3857
>5 hours	23 (9.6%)	217 (90.4%)	240
Total	**612 (8.3%)**	**6782 (91.7%)**	**7394**
New Zealand			
<4 hours	8 (44.4%)	10 (55.6%)	18
4 hours	104 (26.0%)	296 (74.0%)	400
>4-5 hours	174 (24.0%)	550 (76.0%)	724
>5 hours	17 (20.7%)	65 (79.3%)	82
Total	**303 (24.8%)**	**921 (75.2%)**	**1224**

UREA REDUCTION RATIO BY TREATING CENTRE

Figures 5.65 and 5.66 show the median URR in each hospital and Figures 5.67 and 5.68 show the proportions of haemodialysis patients dialysing three times per week in each hospital with URR > 70%, the target recommended by the CARI guidelines.

Median URR values in the respective countries did not vary greatly: 70-82% in Australia and 67-85% in New Zealand. However, the proportions with URR >70% in each unit varied widely, from 55-97% in Australia and 35-95% in New Zealand.

Figure 5.65

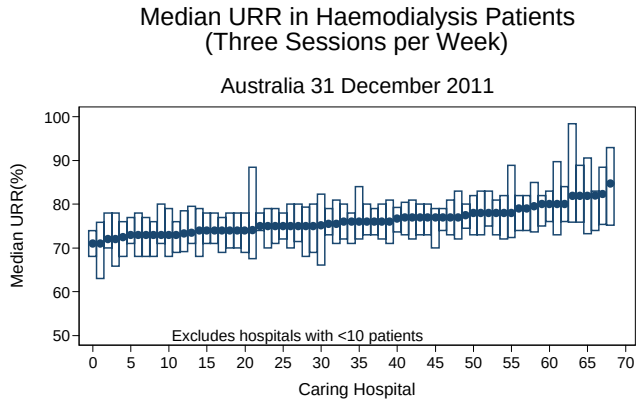
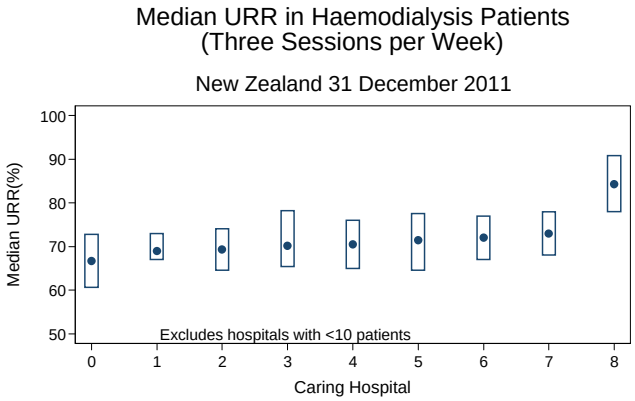


Figure 5.66



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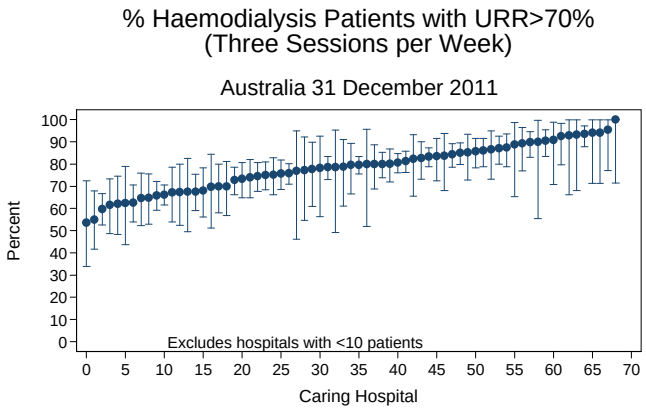
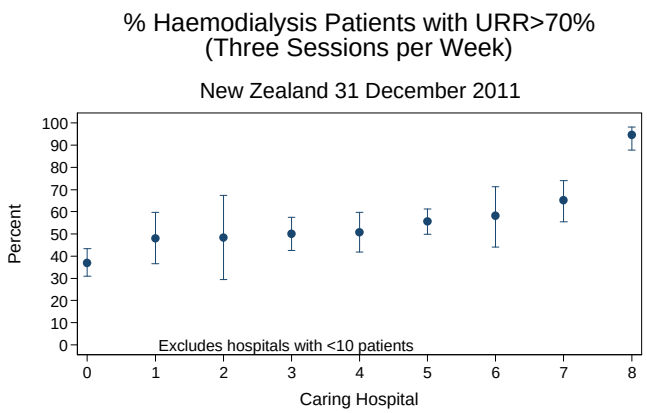


Figure 5.68



VASCULAR ACCESS AT FIRST TREATMENT

Figures 5.69 to 5.78

The proportion of patients starting haemodialysis with an AVF has continued to rise in both Australia and New Zealand although the majority of patients still commence with a catheter.

In Australia, tunnelled catheters were more common than non-tunnelled, but the reverse was true in New Zealand.

Female, young (age <25years) 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 less than half of non-late referred patients commence with a central venous catheter is not known.

Figure 5.69

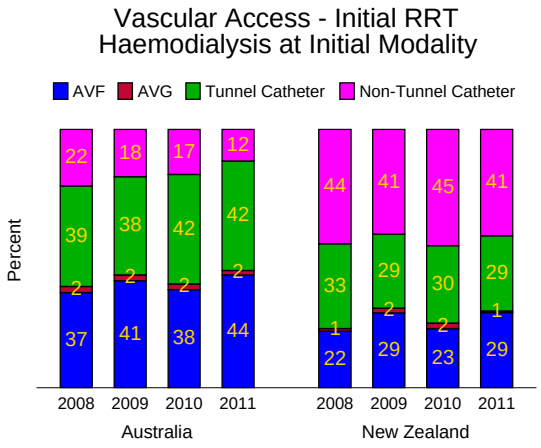


Figure 5.70

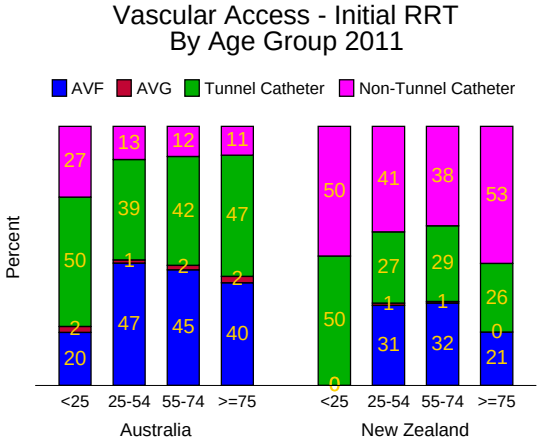
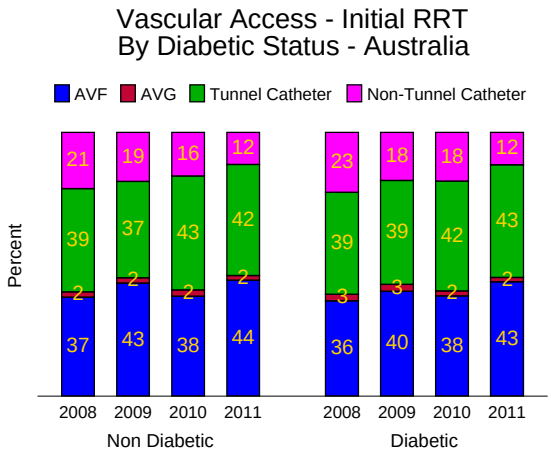


Figure 5.71



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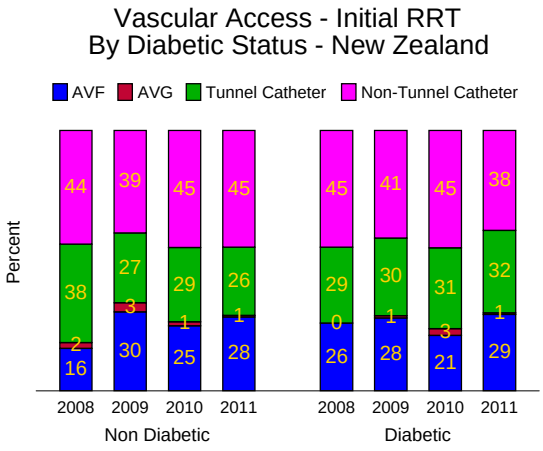


VASCULAR ACCESS AT FIRST TREATMENT

Figure 5.73

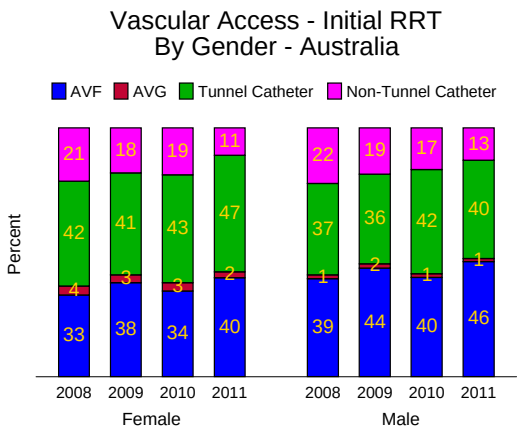


Figure 5.74

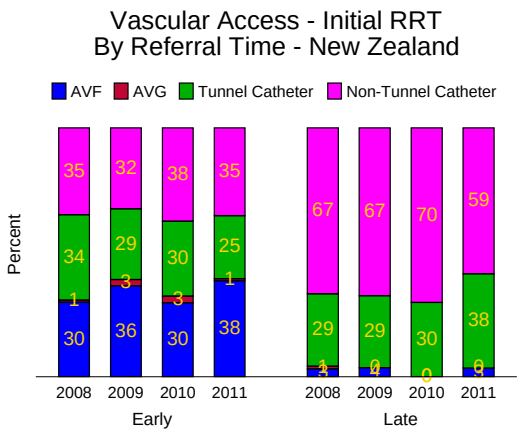


Figure 5.75

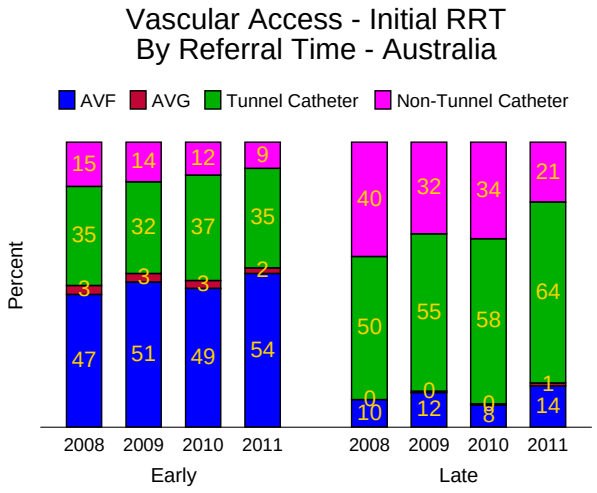


Figure 5.76

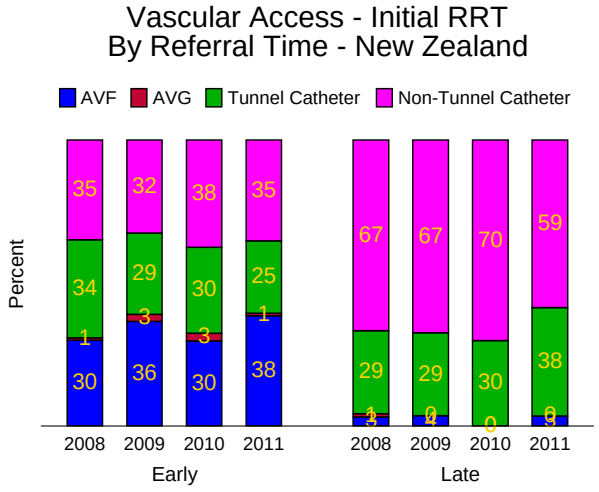


Figure 5.77

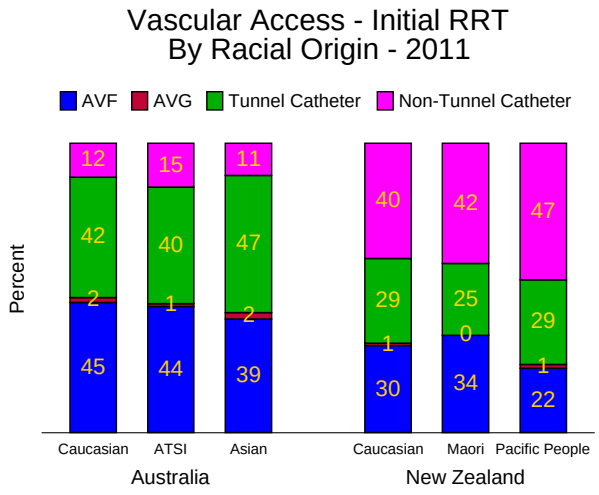
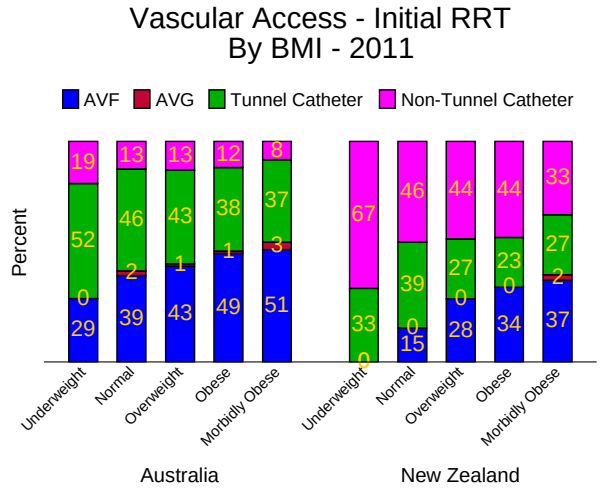


Figure 5.78



VASCULAR ACCESS AT FIRST TREATMENT

Figure 5.79

Vascular Access at First Treatment
Haemodialysis as Initial Modality 1-Jan-2008 to 31-Dec-2011

	2008		2009		2010		2011	
	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC
Australia								
QLD	139 (36%)	250 (64%)	152 (41%)	219 (59%)	138 (40%)	207 (60%)	131 (40%)	197 (60%)
NSW/ACT	189 (34%)	374 (66%)	185 (37%)	316 (63%)	200 (37%)	339 (63%)	223 (39%)	347 (61%)
Vic	185 (47%)	212 (53%)	214 (50%)	216 (50%)	200 (45%)	246 (55%)	230 (51%)	223 (49%)
Tas	12 (35%)	22 (65%)	16 (43%)	21 (57%)	19 (61%)	12 (39%)	19 (61%)	12 (39%)
SA	70 (53%)	61 (47%)	89 (61%)	58 (39%)	55 (40%)	82 (60%)	91 (68%)	42 (32%)
NT	39 (49%)	41 (51%)	27 (46%)	32 (54%)	25 (45%)	30 (55%)	38 (49%)	40 (51%)
WA	67 (34%)	131 (66%)	66 (38%)	106 (62%)	52 (31%)	114 (69%)	86 (41%)	124 (59%)
New Zealand								
	73 (23%)	247 (77%)	111 (31%)	249 (69%)	83 (25%)	250 (75%)	93 (30%)	220 (70%)

Figures 5.80 and 5.81 show the proportion of patients of each hospital starting haemodialysis with AVF/AVG, arranged from the lowest to the highest. In Australia, this ranged widely from 0-80%. 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 5.80

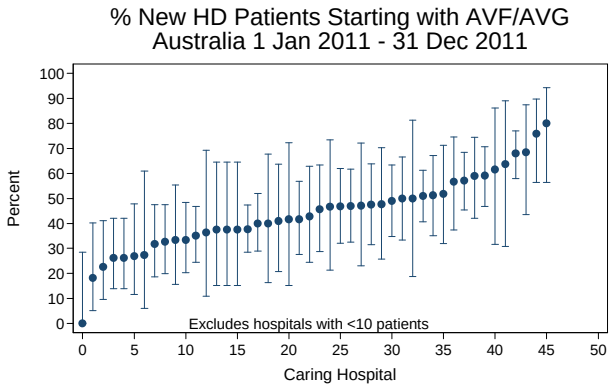
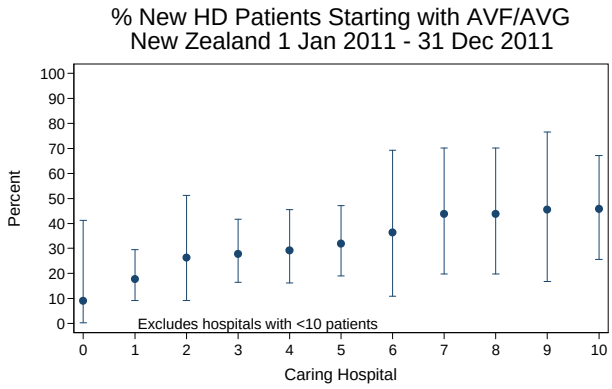


Figure 5.81



PREVALENT HAEMODIALYSIS ACCESS

Figures 5.82 - 5.88

In both Australia and New Zealand, the proportions of patients dialysing with an AV graft at 31 December 2011 are declining, while those dialysing with an AV fistulas are stable. The proportions dialysing with catheters have also stabilised.

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

Figure 5.82

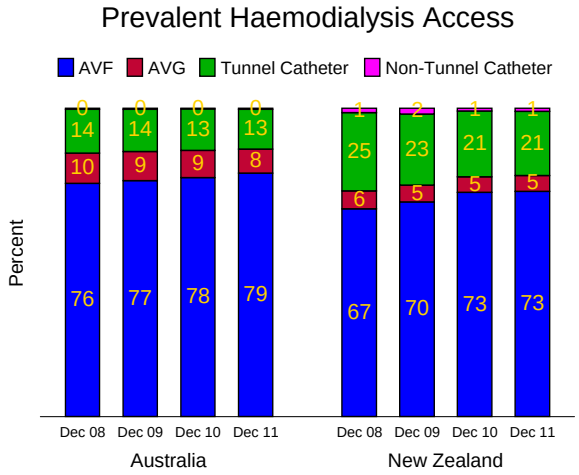
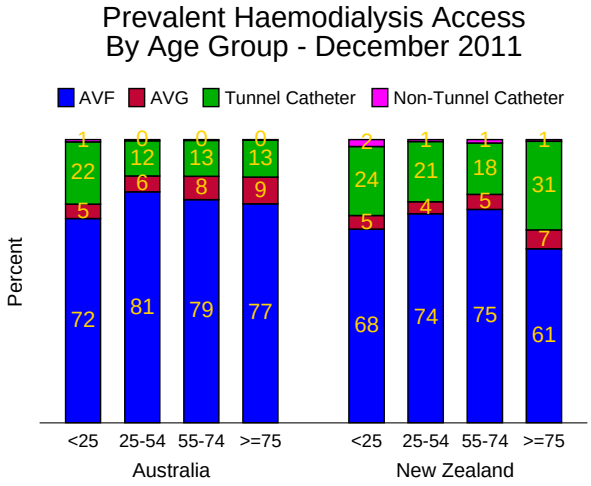


Figure 5.83



PREVALENT HAEMODIALYSIS ACCESS

Figure 5.84

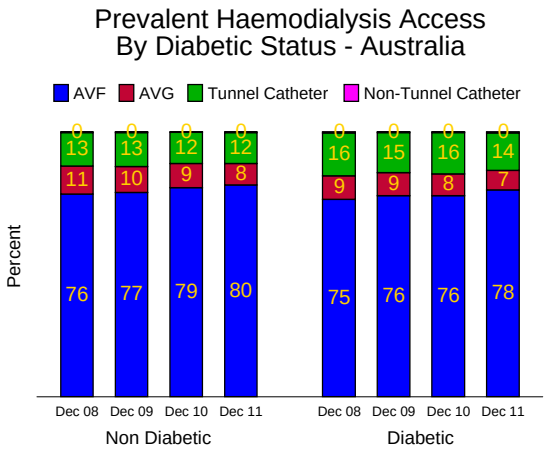


Figure 5.85

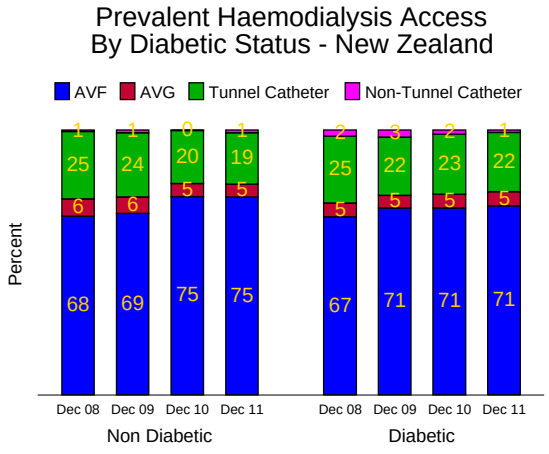


Figure 5.86

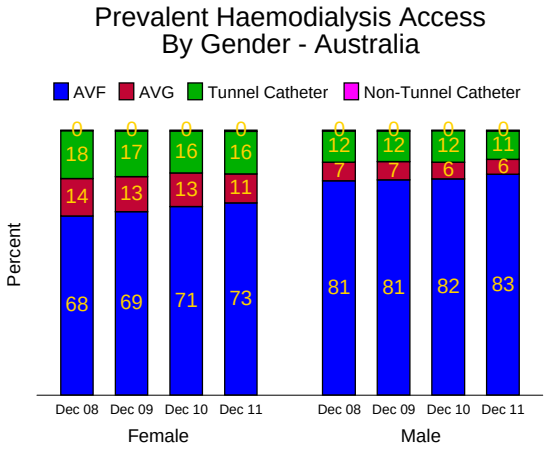


Figure 5.87

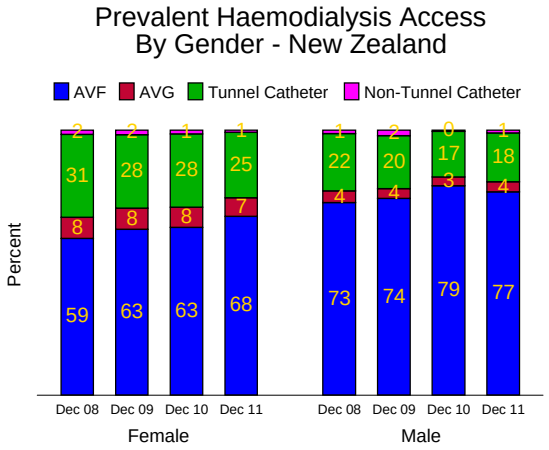
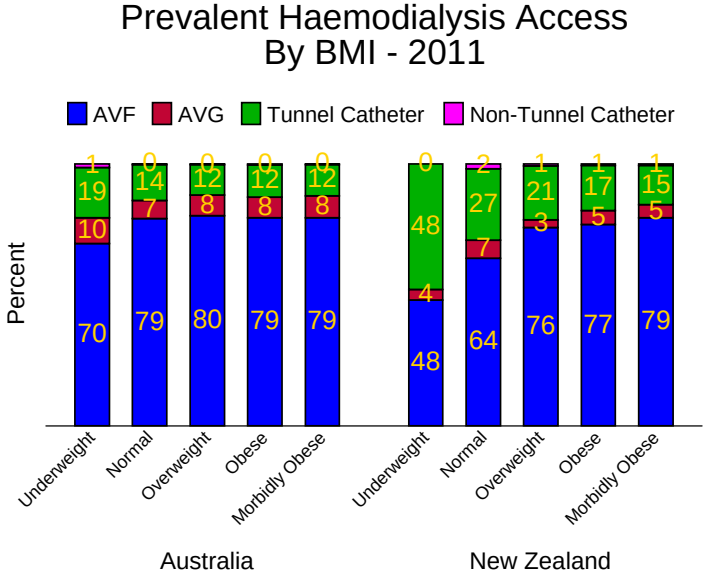


Figure 5.88



PREVALENT HAEMODIALYSIS ACCESS

Figures 5.89- 5.90. These show dialysis access among prevalent (rather than incident) patients (those receiving haemodialysis at 31 December 2011).

In Australia indigenous people were more likely to dialyse with an AVF. In New Zealand, Maori 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 5.89

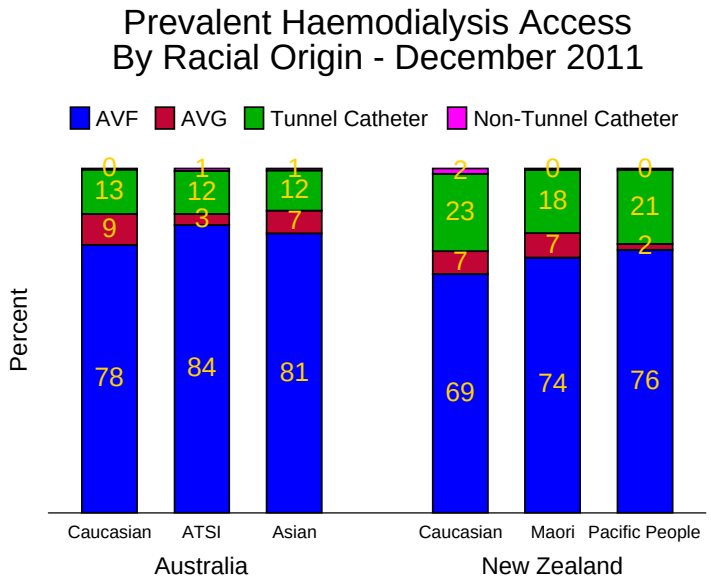
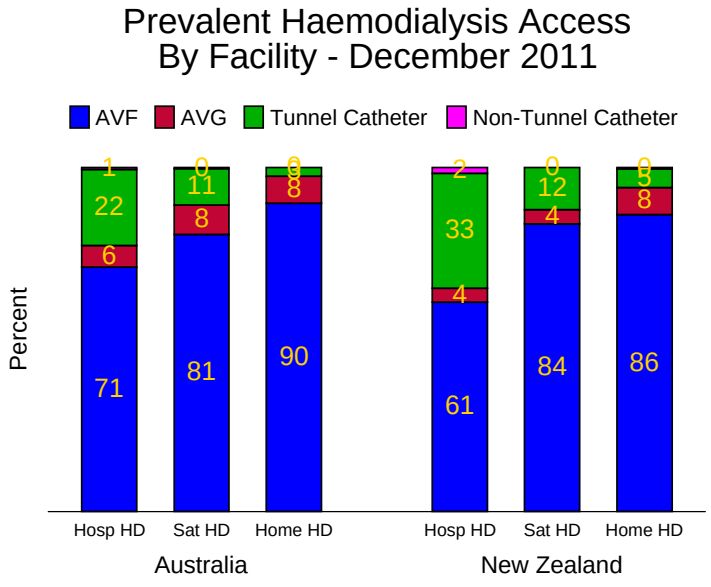


Figure 5.90



PREVALENT HAEMODIALYSIS ACCESS

Figures 5.91 - 5.93 show the proportion of haemodialysis patients at each state or hospital dialysing with an AVF/AVG on 31st December, 2011, arranged from the lowest to the highest.

In Australia, the hospital proportions varied widely from 72-100%. The corresponding range in New Zealand was 59-90%. The error bars displayed show the 95% confidence intervals.

Figure 5.91

Prevalent Vascular Access at 31-Dec-2011

	Dec 2008		Dec 2009		Dec 2010		Dec 2011	
	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC
Australia								
QLD	1283 (87%)	192 (13%)	1372 (88%)	196 (13%)	1426 (88%)	196 (12%)	1429 (87%)	212 (13%)
NSW/ACT	2200 (84%)	421 (16%)	2259 (83%)	449 (17%)	2387 (85%)	430 (15%)	2479 (86%)	415 (14%)
Vic	1860 (90%)	215 (10%)	1899 (89%)	227 (11%)	1972 (88%)	257 (12%)	2049 (89%)	256 (11%)
Tas	110 (82%)	24 (18%)	118 (80%)	30 (20%)	128 (88%)	18 (12%)	134 (85%)	24 (15%)
SA	429 (88%)	61 (12%)	484 (90%)	56 (10%)	504 (89%)	60 (11%)	556 (93%)	42 (7%)
NT	328 (91%)	34 (9%)	366 (96%)	17 (4%)	367 (92%)	34 (8%)	394 (90%)	42 (10%)
WA	562 (73%)	205 (27%)	593 (76%)	183 (24%)	619 (78%)	179 (22%)	634 (78%)	174 (22%)
New Zealand								
	983 (73%)	360 (27%)	1111 (75%)	369 (25%)	1204 (78%)	345 (22%)	1241 (78%)	347 (22%)

Figure 5.92

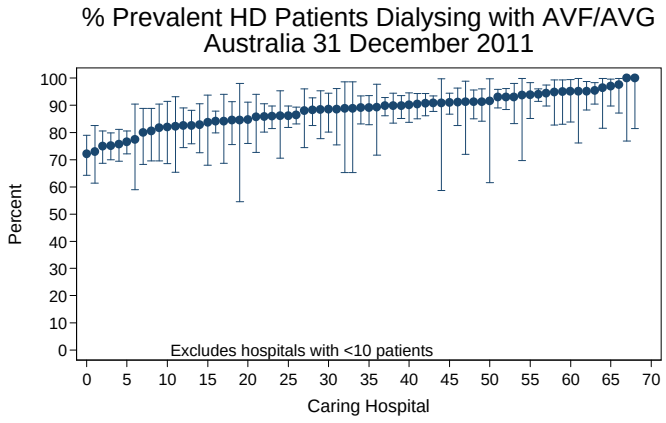
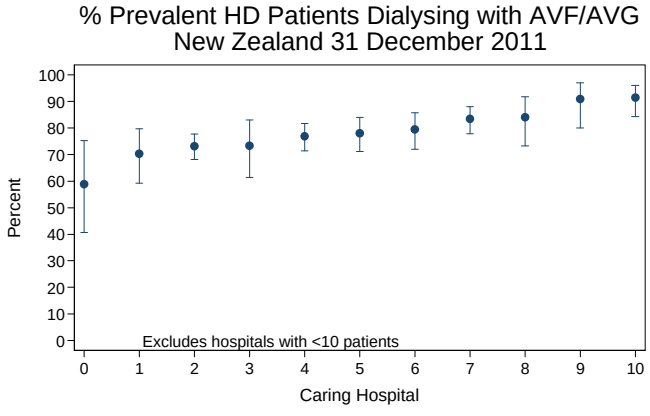


Figure 5.93



OBESITY AMONG INCIDENT HAEMODIALYSIS PATIENTS

Figures 5.94 - 5.99 show the proportions of incident haemodialysis patients with obesity and morbid obesity. In both Australia and New Zealand obesity rates have been increasing over the last ten years. The proportion of morbidly obese patients starting haemodialysis has doubled from 2002 to 2011 in Australia and increased 20% in New Zealand.

As might be expected, patients with diabetes are more likely to be obese or morbidly obese compared to those without diabetes (Figures 5.99 - 5.100).

Obesity for these analysis is defined as a BMI>30kg/m². Morbid obesity is defined as ≥35kg/m²

Figure 5.94

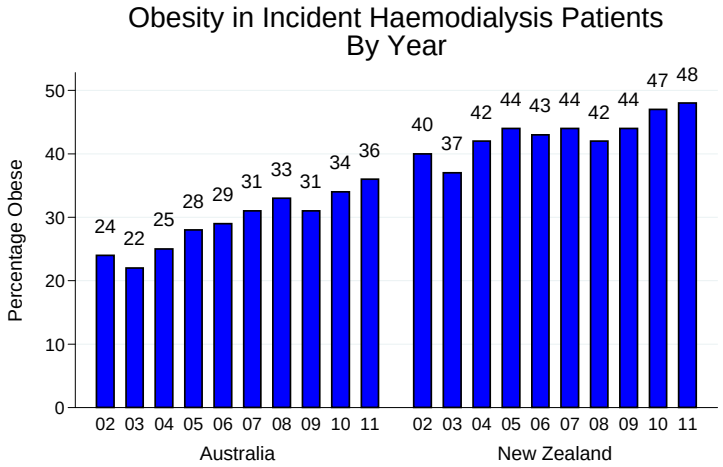


Figure 5.95

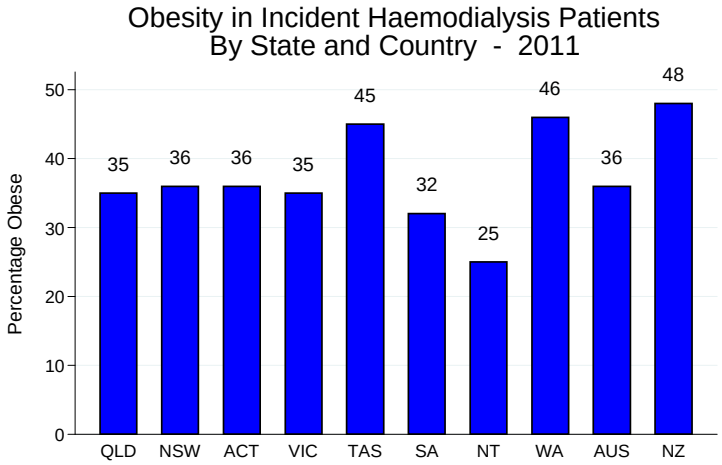
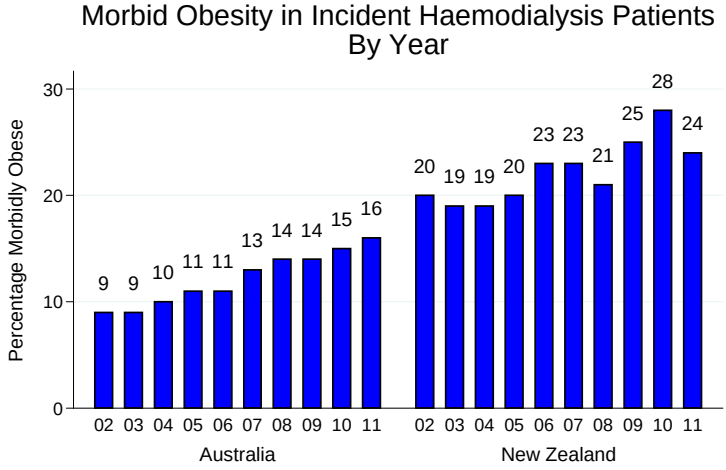


Figure 5.96



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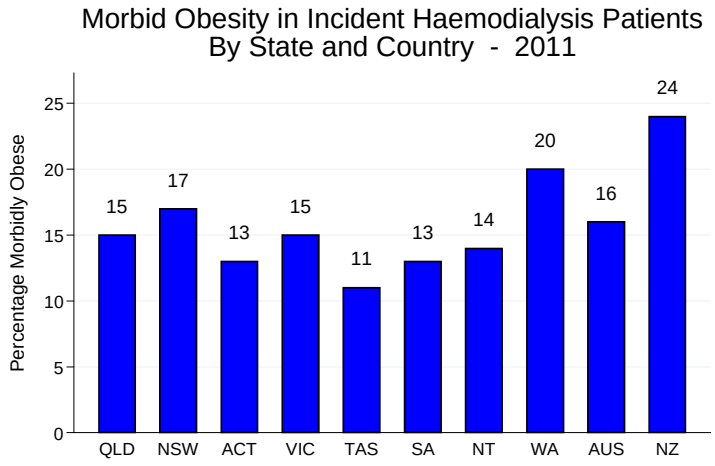


Figure 5.98

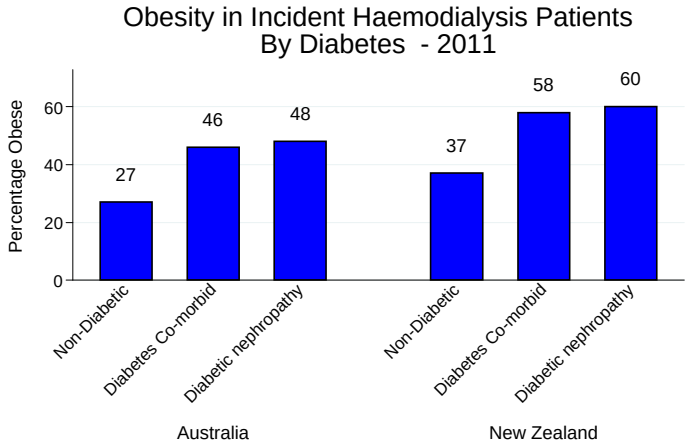
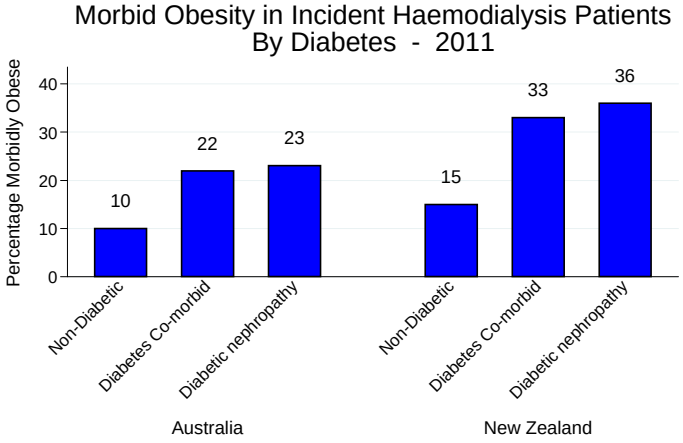


Figure 5.99



OBESITY AMONG PREVALENT HAEMODIALYSIS PATIENTS

Figures 5.100 - 5.105 show the proportion of prevalent haemodialysis patients with obesity and morbid obesity. In both Australia and New Zealand prevalent obesity rates have been increasing over the last ten years. The proportion of morbidly obese patients treated with haemodialysis has nearly doubled from 2002 to 2011 in both countries.

Patients with diabetes are more like to be obese or morbidly obese compared to those without diabetes (Figures 5.104 and 5.105).

Figure 5.100

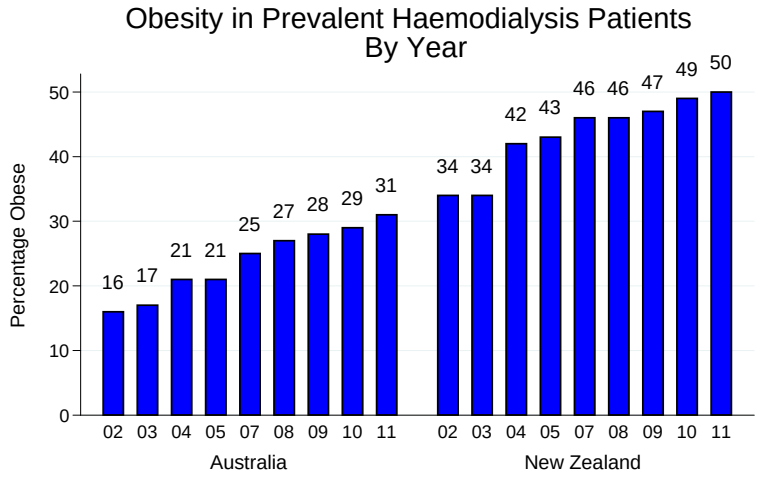
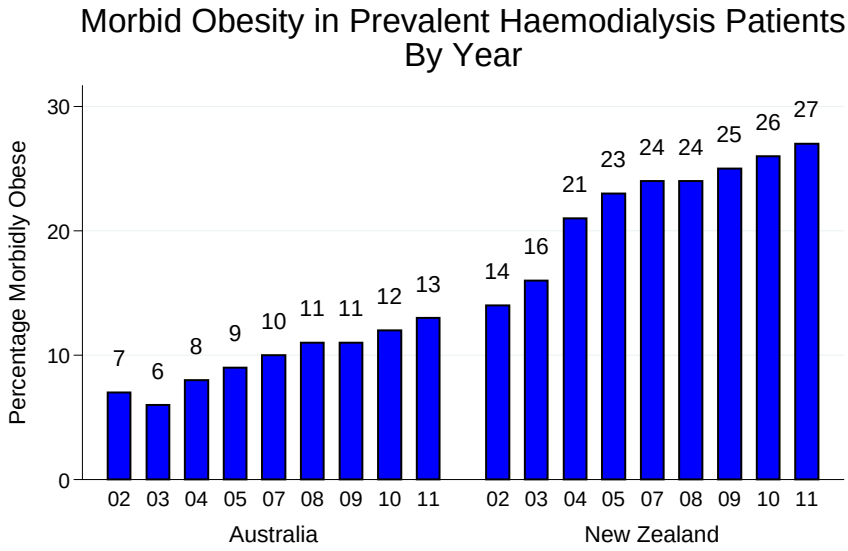


Figure 5.101



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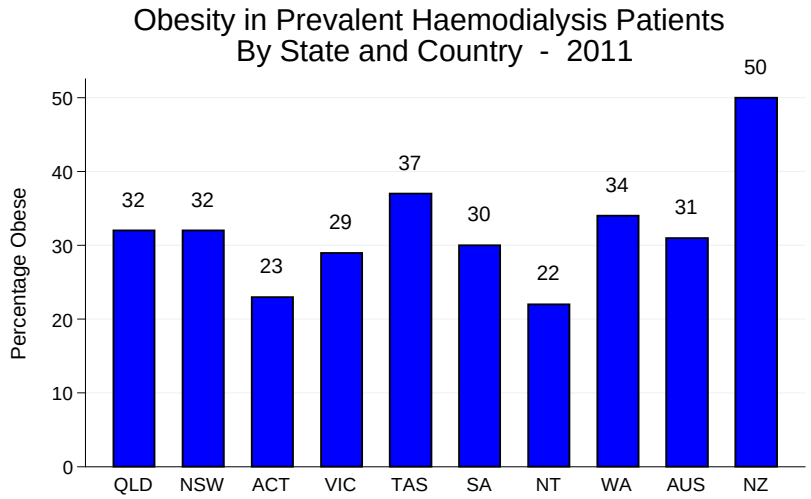


Figure 5.103

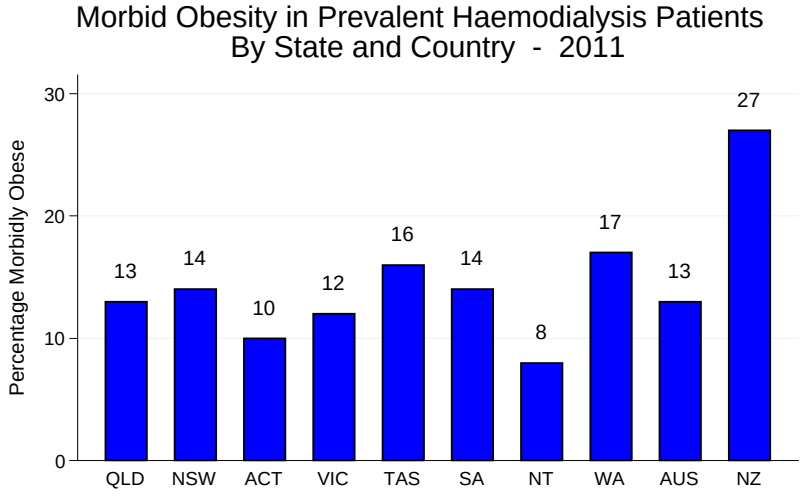


Figure 5.104

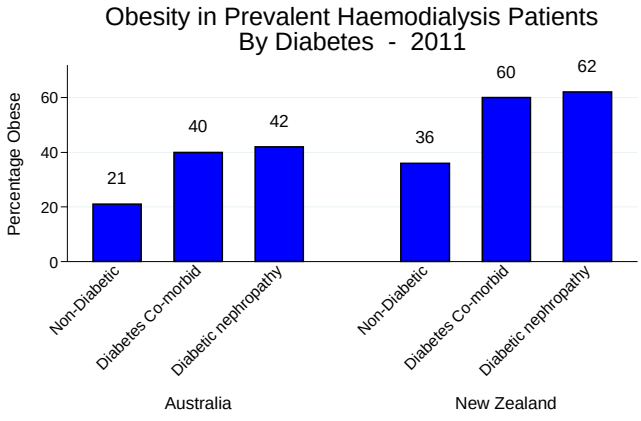
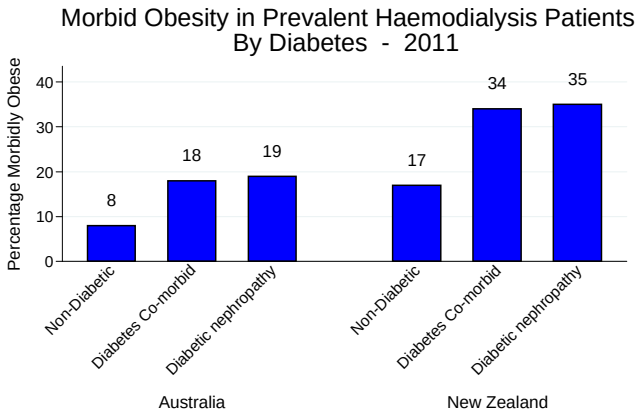


Figure 5.105



Home Haemodialysis

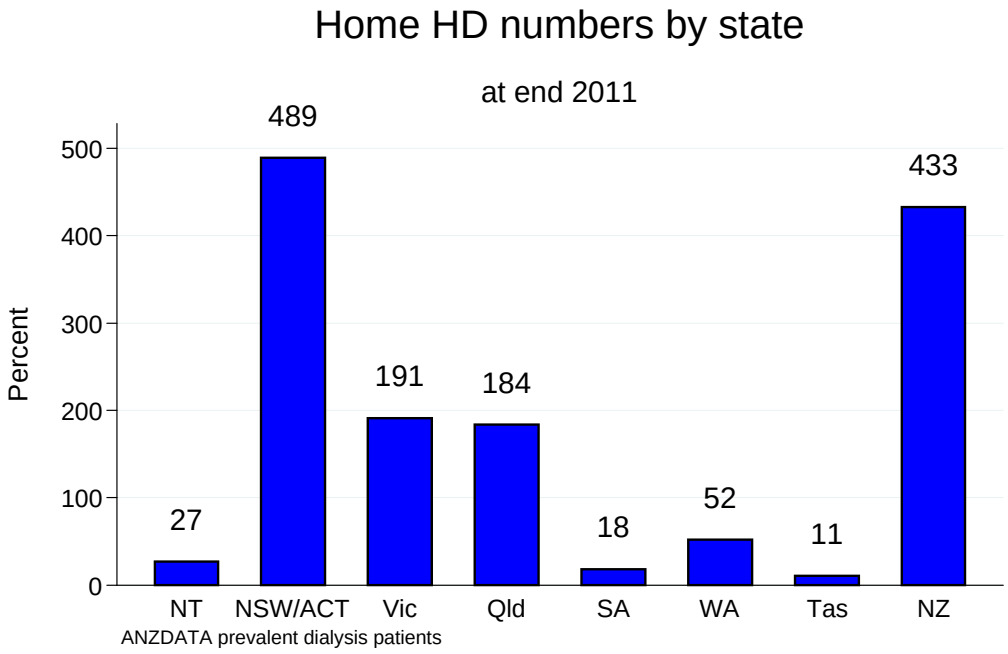
The proportion of all prevalent dialysis patients who were using home HD in each State was 13% for New South Wales / ACT, 9% Queensland, 7% Victoria, 6% the Northern Territory, 5% Tasmania, 5% Western Australia and 3% for South Australia.

The distribution of numbers of patients receiving home haemodialysis by state is shown in Figure 5.106. As can be appreciated, numbers are greatest in New South Wales and in New Zealand, with substantial numbers also in Victoria and Queensland.

These proportions were lower among older people (Figure 5.108).

Considerable further discussion is contained in chapter 4 .

Figure 5.106



The distribution of prevalent home dialysis patients by age group is shown in Figure 5.107.

Figure 5.107

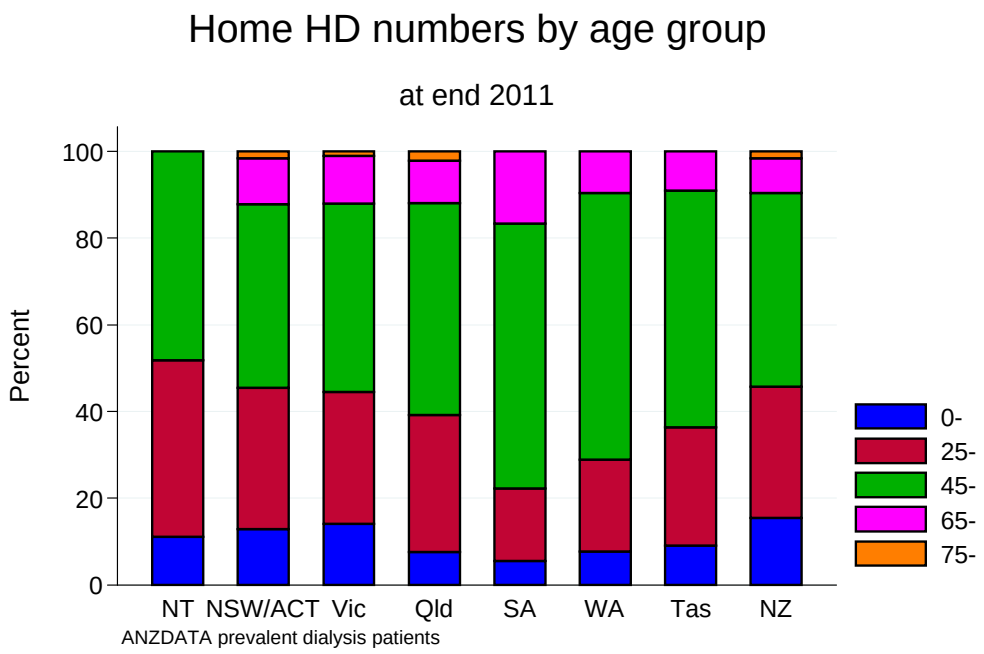


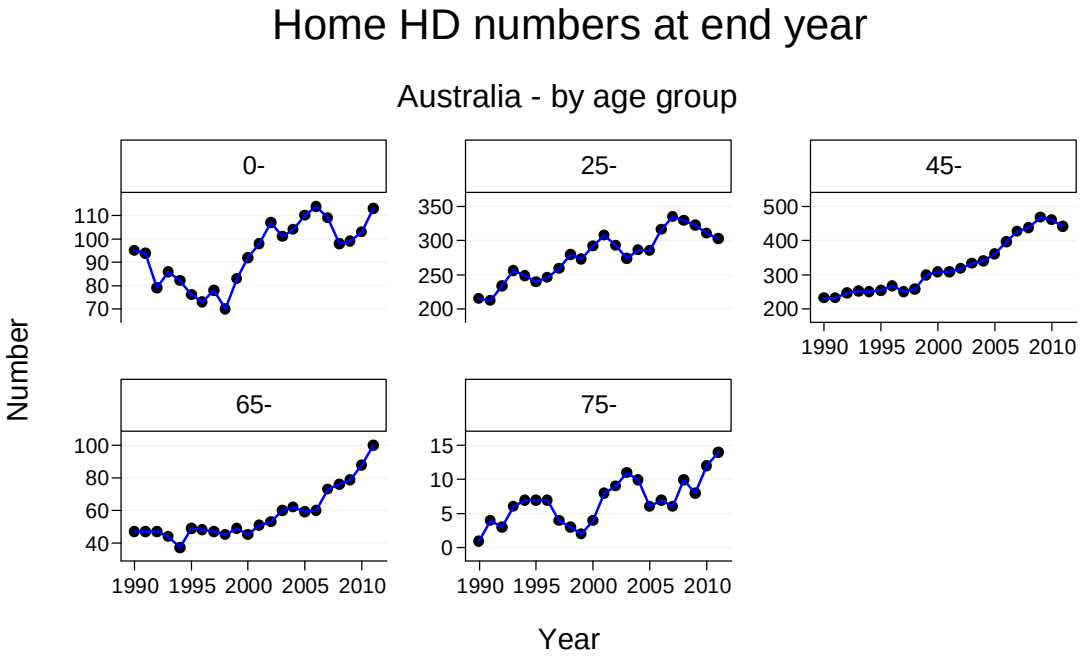
Figure 5.108

Proportion (%) of Prevalent Patients aged ≥ 65 years Treated with Home Haemodialysis 2007 - 2011

State	2007	2008	2009	2010	2011
Australia					
Queensland	5.40%	5.50%	5.40%	5.10%	4.90%
New South Wales/ACT	9.00%	8.30%	8.10%	7.70%	7.40%
Victoria	4.90%	4.70%	4.40%	4.00%	3.80%
Tasmania	2.10%	2.50%	2.80%	3.30%	2.60%
South Australia	0.50%	0.60%	0.70%	0.90%	1.10%
Northern Territory	3.70%	4.30%	5.60%	5.30%	5.00%
Western Australia	1.50%	1.50%	1.90%	2.50%	2.60%
New Zealand	9.60%	9.50%	10.30%	11.10%	11.20%

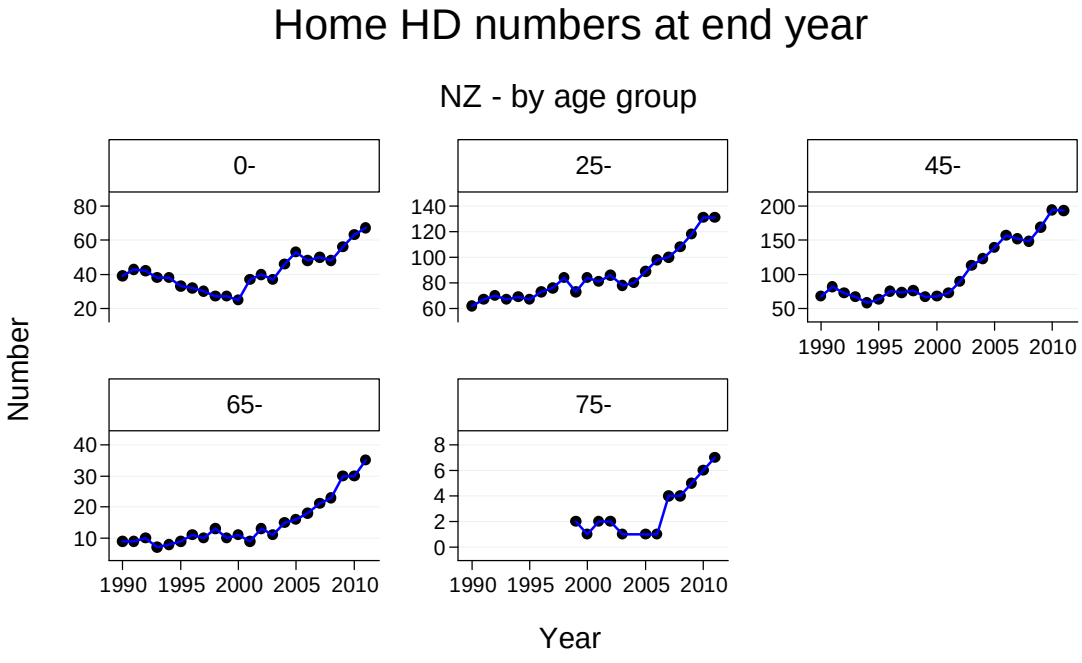
The trend in numbers treated with home HD is for different age groups are illustrated for Australia and New Zealand in the Figure 5.109 and 5.110. The Y axes for individual graphs vary – the absolute numbers in the age groups 25 to 64 years are substantially greater than among older patients. However, there has been strong growth in the older age groups in the last few years .

Figure 5.109



Age at 31 Dec each year

Figure 5.110

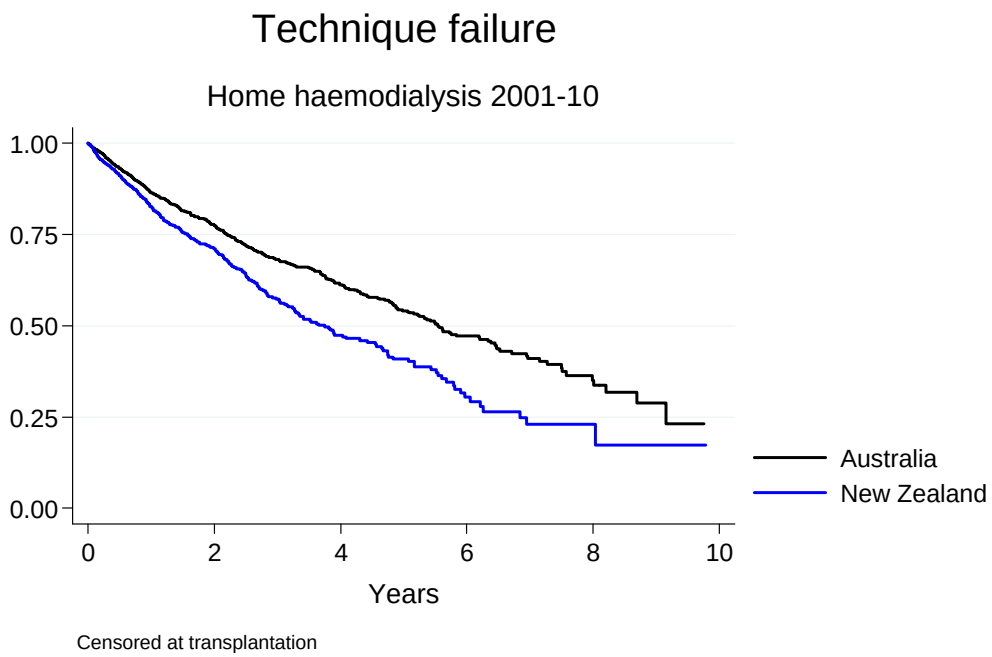


Age at 31 Dec each year

Technique failure

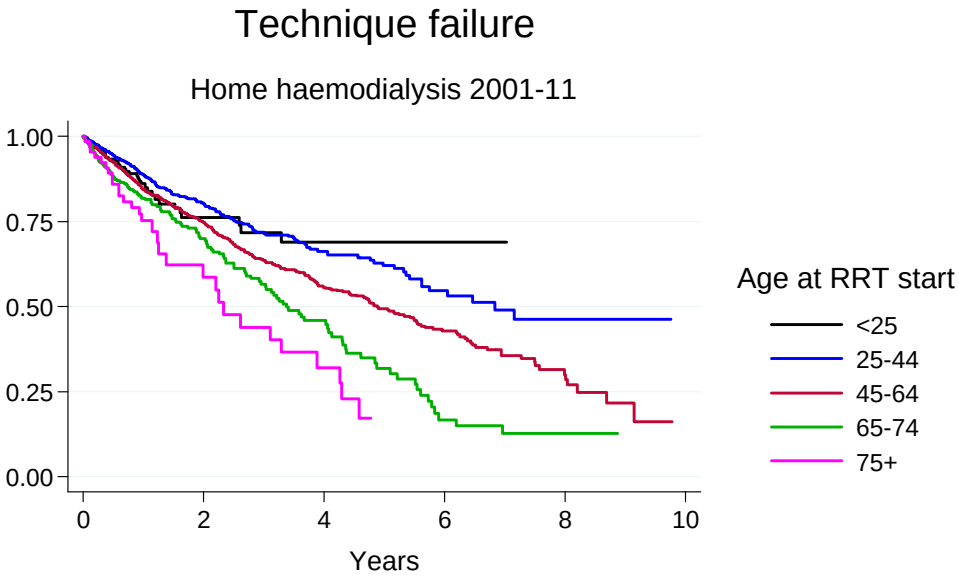
The following 3 figures explore the concept of technique failure as applied to home haemodialysis. Each treatment episode can end in a variety of ways. Changes to another dialysis modality (either institutional haemodialysis or peritoneal dialysis) are considered a “failure”, as is death. Follow-up is censored at transplantation, or 31 Dec 2011.

Figure 5.111



Censored at transplantation

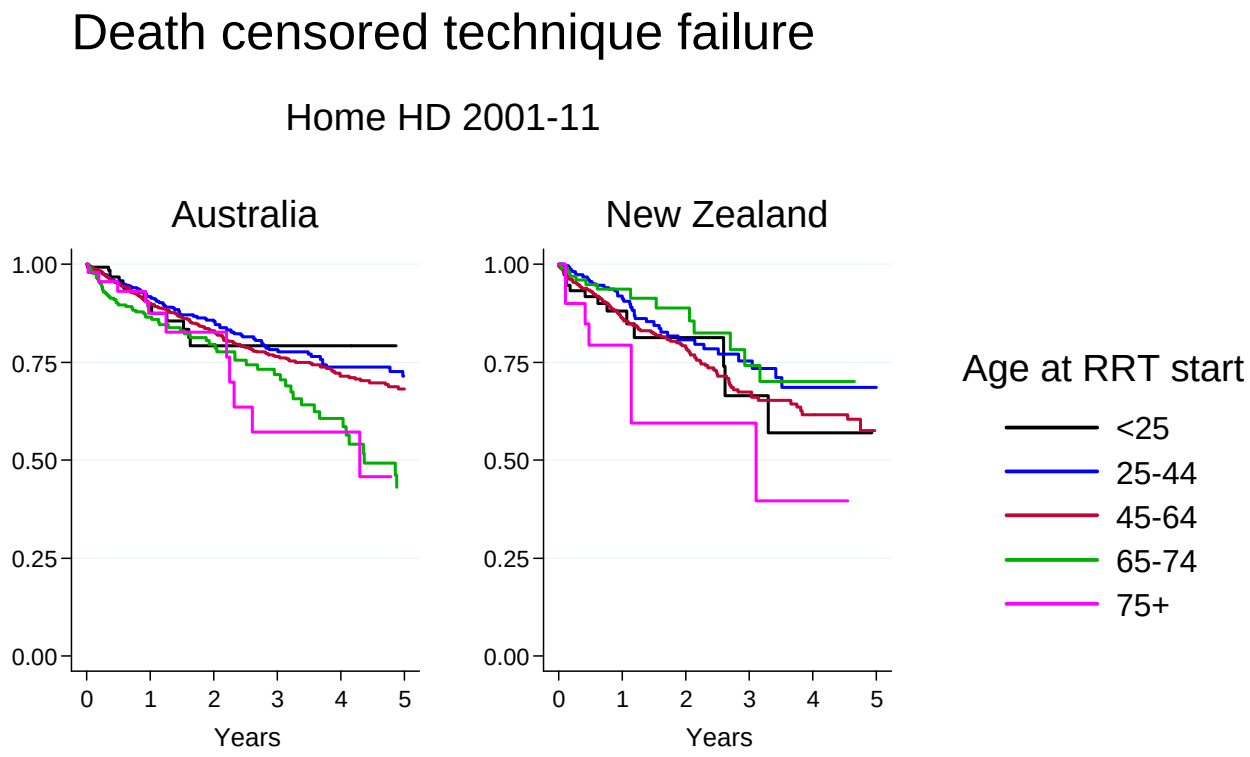
Figure 5.112



Censored at transplantation
Australia and NZ combined

When death of patient is counted as a censoring event (rather than “failure”), the differences between the age groups become less apparent (Figure 5.113). It can be seen that (among those alive and not transplanted) over 75% of home haemodialysis patients continue in this therapy after 2 years. However, as time passes there is a progressive difference which emerges with higher technique failure rates among the older patients.

Figure 5.113



Censored at transplantation and death
ANZDATA Registry

Definitions in use

CARI guidelines	**Caring for Australasians with Renal Impairment guidelines**
Quotidian HD	**> 3 sessions/week and/or > 5.5 hours/session**
Long Hour HD	**≥ 6.5 hours per HD session**
High Flux Dialyser	**Ultrafiltration coefficient (kuf) >20 ml/hr/mmHg as specified by the manufacturer)**
AVF	**Native vein arteriovenous fistula**
AVG	**Synthetic arteriovenous bridge graft**
CVC	**Central venous HD catheter (Includes both tunnelled and non-tunnelled unless otherwise stated)**
Obese	**BMI ≥ 30**
Morbid Obesity	**BMI ≥ 35**