CHAPTER 5

Haemodialysis

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Stock and Flow

Australia

The annual stock and flow of HD patients during the period 2006-2010 is shown in Figures 5.1, 5.2 and 5.3.

There were 8,527 patients receiving HD treatment at 31st December 2010, an increase of 3%; of these 29% were hospital based, 59% were in satellite centres and 12% at home, the same as in 2009.

A total of 1,986 patients received HD for the first time during the year, a decrease of 3% from 2009, after a decrease of 6% from 2008.

The proportion of all HD patients in each age group is shown in Figure 5.7. There were 1,854 people ≥ 75 years receiving haemodialysis, including 392 people ≥ 85 years, a rise of 21% from 2009, following a 15% rise for the previous year.

There were 548 transplant operations, an 10% increase from 2009 (495 operations), representing 6% of all HD patients dialysing and 11% of those patients < 65 years. There were 41 patients aged ≥ 65 years transplanted.

There were 1,138 deaths in 2010.

For more detail regarding age and mode of HD in each State see Appendix II at the Website (www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm).

Figure 5.1

Stock and Flow of Haemodialysis Patients 2006 - 2010

	2006	2007	2008	2009	2010
Australia					
Patients new to HD	2062	2021	2149	2056	1986
First Dialysis Treatment	1777	1730	1788	1703	1676
Previous Dialysis (PD)	253	268	321	314	276
Failed Transplant	32	23	40	39	34
Transplanted	427	405	535	495	548
Deaths	1036	1163	1201	1226	1138
Never Transplanted	962	1084	1138	1150	1070
Previous Transplant	74	79	63	76	68
Transfer to Peritoneal Dialysis	534	436	487	428	328
Patients Dialysing (HD) at 31 December	7216	7592	7919	8232	8527
Patients Dialysing (HD) at Home at 31 December	894	949	950	972	964
% of all Home Dialysis (HD and PD) Patients	31%	31%	30%	31%	32%
New Zealand					
Patients new to HD	407	380	394	429	391
First Dialysis Treatment	327	311	320	360	326
Previous Dialysis (PD)	70	57	66	59	58
Failed Transplant	10	12	8	10	7
Transplanted	51	60	69	61	47
Deaths	181	177	236	205	205
Never Transplanted	166	167	219	192	182
Previous Transplant	15	10	17	13	23
Transfer to Peritoneal Dialysis	179	146	158	118	147
Patients Dialysing (HD) at 31 December	1231	1325	1343	1481	1545
Patients Dialysing (HD) at Home at 31 December	322	327	330	377	422
% of all Home Dialysis (HD and PD) Patients	30%	31%	30%	32%	34%

New Zealand

The annual stock and flow of HD patients during the period 2006-2010 is shown in Figures 5.1, 5.4 and 5.5.

There were 1,545 patients receiving treatment at 31st December 2010, a continuation of the trend from 2008-2009.

Hospital based HD (46%), satellite HD (29%) and home HD (25%) have all remained the same for the past three years.

New Zealand is continued on page 5-6.

Figure 5.2

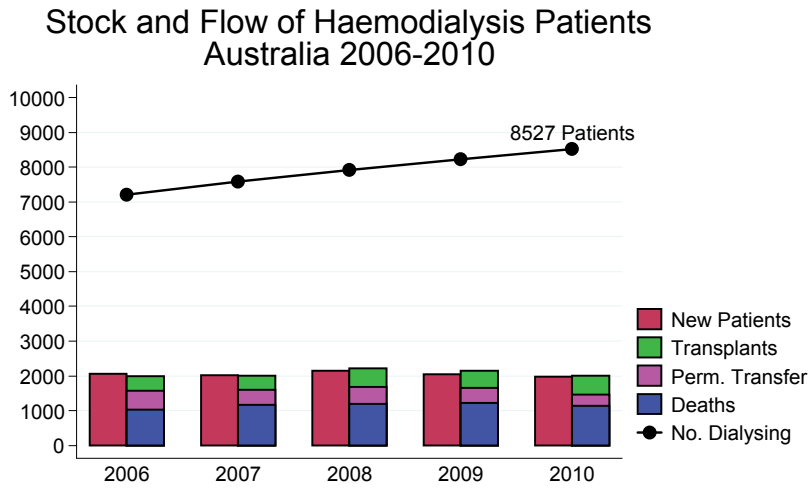


Figure 5.3

Stock and Flow of Haemodialysis Patients
Australia 2006 - 2010 Number (%)

Age Groups	2006	2007	2008	2009	2010
New Patients *					
00-14 years	13 (1%)	9 (0%)	13 (1%)	9 (0%)	13 (1%)
15-24 years	34 (2%)	45 (2%)	42 (2%)	45 (2%)	42 (2%)
25-34 years	77 (4%)	94 (5%)	101 (5%)	89 (4%)	75 (4%)
35-44 years	198 (10%)	187 (9%)	172 (8%)	176 (9%)	166 (8%)
45-54 years	296 (14%)	315 (16%)	345 (16%)	312 (15%)	308 (16%)
55-64 years	454 (22%)	437 (22%)	447 (21%)	442 (21%)	430 (22%)
65-74 years	532 (26%)	485 (24%)	541 (25%)	513 (25%)	472 (24%)
75-84 years	413 (20%)	405 (20%)	431 (20%)	411 (20%)	397 (20%)
>=85 years	45 (2%)	44 (2%)	57 (3%)	59 (3%)	83 (4%)
Total	**2062 (100%)**	**2021 (100%)**	**2149 (100%)**	**2056 (100%)**	**1986 (100%)**
Patients Dialysing					
00-14 years	7 (0%)	5 (0%)	10 (0%)	9 (0%)	10 (0%)
15-24 years	94 (1%)	98 (1%)	88 (1%)	91 (1%)	98 (1%)
25-34 years	301 (4%)	305 (4%)	290 (4%)	293 (4%)	286 (3%)
35-44 years	697 (10%)	737 (10%)	692 (9%)	692 (8%)	684 (8%)
45-54 years	1142 (16%)	1210 (16%)	1274 (16%)	1314 (16%)	1310 (15%)
55-64 years	1568 (22%)	1618 (21%)	1719 (22%)	1775 (22%)	1841 (22%)
65-74 years	1753 (24%)	1804 (24%)	1894 (24%)	1980 (24%)	2052 (24%)
75-84 years	1469 (20%)	1602 (21%)	1685 (21%)	1766 (21%)	1854 (22%)
>=85 years	185 (3%)	213 (3%)	267 (3%)	312 (4%)	392 (5%)
Total	**7216 (100%)**	**7592 (100%)**	**7919 (100%)**	**8232 (100%)**	**8527 (100%)**
Primary Renal Disease *					
Glomerulonephritis	463 (22%)	482 (24%)	462 (21%)	504 (25%)	417 (21%)
Analgesic Nephropathy	48 (2%)	46 (2%)	45 (2%)	39 (2%)	38 (2%)
Hypertension	307 (15%)	319 (16%)	322 (15%)	285 (14%)	278 (14%)
Polycystic Disease	134 (6%)	127 (6%)	125 (6%)	123 (6%)	130 (7%)
Reflux Nephropathy	62 (3%)	56 (3%)	59 (3%)	61 (3%)	42 (2%)
Diabetic Nephropathy	681 (33%)	642 (32%)	746 (35%)	680 (33%)	722 (36%)
Miscellaneous	252 (12%)	217 (11%)	233 (11%)	230 (11%)	240 (12%)
Uncertain	115 (6%)	132 (7%)	157 (7%)	134 (7%)	119 (6%)
Total	**2062 (100%)**	**2021 (100%)**	**2149 (100%)**	**2056 (100%)**	**1986 (100%)**

* New patients receiving first haemodialysis treatment

Figure 5.4

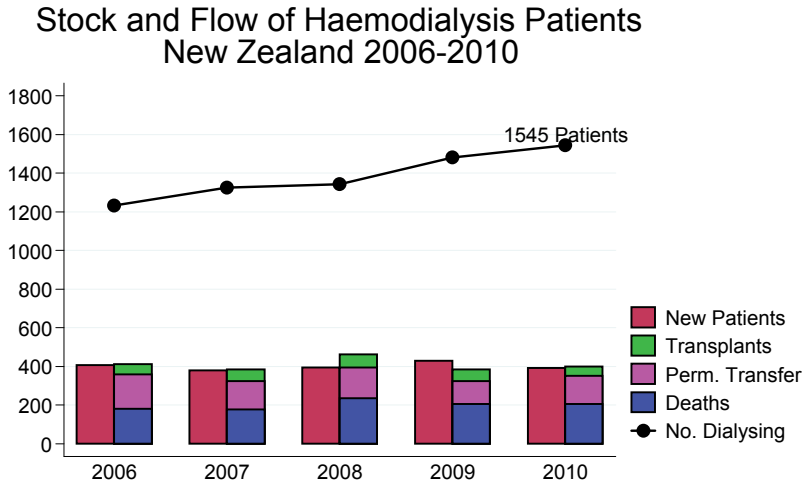


Figure 5.5

Stock and Flow of Haemodialysis Patients
New Zealand 2006 - 2010 Number (%)

Age Groups	2006	2007	2008	2009	2010
New Patients *					
00-14 years	3 (1%)	3 (1%)	5 (1%)	2 (0%)	1 (0%)
15-24 years	15 (4%)	21 (6%)	19 (5%)	10 (2%)	12 (3%)
25-34 years	30 (7%)	17 (4%)	15 (4%)	24 (6%)	12 (3%)
35-44 years	33 (8%)	45 (12%)	34 (9%)	54 (13%)	39 (10%)
45-54 years	92 (23%)	63 (17%)	84 (21%)	89 (21%)	96 (25%)
55-64 years	96 (24%)	100 (26%)	117 (30%)	103 (24%)	108 (28%)
65-74 years	94 (23%)	88 (23%)	89 (23%)	92 (21%)	82 (21%)
75-84 years	40 (10%)	39 (10%)	30 (8%)	52 (12%)	38 (10%)
>=85 years	4 (1%)	4 (1%)	1 (0%)	3 (1%)	3 (1%)
Total	**407 (100%)**	**380 (100%)**	**394 (100%)**	**429 (100%)**	**391 (100%)**
Patients Dialysing					
00-14 years	2 (0%)	3 (0%)	3 (0%)	3 (0%)	4 (0%)
15-24 years	32 (3%)	39 (3%)	38 (3%)	41 (3%)	45 (3%)
25-34 years	88 (7%)	80 (6%)	76 (6%)	90 (6%)	89 (6%)
35-44 years	150 (12%)	160 (12%)	149 (11%)	162 (11%)	164 (11%)
45-54 years	247 (20%)	261 (20%)	275 (20%)	309 (21%)	328 (21%)
55-64 years	347 (28%)	364 (27%)	373 (28%)	403 (27%)	427 (28%)
65-74 years	269 (22%)	297 (22%)	293 (22%)	315 (21%)	322 (21%)
75-84 years	87 (7%)	108 (8%)	126 (9%)	147 (10%)	152 (10%)
>=85 years	9 (1%)	13 (1%)	10 (1%)	11 (1%)	14 (1%)
Total	**1231 (100%)**	**1325 (100%)**	**1343 (100%)**	**1481 (100%)**	**1545 (100%)**
Primary Renal Disease *					
Glomerulonephritis	92 (23%)	89 (23%)	72 (18%)	96 (22%)	88 (23%)
Analgesic Nephropathy	1 (0%)	3 (1%)	1 (0%)	1 (0%)	
Hypertension	39 (10%)	43 (11%)	33 (8%)	44 (10%)	38 (10%)
Polycystic Disease	23 (6%)	15 (4%)	14 (4%)	18 (4%)	11 (3%)
Reflux Nephropathy	7 (2%)	8 (2%)	9 (2%)	3 (1%)	6 (2%)
Diabetic Nephropathy	184 (45%)	163 (43%)	204 (52%)	212 (49%)	202 (52%)
Miscellaneous	32 (8%)	47 (12%)	46 (12%)	41 (10%)	35 (9%)
Uncertain	29 (7%)	12 (3%)	15 (4%)	14 (3%)	11 (3%)
Total	**407 (100%)**	**380 (100%)**	**394 (100%)**	**429 (100%)**	**391 (100%)**

* New patients receiving first haemodialysis treatment

Figure 5.6

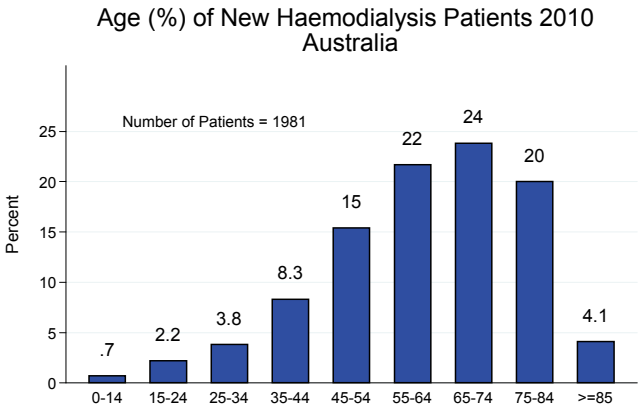
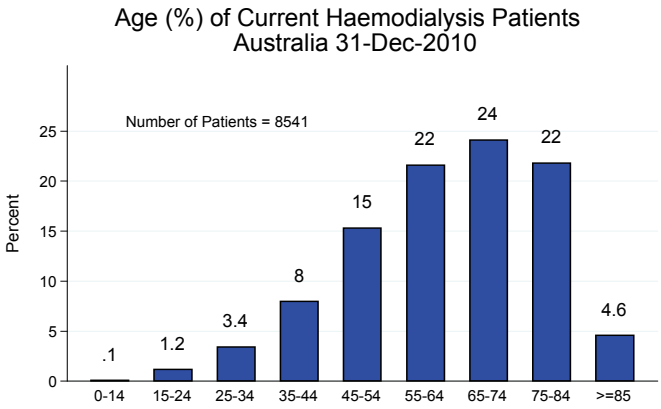


Figure 5.7



NEW ZEALAND (continued from page 5-2)

There were 391 patients who received HD for the first time, a small decrease in number from 2009. Eighty three percent were having their initial dialysis treatment, 15% were previously dialysing with peritoneal dialysis and 2% were failed transplants.

The modal age group for new HD patients was 55-64 years (28%), 7% were <35 years and 32% ≥ 65 years (Figures 5.5 and 5.8). The age distribution of the prevalent HD population was similar (Figure 5.10).

There were 47 HD patients who received transplants in 2010 (61 in 2009). Four patients ≥ 65 years were transplanted.

There were 205 deaths in 2010 the same as number as 2009.

For more details see Appendix III at the Website
(www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm).

Figure 5.8

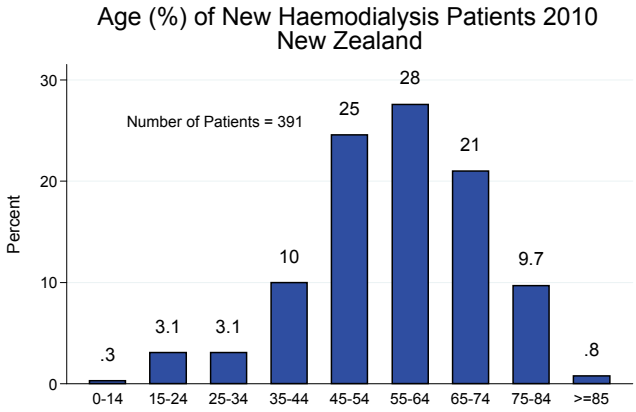
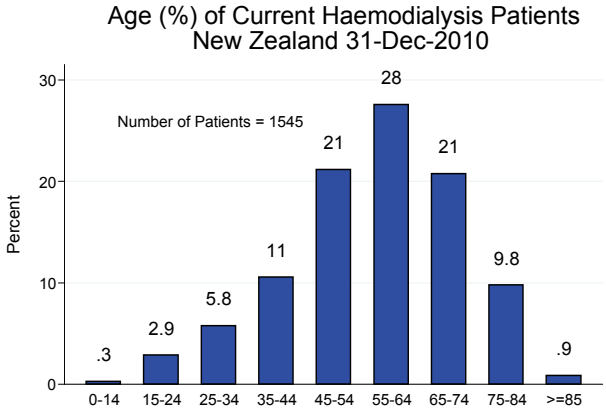


Figure 5.9



AUSTRALIA

Blood flow rates in Australia showed a similar picture in 2010 and continued to slowly rise.The proportion receiving a prescribed blood flow rate of 300 mls/ minute or higher was 81% in 2010 the same as in 2009 with 78% in 2008.

Only 4% (341 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 2010, 68% 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) 2006 - 2010

Country		No. Pts	*	Mls/Minute					
				<200	200-249	250-299	300-349	350-399	>400
Aust	December 2010	8524	3	0.50%	3.50%	14.30%	57.90%	20.10%	3.70%
	December 2009	8231	1	0.60%	3.50%	14.60%	57.50%	19.80%	4%
	December 2008	7919		0.70%	4.40%	16.20%	54.80%	20%	3.90%
	December 2007	7590	2	0.50%	4.50%	18.40%	53.20%	19.50%	3.90%
	December 2006	7215	1	0.40%	4.50%	19.30%	52.30%	19.10%	4.40%
NZ	December 2010	1545		0.30%	6.20%	25.40%	49.30%	16.70%	2.10%
	December 2009	1480	1	0.30%	6.40%	24.90%	45.90%	20.20%	2.30%
	December 2008	1343		0.40%	7.50%	31.70%	41.20%	17.30%	1.90%
	December 2007	1325		0.50%	6.60%	28.80%	41.10%	21%	2.10%
	December 2006	1231		0.40%	6.90%	26.30%	44.80%	19.50%	2.10%

Figure 5.11

Blood Flow Rate by Type of Access December 2010

Blood Flow Rate	Australia			New Zealand		
	AVF	AVG	CVC *	AVF	AVG	CVC
<200	22 (.3%)	-	17 (1.5%)	2 (.2%)	1 (1.3%)	2 (.6%)
200-249	204 (3.1%)	26 (3.5%)	67 (5.7%)	73 (6.5%)	2 (2.6%)	21 (6.1%)
250-299	805 (12.2%)	119 (15.9%)	298 (25.6%)	199 (17.7%)	24 (30.8%)	169 (49.4%)
300-349	3793 (57.4%)	467 (62.5%)	679 (58.2%)	582 (51.7%)	48 (61.5%)	132 (38.6%)
350-399	1498 (22.7%)	115 (15.4%)	101 (8.7%)	238 (21.2%)	3 (3.8%)	17 (5%)
>=400	289 (4.4%)	20 (2.7%)	4 (.3%)	31 (2.8%)	-	1 (.3%)
Total	**6611 (100%)**	**747 (100%)**	**1166 (100%)**	**1125 (100%)**	**78 (100%)**	**342 (100%)**

* Number of patients having C.V.V. HD not included

Figure 5.12

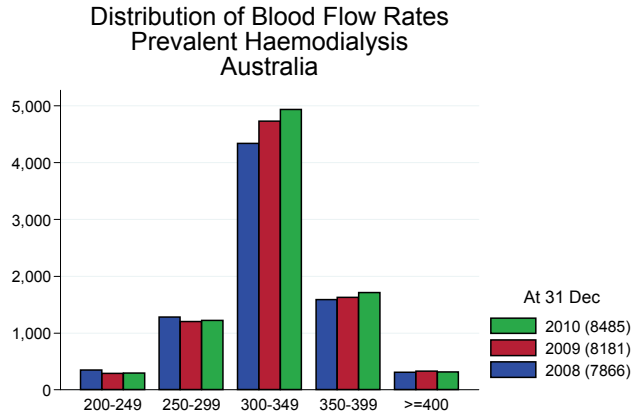


Figure 5.13

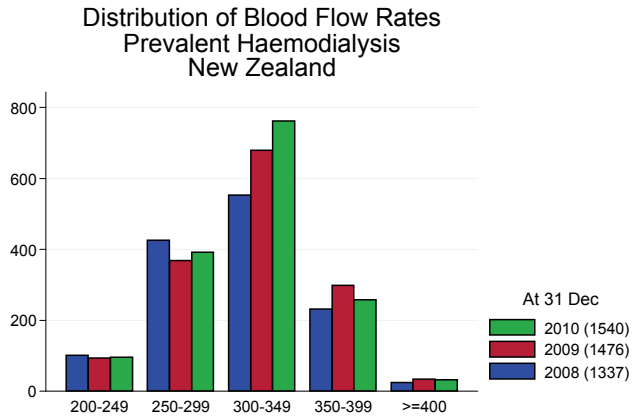
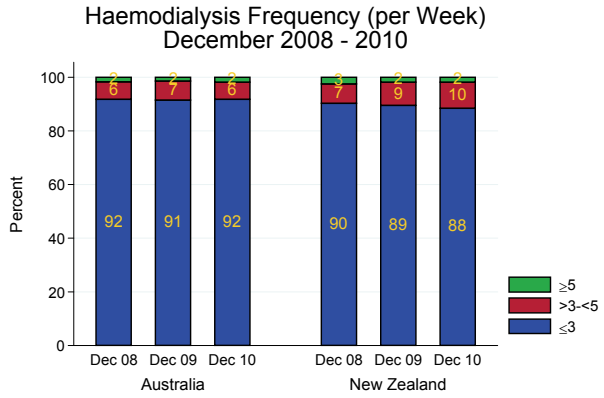


Figure 5.14

Duration and Number of Sessions Per Week
December 2010

Sessions Per week	Hours of Each Treatment						Total
	<4	4	4>4-4.5	>4.5-5	>5-5.5	>5.5	
Australia							
<=3	343 (4.4%)	3240 (41.8%)	1638 (21.1%)	2198 (28.4%)	138 (1.8%)	192 (2.5%)	7749 (100%)
>3-<5	42 (7.8%)	88 (16.3%)	51 (9.4%)	105 (19.4%)	9 (1.7%)	245 (45.4%)	540 (100%)
>=5	71 (45.8%)	33 (21.3%)	2 (1.3%)	9 (5.8%)	1 (.6%)	39 (25.2%)	155 (100%)
Total	**456 (5.4%)**	**3361 (39.8%)**	**1691 (20%)**	**2312 (27.4%)**	**148 (1.8%)**	**476 (5.6%)**	**8444 (100%)**
New Zealand							
<=3	22 (1.6%)	510 (37.7%)	272 (20.1%)	448 (33.1%)	30 (2.2%)	71 (5.2%)	1353 (100%)
>3-<5	8 (5.3%)	33 (22%)	10 (6.7%)	54 (36%)	10 (6.7%)	35 (23.3%)	150 (100%)
>=5	14 (50%)	8 (28.6%)	2 (7.1%)	3 (10.7%)	-	1 (3.6%)	28 (100%)
Total	**44 (2.9%)**	**551 (36%)**	**284 (18.5%)**	**505 (33%)**	**40 (2.6%)**	**107 (7%)**	**1531 (100%)**

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 2007. In New Zealand the proportion dialysing more than three times per week continues to increase. The proportions dialysing ≥ 4.5 hours per session has plateaued as has the total hours per week. As a result, the proportions dialysing more than the "standard" 12 hours per week has now stabilised in Australia but not New Zealand.

In 2010, 54% and 64% 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 prospectives.

Figure 5.16

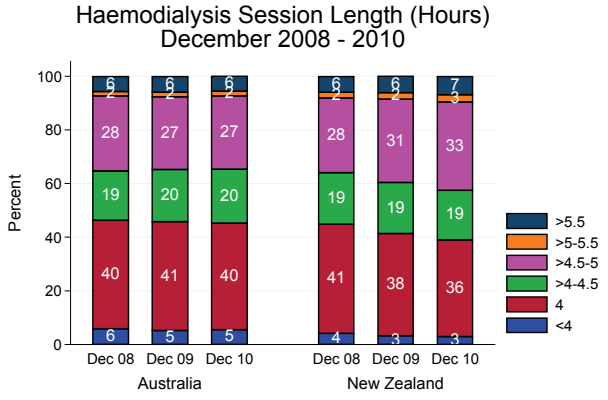


Figure 5.17

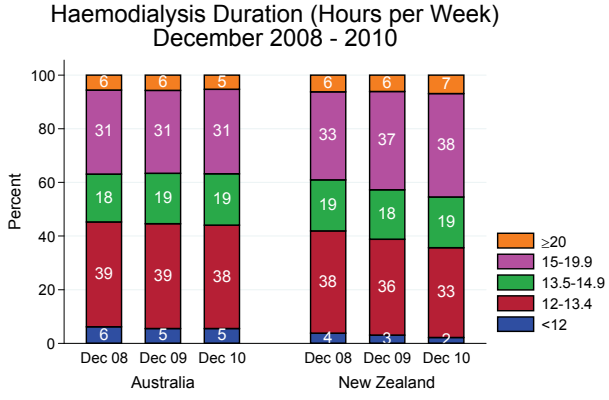


Figure 5.18

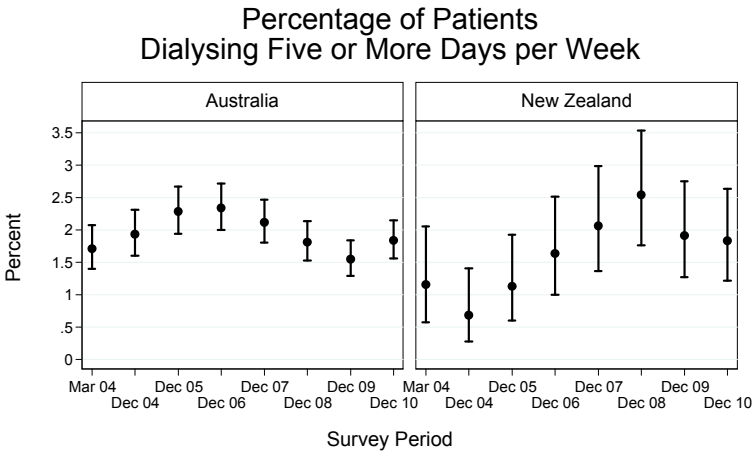


Figure 5.19

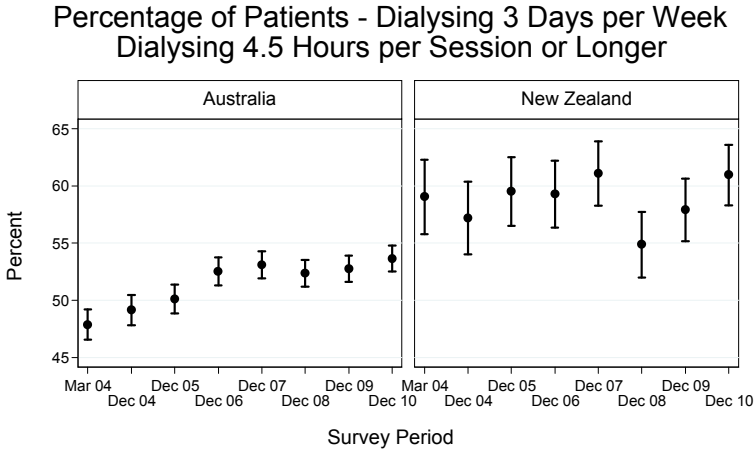
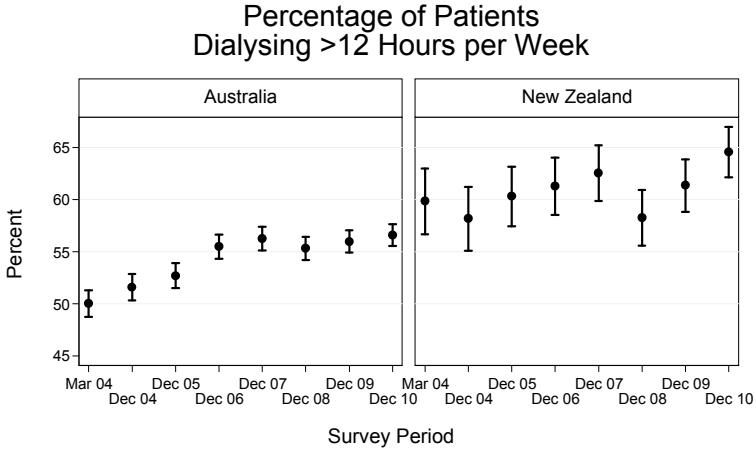


Figure 5.20



Dialysis frequency and session length vary among the Australian States. Patients in Queensland, Victoria and South Australia 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-10	49 (3.1%)	26 (.9%)	48 (2.2%)	3 (2.1%)	8 (1.4%)	6 (1.5%)	15 (1.9%)	28 (1.8%)
Dec-09	40 (2.6%)	27 (1%)	39 (1.8%)	2 (1.4%)	6 (1.1%)	-	10 (1.3%)	28 (1.9%)
Dec-08	50 (3.4%)	23 (.9%)	45 (2.2%)	2 (1.6%)	8 (1.7%)	1 (.3%)	12 (1.6%)	34 (2.5%)
Dec-07	57 (4.2%)	26 (1%)	53 (2.6%)	1 (.8%)	9 (1.9%)	-	14 (2%)	27 (2.1%)

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-10	809 (50.8%)	1820 (65.9%)	744 (33.7%)	77 (53.8%)	137 (24.4%)	295 (73.9%)	198 (25.2%)	816 (53.2%)
Dec-09	769 (49.9%)	1717 (64.5%)	661 (31.3%)	75 (53.6%)	133 (25%)	304 (79.6%)	191 (24.8%)	748 (51%)
Dec-08	716 (49.4%)	1713 (66.1%)	640 (31%)	52 (41.6%)	105 (21.8%)	276 (76.7%)	177 (23.2%)	650 (48.7%)
Dec-07	678 (49.7%)	1659 (66%)	611 (30.5%)	43 (35%)	121 (25.2%)	278 (83.2%)	186 (26.1%)	724 (55.1%)

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-10	978 (61.3%)	2034 (73.9%)	954 (43.2%)	89 (62.7%)	166 (29.5%)	308 (77.4%)	252 (32%)	984 (64.5%)
Dec-09	942 (61.2%)	1959 (73.5%)	870 (41.2%)	87 (62.1%)	162 (30.6%)	304 (80.2%)	237 (30.8%)	900 (61.2%)
Dec-08	880 (60.6%)	1930 (74.4%)	837 (40.6%)	59 (46.8%)	129 (26.7%)	285 (78.7%)	216 (28.3%)	780 (58.4%)
Dec-07	841 (62.3%)	1873 (74.5%)	804 (40.1%)	53 (42.7%)	151 (31.5%)	282 (84.7%)	222 (31.1%)	819 (62.5%)

OUTCOME 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.

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 1999 - 2010
% [95% Confidence Interval]

	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
1999-2001	3966	93 [92, 94]	87 [85, 88]	65 [64, 67]	48 [47, 50]
2002-2004	4234	93 [92, 94]	86 [85, 87]	65 [64, 67]	47 [45, 48]
2005-2007	5255	92 [91, 93]	86 [85, 87]	65 [63, 66]	47 [46, 49]
2008-2010	5170	93 [92, 93]	87 [86, 88]	-	-
New Zealand					
1999-2001	726	93 [91, 95]	87 [84, 89]	62 [58, 66]	41 [37, 45]
2002-2004	864	94 [92, 96]	88 [85, 90]	65 [62, 68]	44 [41, 48]
2005-2007	947	94 [92, 95]	89 [86, 90]	65 [62, 68]	44 [39, 48]
2008-2010	1017	93 [91, 95]	90 [87, 91]	-	-

Figure 5.25

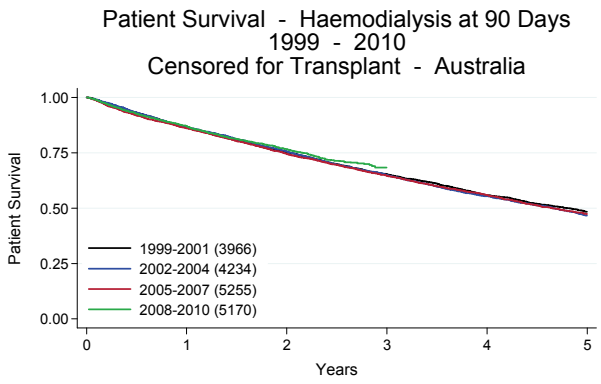
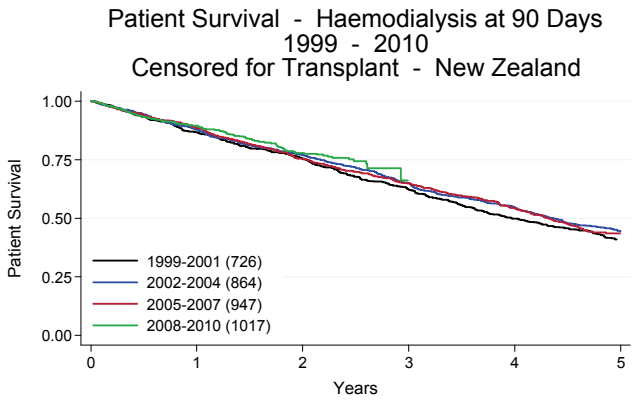


Figure 5.26



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

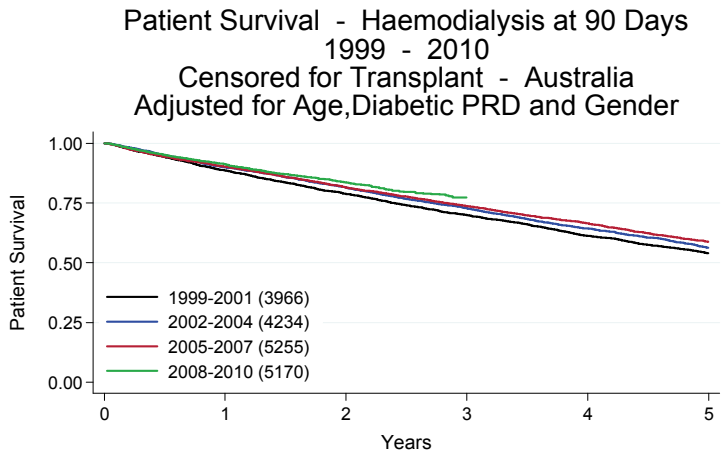


Figure 5.28

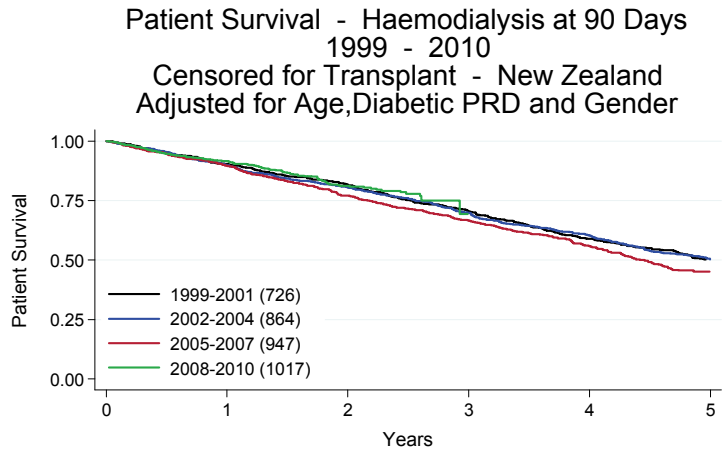


Figure 5.29

Haemodialysis at 90 Days
Patient Survival - Diabetic / Non Diabetic
Censored for Transplant 1999 - 2010
% [95% Confidence Interval]

		Survival			
	No. of Patients	6 months	1 year	3 years	5 years
Australia					
Non Diabetic (n=10,869)	12939	92 [92, 93]	86 [86, 87]	67 [66, 68]	50 [49, 51]
Diabetic (n=4,806)	5686	93 [92, 94]	87 [86, 87]	62 [61, 64]	43 [41, 44]
New Zealand					
Non Diabetic (n=1,436)	1940	93 [92, 94]	88 [86, 89]	67 [65, 69]	48 [45, 51]
Diabetic (n=1,237)	1614	95 [94, 96]	89 [87, 90]	62 [60, 65]	39 [35, 42]

Figure 5.30

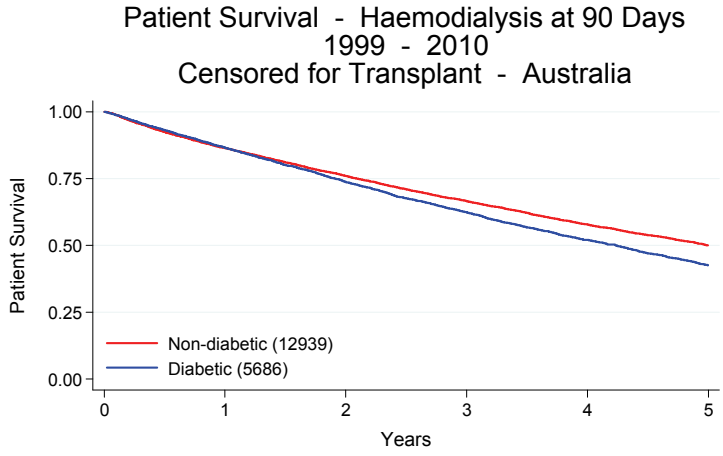


Figure 5.31

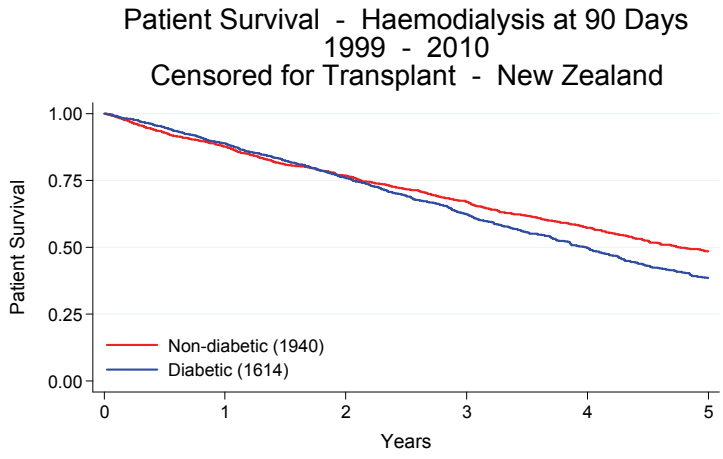


Figure 5.32

Haemodialysis at 90 Days
Patient Survival - By Age Group
Censored for Transplant 1999 - 2010
% [95% Confidence Interval]

Age Groups	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
0-39 years	2143	98 [97, 99]	96 [95, 97]	87 [85, 89]	80 [77, 82]
40-59 years	5824	96 [95, 96]	92 [91, 93]	77 [76, 78]	63 [61, 65]
60-74 years	6668	92 [91, 93]	85 [84, 86]	62 [61, 63]	43 [42, 45]
>=75 years	3990	87 [85, 88]	77 [76, 79]	46 [44, 48]	25 [23, 26]
New Zealand					
0-39 years	484	99 [98, 100]	96 [94, 98]	83 [78, 87]	72 [65, 77]
40-59 years	1491	95 [94, 96]	91 [89, 92]	73 [71, 76]	52 [48, 55]
60-74 years	1257	93 [91, 94]	86 [84, 88]	57 [54, 60]	33 [30, 37]
>=75 years	322	84 [79, 87]	71 [66, 76]	33 [27, 39]	17 [12, 23]

Figure 5.33

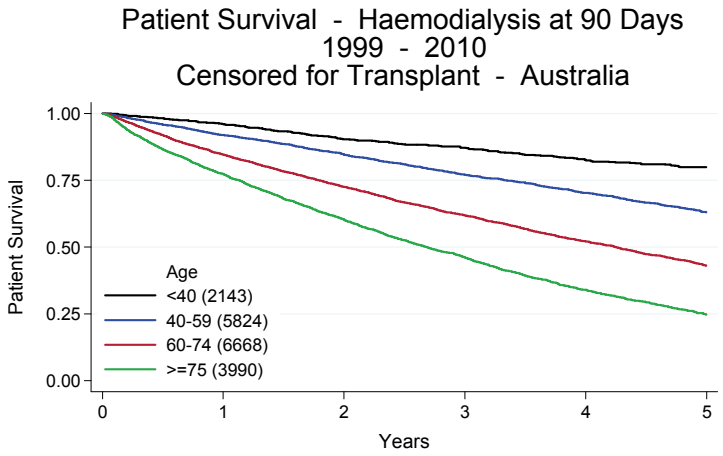
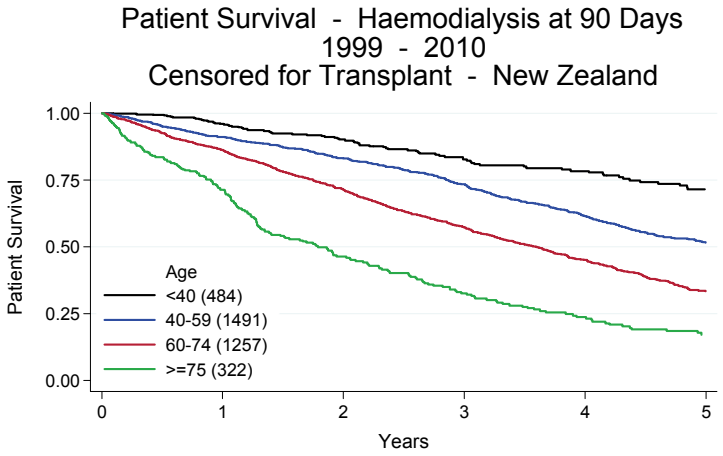


Figure 5.34



Membrane Type and Surface Areas

Australia Figures 5.35 - 5.38.

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

High flux Polysulphone-Helixone increased to 57% in December 2010 from 53% in 2009, 49% in 2008, 39% in 2007 and 34% in 2006. High flux Polyamix increased to 32% this year from 29% last year and 26% in 2008.

There were 96% of patients receiving dialysis with high flux dialysers in 2010 (88% in 2009, 81% in 2008, 72% in 2007 and 64% in 2006).

New Zealand Figures 5.36 and 5.39.

Low flux polysulphone decreased to 13% in December 2010, from 19% and 24% in December 2009 and 2008 respectively.

There were 72% (1104 patients) reported as receiving dialysis with high flux dialysers in December 2010, an increase from 62% (911patients) in 2009 and 52%(701 patients) in 2008.

Figure 5.35

Haemodialyser Membrane Types

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 ACETATE	LOW	1	.	.	.	1	2
CELLULOSE TRIACETATE	HIGH	.	.	4	14	46	64
DIACETATE	LOW	.	.	4	.	2	6
POLYAMIX	HIGH	1	44	725	.	2002	2772
POLYAMIX	LOW	.	7	44	.	54	105
POLYETHERSULFONE	HIGH	.	.	6	101	252	359
POLYNEPHRON	HIGH	.	.	.	.	46	46
POLYSULPHONE	HIGH	.	15	.	12	11	38
POLYSULPHONE	LOW	5	10	.	95	99	209
POLYSULPHONE-HELIXONE	HIGH	.	718	.	3077	1064	4859
Total		**7**	**794**	**783**	**3299**	**3577**	**8460**
New Zealand							
POLYAMIX	HIGH	.	3	57	.	378	438
POLYAMIX	LOW	.	5	70	.	137	212
POLYSULPHONE	HIGH	.	.	.	5	.	5
POLYSULPHONE	LOW	2	.	.	93	114	209
POLYSULPHONE-HELIXONE	HIGH	.	405	.	187	69	661
Total		**2**	**413**	**127**	**285**	**698**	**1525**

Figure 5.36

Number of Patients at end of 2010 by HD Modality

	NT	NSW/ACT	Vic	Qld	SA	WA	Tas	NZ	Total
Haemodiafiltration	0	288	17	207	89	83	35	284	1,003
Haemodialysis - Hollow	405	2,669	2,380	1,490	523	749	128	1,307	9,651
Haemofiltration	0	12	0	25	0	0	0	9	46
Total	**405**	**2,969**	**2,397**	**1,722**	**612**	**832**	**163**	**1,600**	**10,700**

Figure 5.37

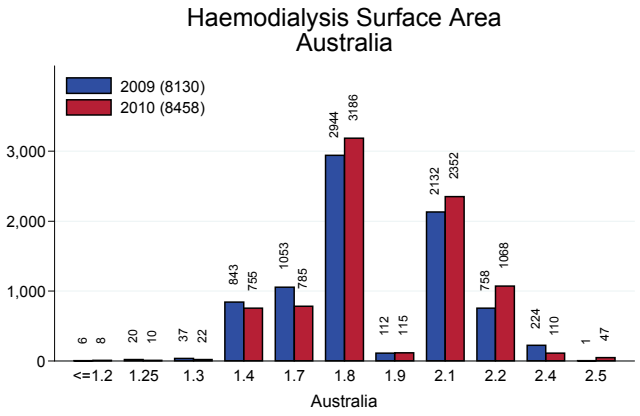
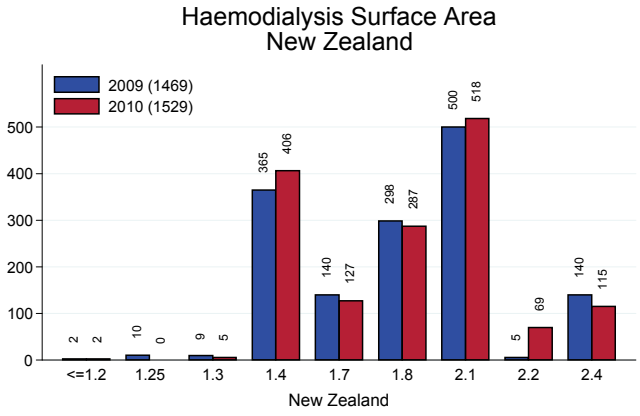


Figure 5.38



ANAEMIA

In Australia, mean haemoglobin and erythropoietic agent use has stabilised. 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 2003-2005 has reached a plateau.

Figure 5.39

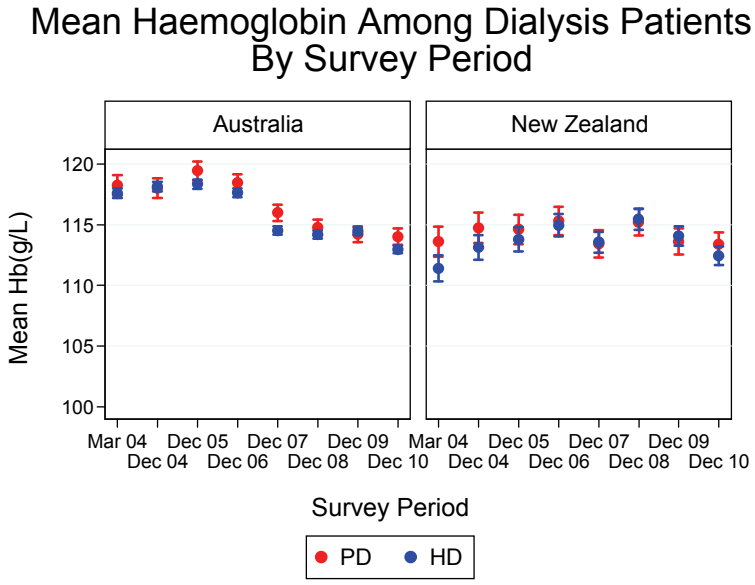
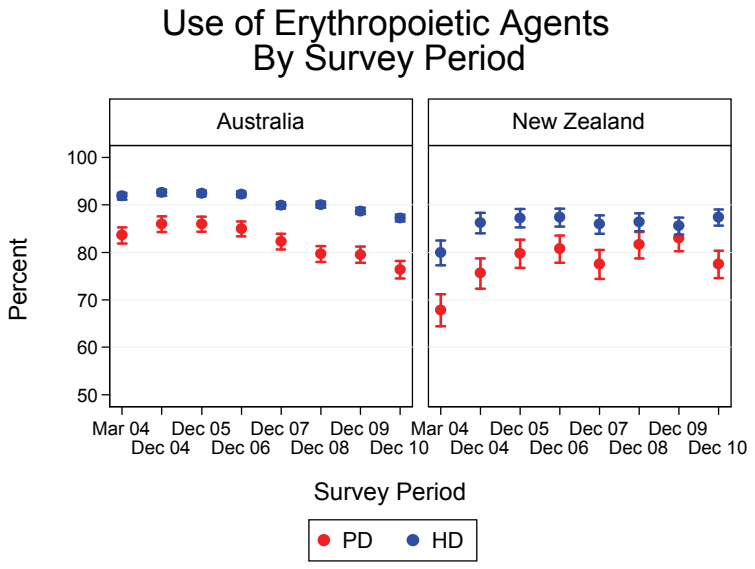


Figure 5.40



HAEMOGLOBIN

In Australia, haemoglobin is <110 g/L in 38% and ≥140g/L in 4% of haemodialysis patients, which is the same as the previous two years.

In New Zealand, the corresponding percentages are 41% 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

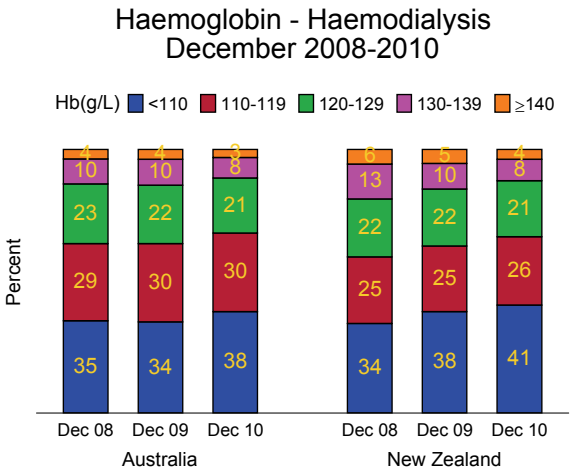
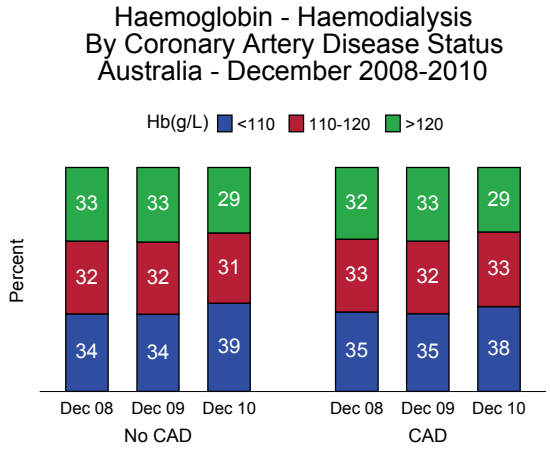
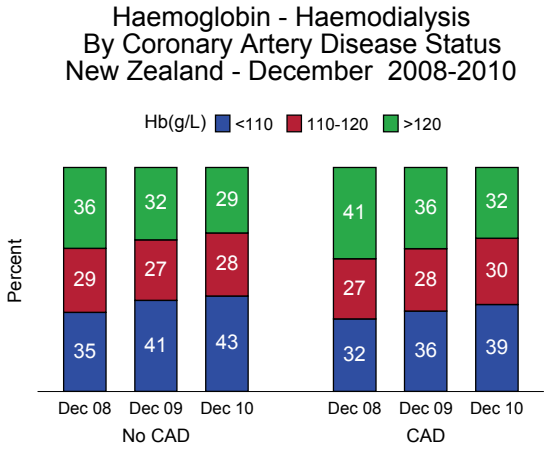


Figure 5.42





Haemoglobin by Treating Centre

Figures 5.43- 5.46

These 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 25% to 80% for haemodialysis patients and for New Zealand 28% to 60%.

Figure 5.43

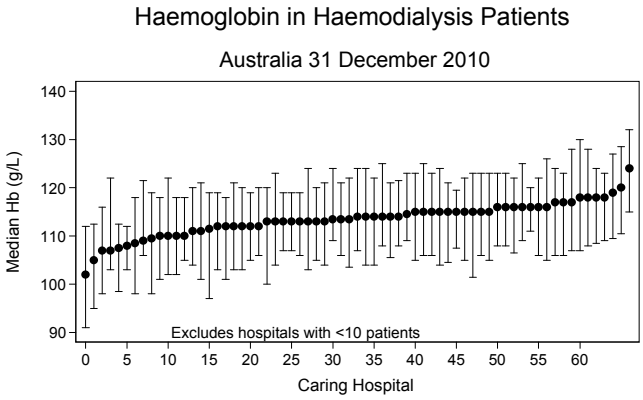


Figure 5.44

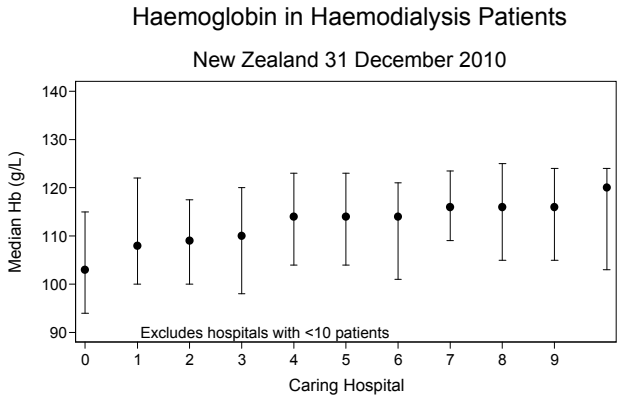


Figure 5.45

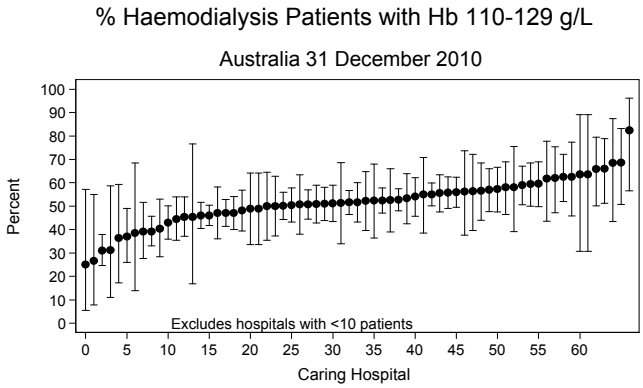
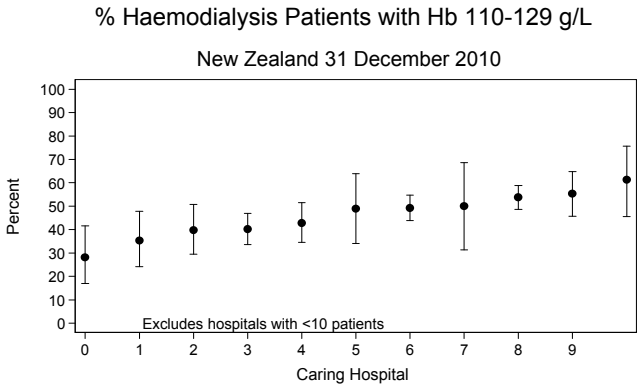


Figure 5.46



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 reduced.

Figure 5.47

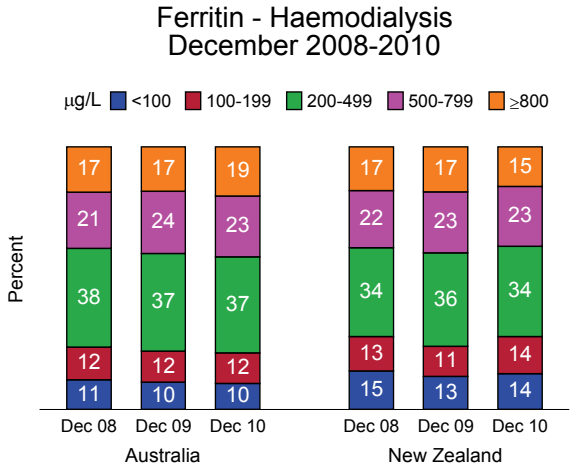
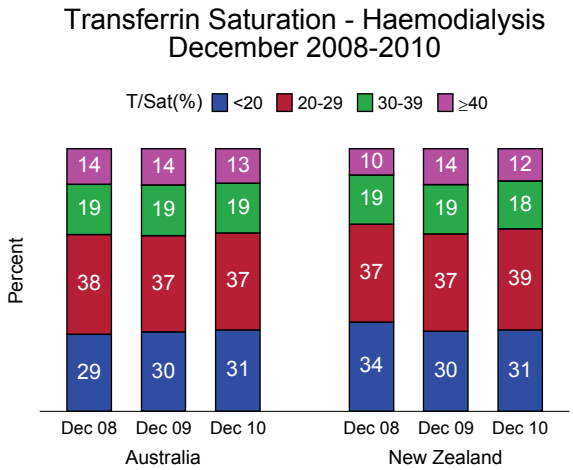


Figure 5.48



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 2-80% for haemodialysis patients. Similarly large variations between centres were seen for transferrin saturation, between 25-100%. 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 17-54% for haemodialysis patients and the corresponding figures for transferrin saturation were between 48-83%. 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

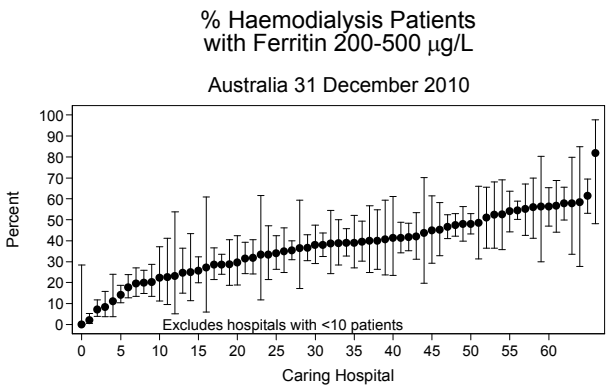


Figure 5.50

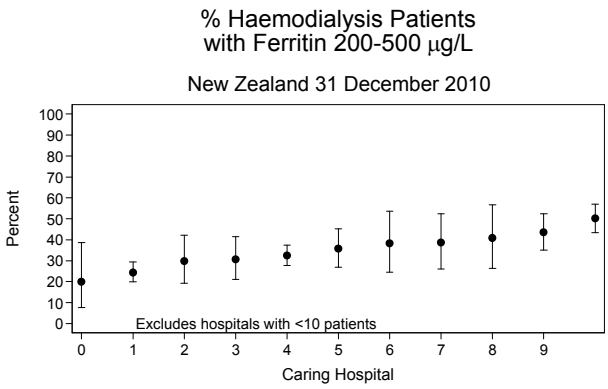


Figure 5.51

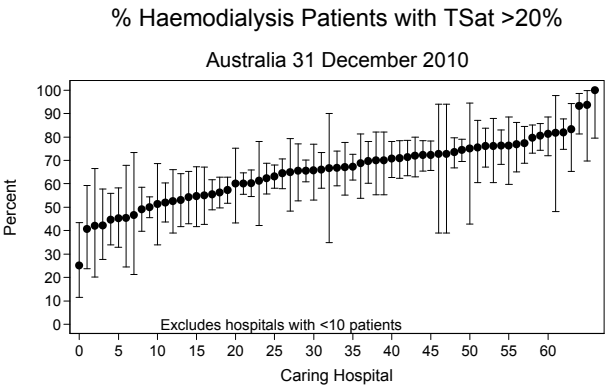
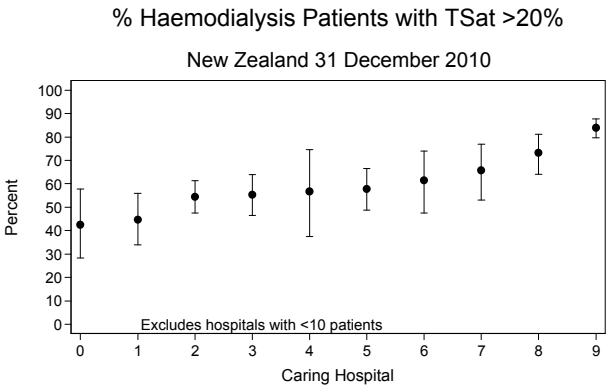


Figure 5.52

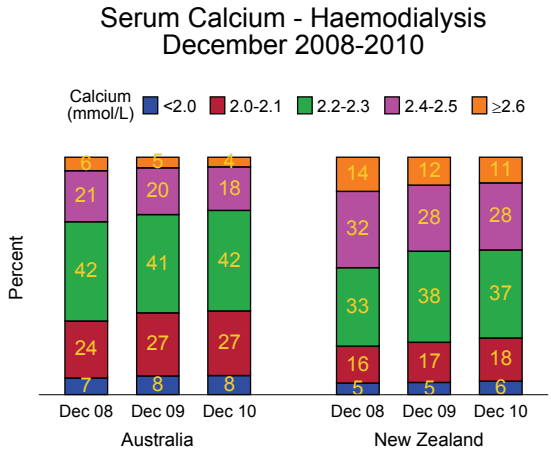


SERUM CALCIUM

Figure 5.53

In both Australia and New Zealand the proportions of patients with proportions with serum calcium ≥ 2.4 mmol/L has continued to decrease, while those with < 2.2 mmol/L have decreased 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 were for corrected total calcium, while those in this report are for uncorrected total calcium.

In Australia, the proportions ranged widely between 25-100% for haemodialysis patients, while in New Zealand the corresponding proportions were 42-80%.

Figure 5.54

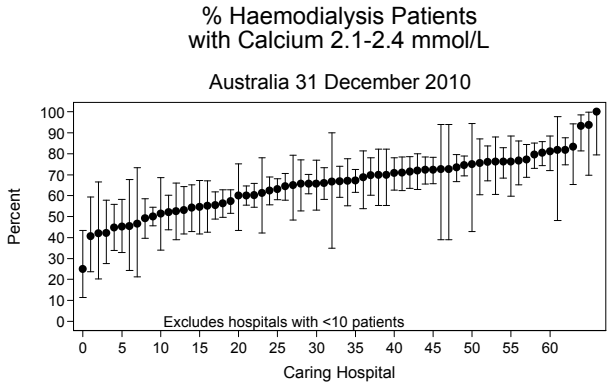
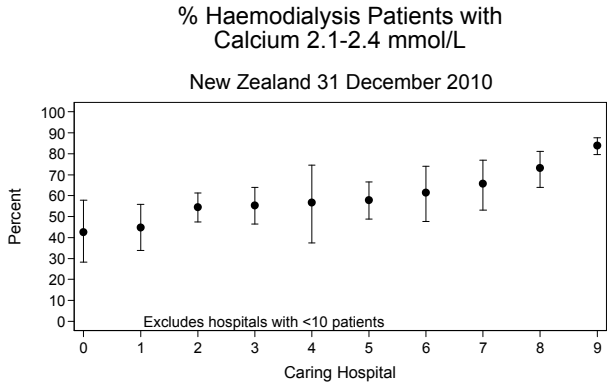


Figure 5.55

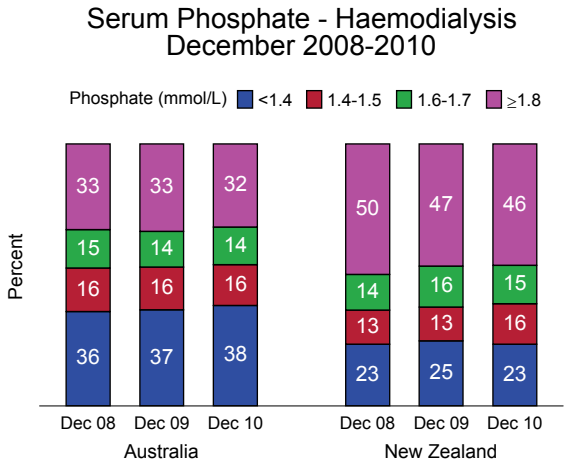


Serum Phosphate

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 35-90% for haemodialysis patients and in

New Zealand, the corresponding proportions were 29-51%.

Figure 5.57

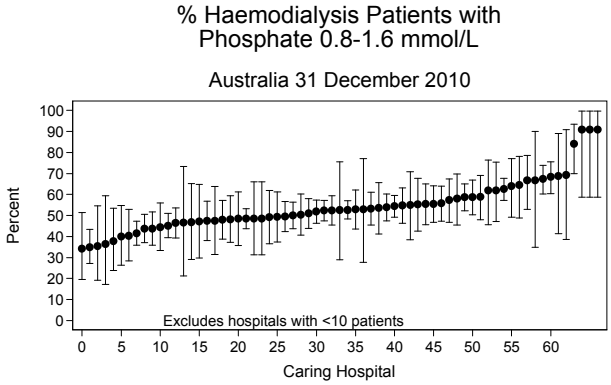
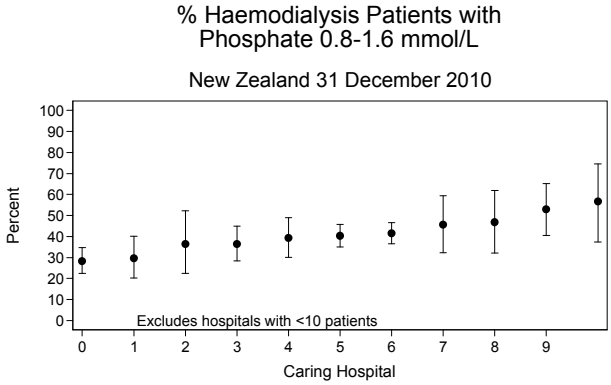


Figure 5.58



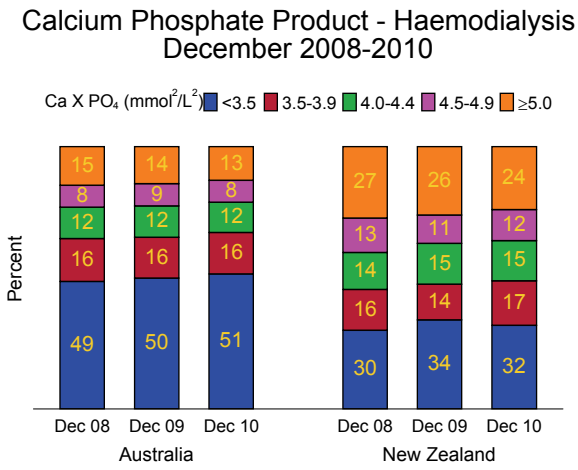
CALCIUM-PHOSPHATE PRODUCT

Figure 5.59

In both Australia and New Zealand, calcium-phosphate product has continued to improve, among haemodialysis patients, with smaller proportions of patients with a product ≥ 5.0 mmol^2/l$^{2.}$

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 45-100% for haemodialysis patients while in New Zealand, the corresponding proportions were 40-65%.

Figure 5.60

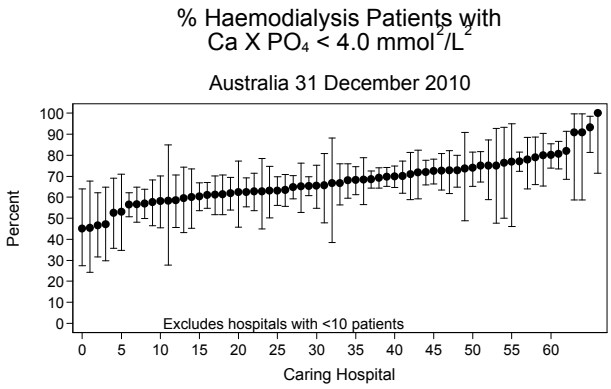
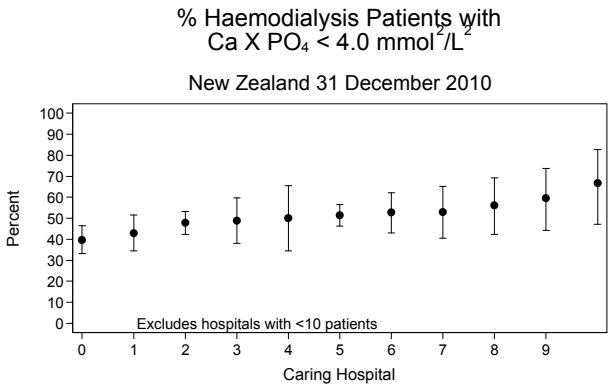


Figure 5.61



Urea Reduction Ratio

Figures 5.62 and 5.64

Distributions of URR values have been fairly stable over the past three years. About 8% and 30% 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%, 18% in Australia and 36% in New Zealand had CVC access.

Figure 5.62

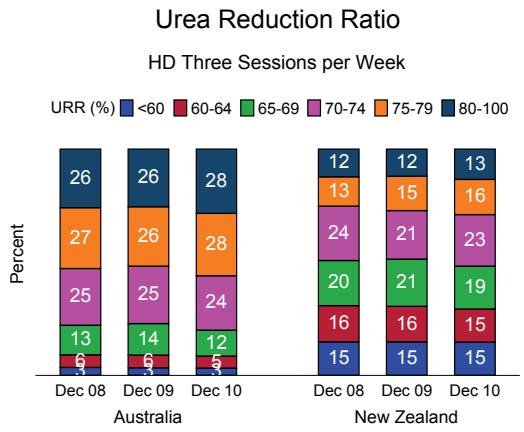


Figure 5.63

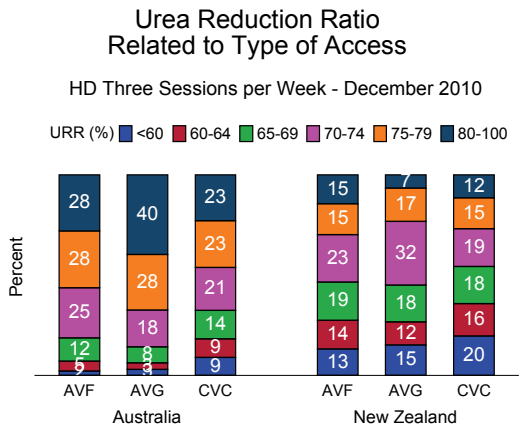


Figure 5.64

Urea Reduction Ratio - Prevalent Patients Three Sessions per Week - December 2010

Hours per Session	Urea Reduction Ratio %		
	< 65	>=65	Total
Australia			
<4 hours	53 (18.1%)	240 (81.9%)	293
4 hours	246 (8.3%)	2715 (91.7%)	2961
>4-5 hours	262 (7.4%)	3265 (92.6%)	3527
>5 hours	27 (11.7%)	204 (88.3%)	231
Total	**588 (8.4%)**	**6424 (91.6%)**	**7012**
New Zealand			
<4 hours	6 (40.0%)	9 (60.0%)	15
4 hours	149 (32.3%)	313 (67.7%)	462
>4-5 hours	178 (28.2%)	453 (71.8%)	631
>5 hours	11 (15.5%)	60 (84.5%)	71
Total	**344 (29.2%)**	**835 (70.8%)**	**1179**

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: 64-81% in Australia and 67-75% in New Zealand. However, the proportions with URR >70% in each unit varied widely, from 31-95% in Australia and 29-81% in New Zealand.

Figure 5.65

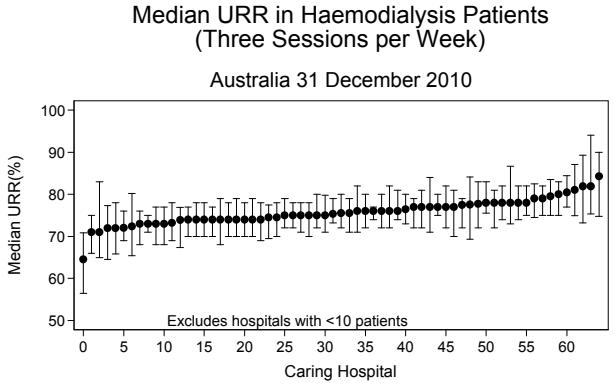


Figure 5.66

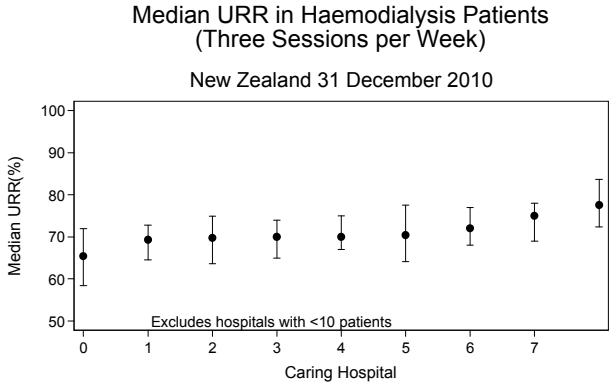


Figure 5.67

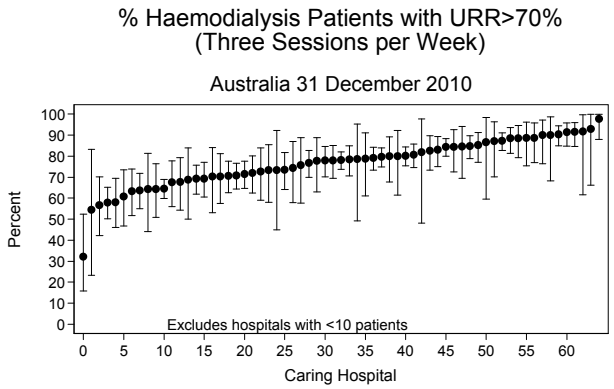
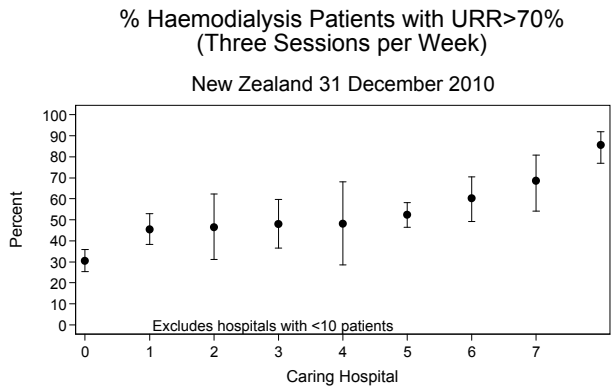


Figure 5.68



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.

Diabetic, female, young (age <25years) patients and 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 increased rates of AVF or AVG at the commencement of dialysis.

ANZDATA does not collect HD without permanent access information about indication for catheter usage, hence the reason less than half of non-late referred patients commence is not known.

Figure 5.69

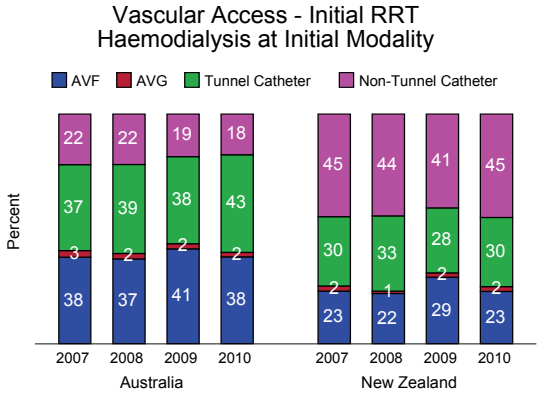
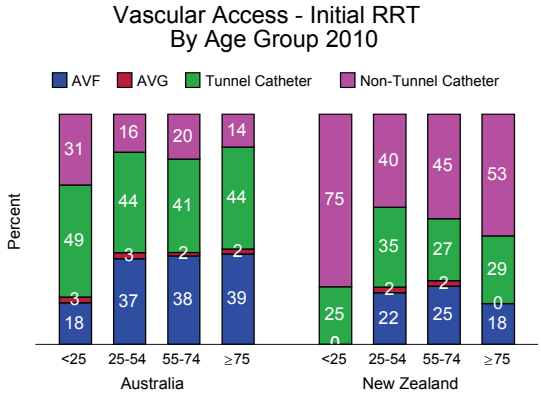


Figure 5.70



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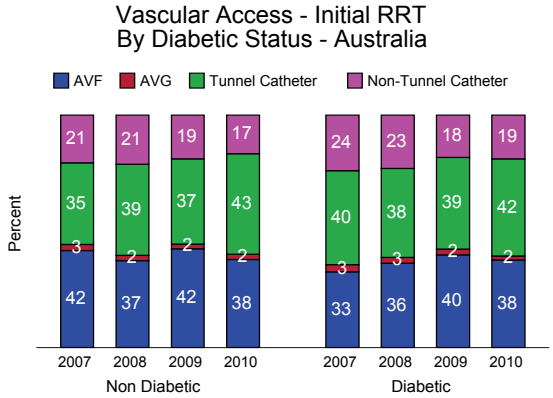

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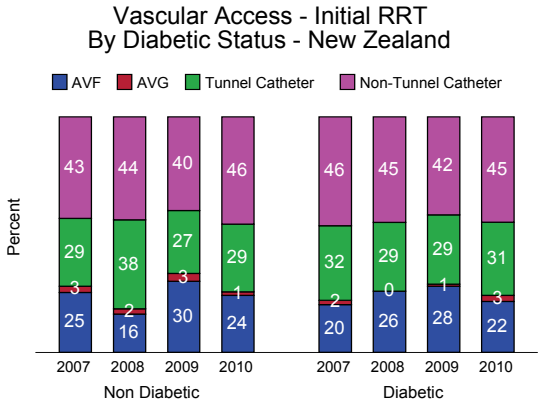


Vascular Access at First Treatment

Figure 5.73

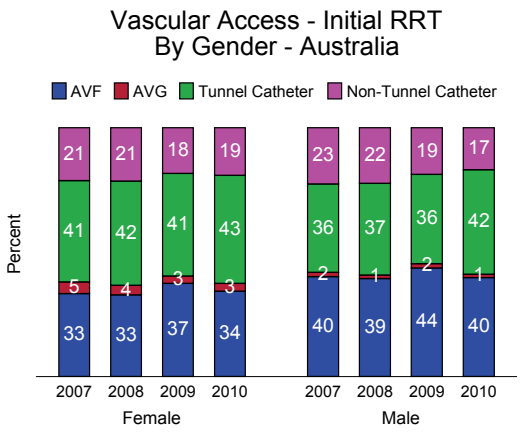
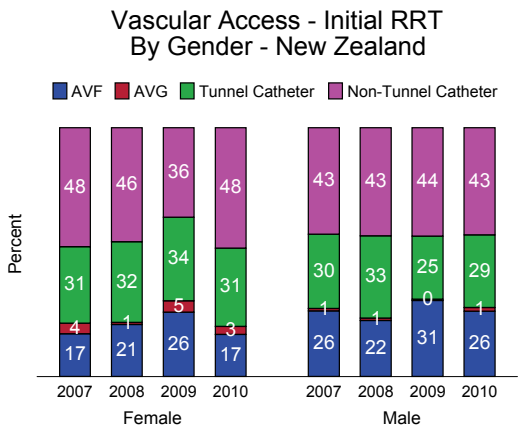


Figure 5.74



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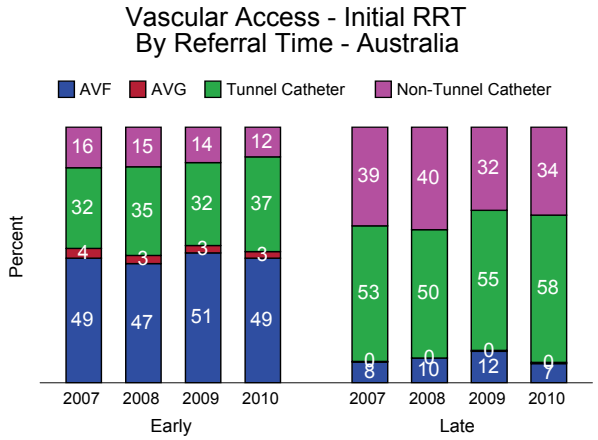


Figure 5.76

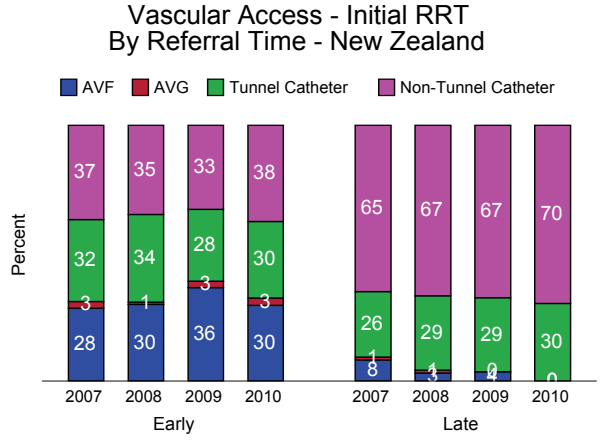


Figure 5.77

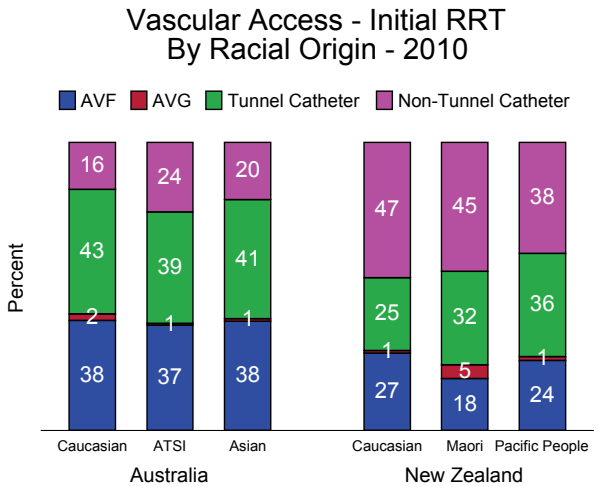
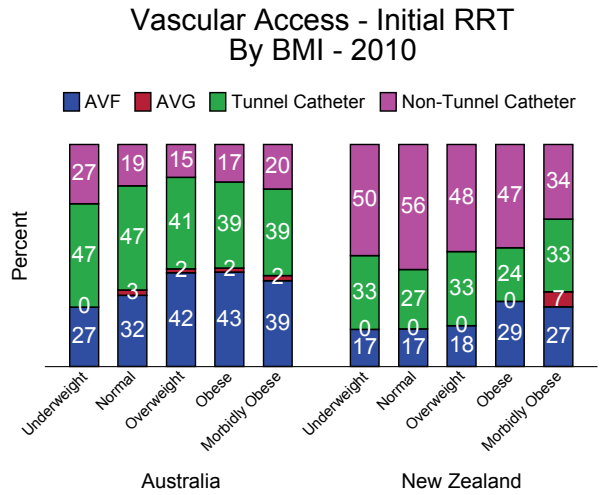


Figure 5.78



VASCULAR ACCESS AT FIRST TREATMENT

Figure 5.79

Vascular Access at First Treatment
Haemodialysis as Initial Modality 1-Jan-2007 to 31-Dec-2010

	2007		2008		2009		2010	
	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC
Australia								
QLD	149 (41%)	212 (59%)	139 (36%)	249 (64%)	152 (41%)	220 (59%)	138 (41%)	202 (59%)
NSW/ACT	198 (35%)	367 (65%)	187 (33%)	374 (67%)	177 (36%)	312 (64%)	183 (36%)	331 (64%)
Vic	193 (47%)	217 (53%)	186 (47%)	209 (53%)	213 (50%)	216 (50%)	197 (45%)	243 (55%)
Tas	14 (41%)	20 (59%)	12 (35%)	22 (65%)	16 (43%)	21 (57%)	19 (61%)	12 (39%)
SA	66 (58%)	48 (42%)	71 (54%)	61 (46%)	89 (61%)	57 (39%)	54 (41%)	79 (59%)
NT	20 (31%)	44 (69%)	39 (49%)	41 (51%)	27 (46%)	32 (54%)	25 (46%)	29 (54%)
WA	60 (33%)	122 (67%)	67 (34%)	131 (66%)	66 (39%)	105 (61%)	51 (31%)	113 (69%)
New Zealand								
	78 (25%)	233 (75%)	73 (23%)	247 (77%)	111 (31%)	249 (69%)	81 (25%)	245 (75%)

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 5-70%. The corresponding range in New Zealand was 16-40%. This wide variation probably reflects differences in practices, protocols, resources and patient case-mix among centres. However, the patient case-mix is unlikely to explain all of this variation.

Figure 5.80

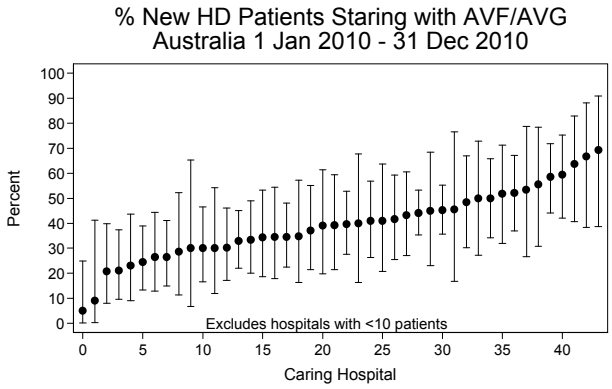
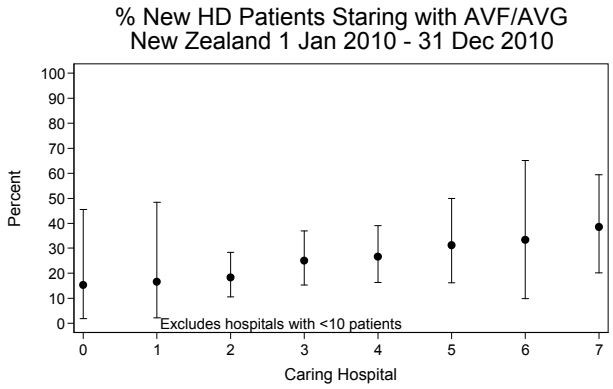


Figure 5.81



PREVALENT HAEMODIALYSIS ACCESS

Figures 5.82 - 5.88

In both Australia and New Zealand, the proportions of patients dialysing with an AV graft 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

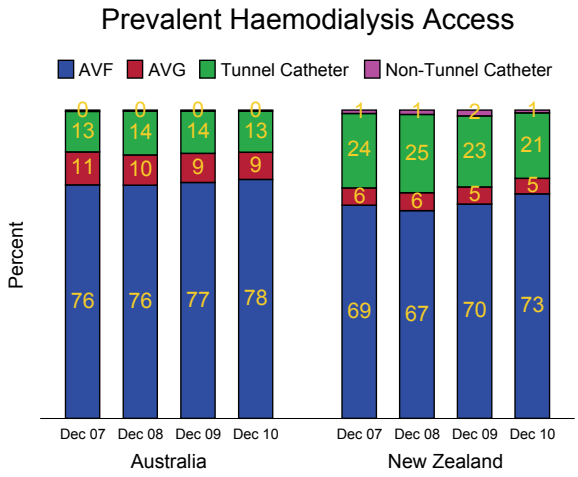
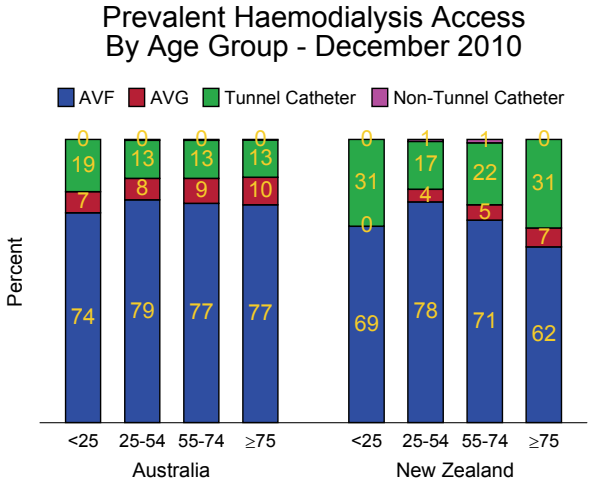


Figure 5.83



Prevalent Haemodialysis Access

Figure 5.84

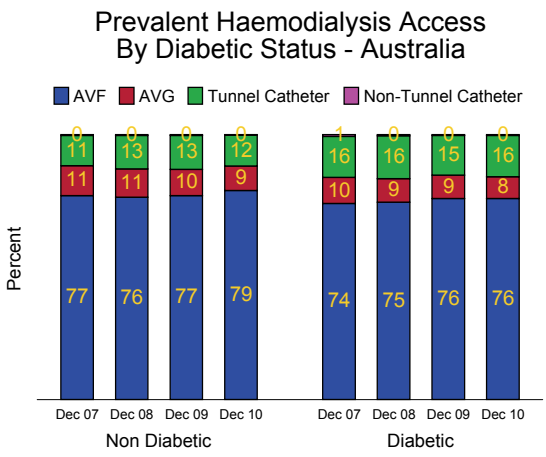


Figure 5.85

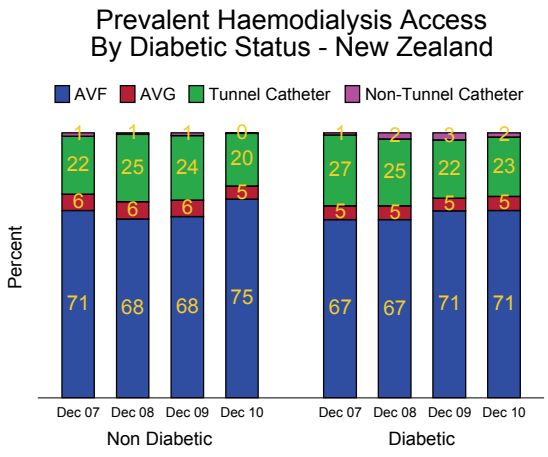


Figure 5.86

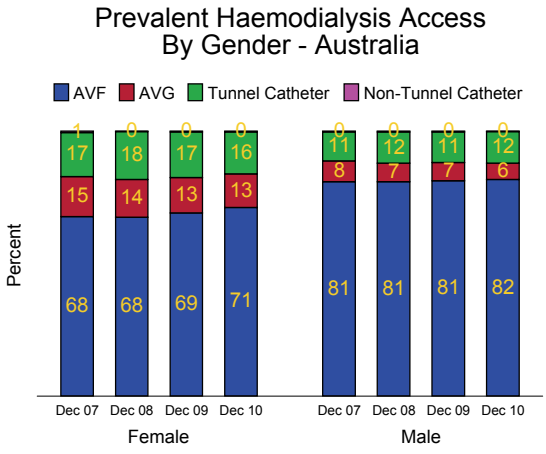


Figure 5.87

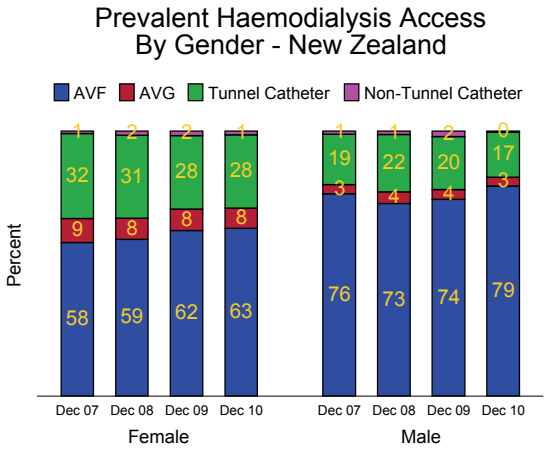
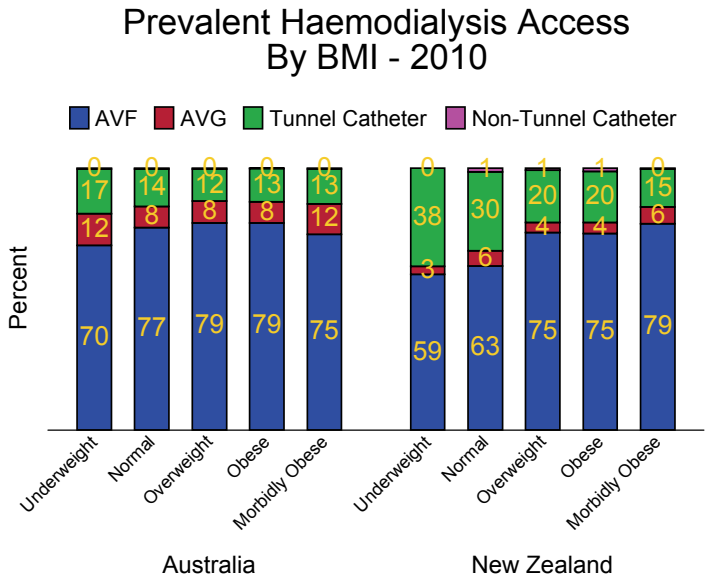


Figure 5.88



PREVALENT HAEMODIALYSIS ACCESS

Figures 5.89- 5.90

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

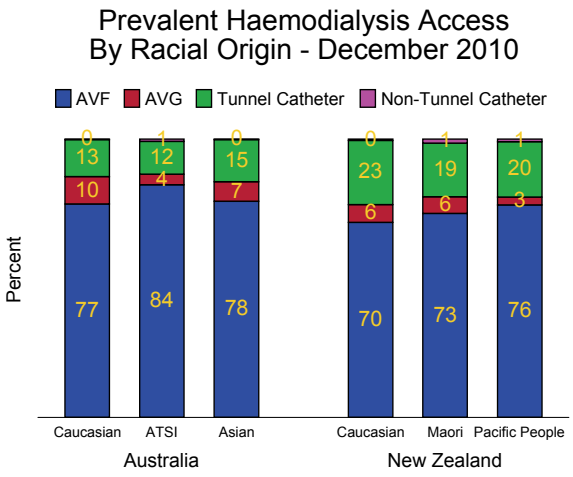
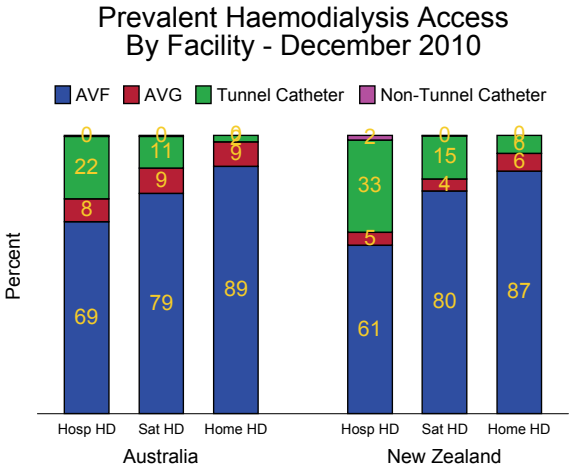


Figure 5.90



PREVALENT HAEMODIALYSIS ACCESS

Figures 5.91 - 5.93 show the proportion of haemodialysis patients at each hospital dialysing with an AVF/AVG on 31st December, 2010, arranged from the lowest to the highest.

In Australia, the proportions varied widely from 68-100%. The corresponding range in New Zealand was 67-92%. The error bars displayed show the 95% confidence intervals.

Figure 5.91

Prevalent Vascular Access at 31-Dec-2010

	Dec 2007		Dec 2008		Dec 2009		Dec 2010	
	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC
Australia								
QLD	1232 (89%)	148 (11%)	1283 (87%)	192 (13%)	1373 (88%)	195 (12%)	1423 (88%)	195 (12%)
NSW/ACT	2142 (84%)	394 (16%)	2197 (84%)	421 (16%)	2245 (83%)	448 (17%)	2358 (85%)	426 (15%)
Vic	1790 (89%)	221 (11%)	1857 (90%)	215 (10%)	1895 (89%)	227 (11%)	1964 (89%)	255 (11%)
Tas	113 (88%)	16 (12%)	110 (82%)	24 (18%)	118 (80%)	30 (20%)	128 (88%)	18 (12%)
SA	436 (90%)	47 (10%)	430 (88%)	61 (12%)	485 (90%)	55 (10%)	506 (89%)	61 (11%)
NT	297 (89%)	38 (11%)	328 (91%)	34 (9%)	366 (96%)	17 (4%)	367 (92%)	33 (8%)
WA	554 (77%)	164 (23%)	561 (73%)	205 (27%)	592 (76%)	182 (24%)	614 (78%)	178 (22%)
New Zealand								
	991 (75%)	334 (25%)	983 (73%)	360 (27%)	1111 (75%)	370 (25%)	1203 (78%)	342 (22%)

Figure 5.92

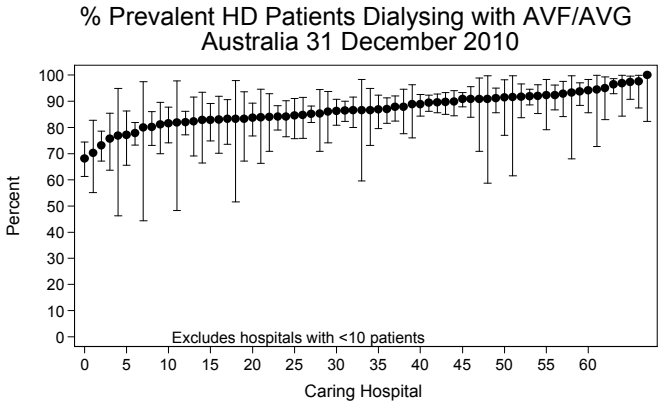
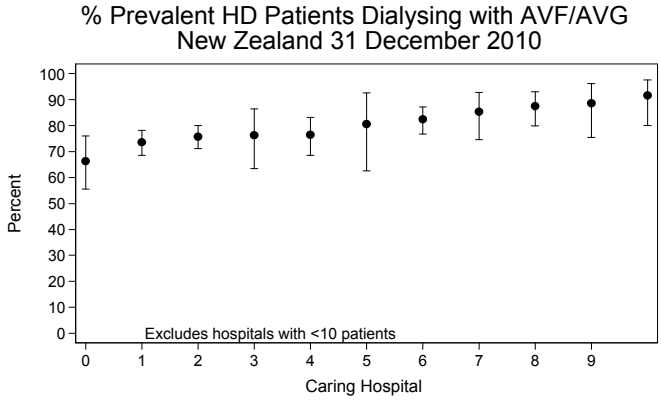


Figure 5.93



OBESITY IN 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 2001 to 2010 in both countries.

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

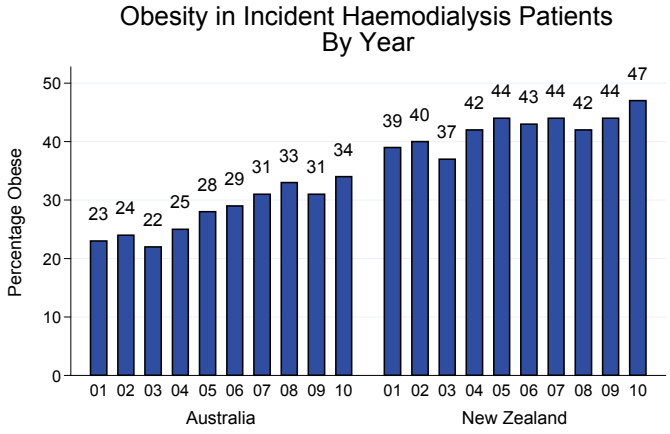


Figure 5.95

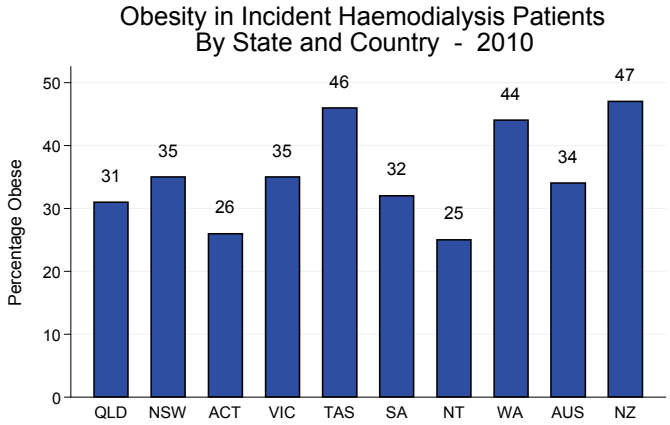
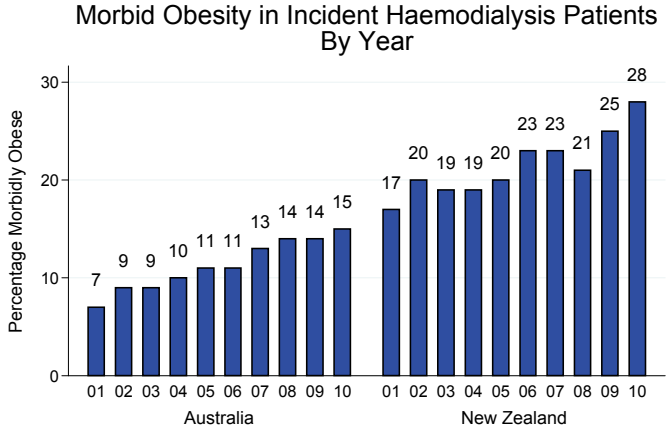


Figure 5.96



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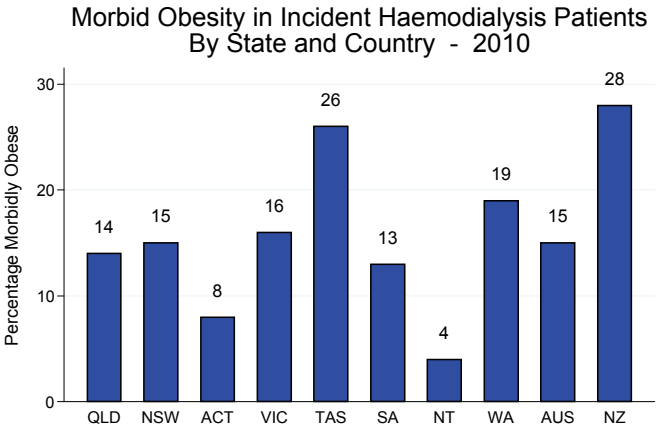


Figure 5.98

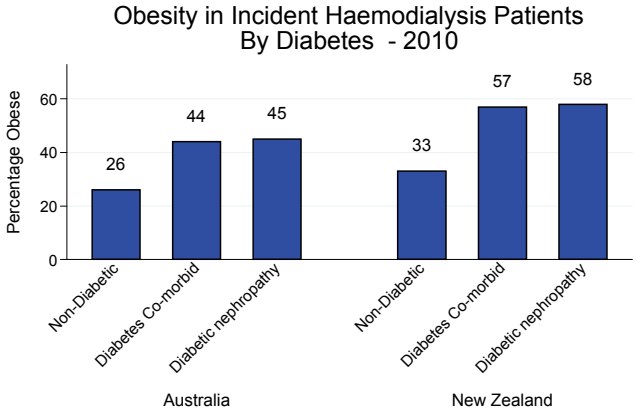
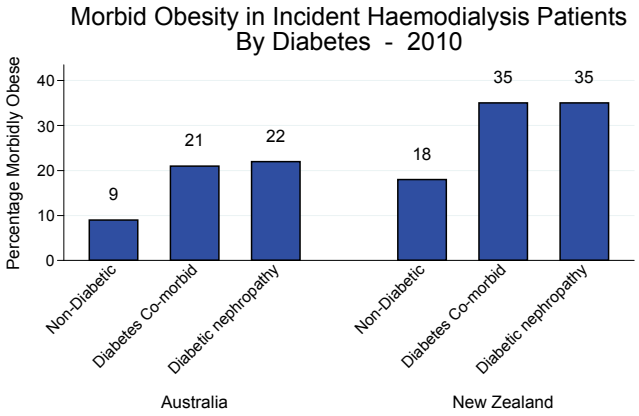


Figure 5.99



OBESITY IN 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 2001 to 2010 in both countries.

Patients with diabetes are more like to be obese or morbidly obese compared to those without diabetes (Figures 5.105 and 5.106).

Figure 5.100

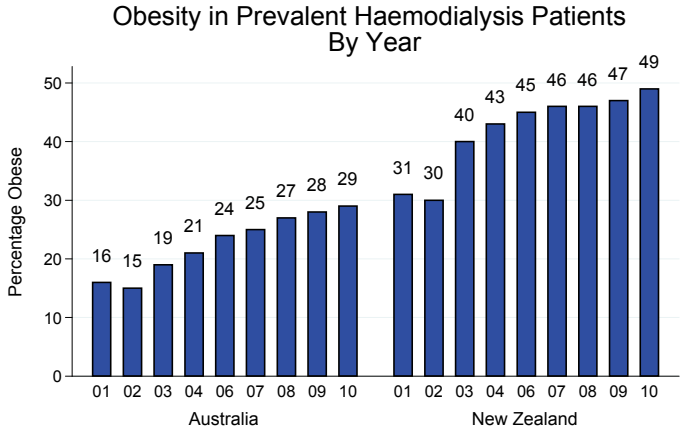
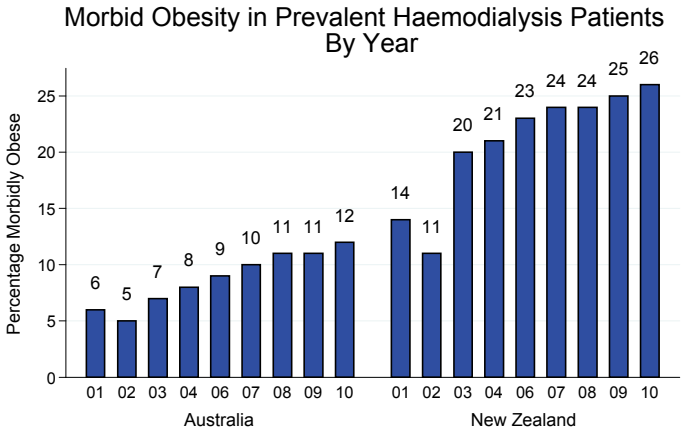


Figure 5.101



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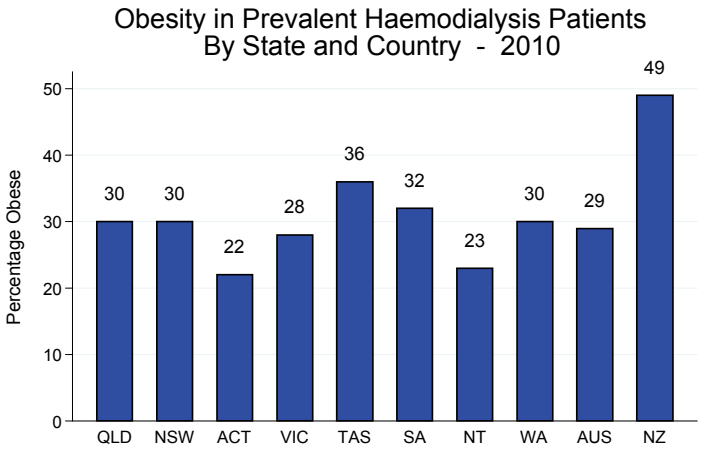

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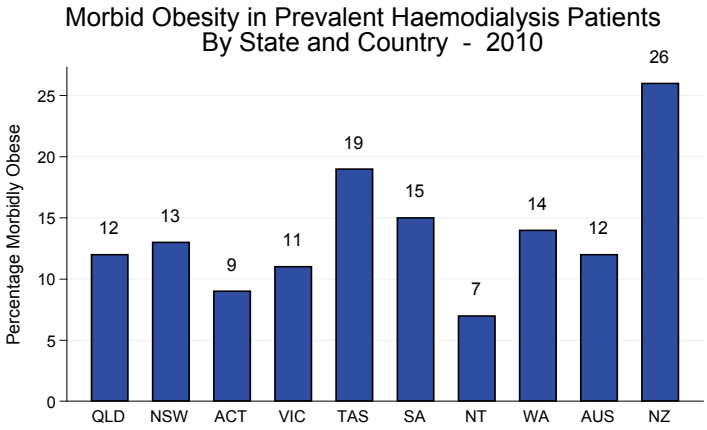


Figure 5.104

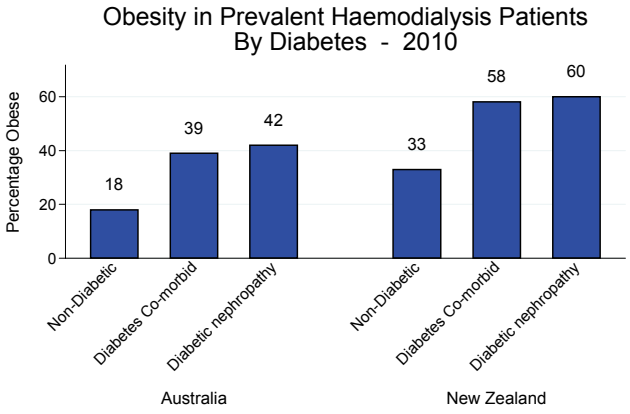
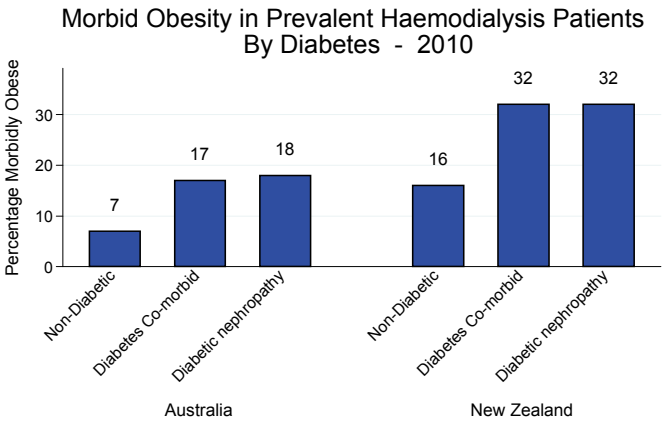


Figure 5.105



Home Haemodialysis

The proportion of all prevalent dialysis patients who were using home HD in each State was 14% for New South Wales, 12% the ACT, 10% Queensland, 8% Victoria, 7% the Northern Territory, 5% Tasmania, 3% Western Australia and 2% for South Australia.

These proportions were lower among older people (Figure 5.109).

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.

Figure 5.107 shows the trend over recent years. In particular, can be appreciated that in the States with fewer patients (Northern Territory, South Australia, Western Australia and Tasmania) there are clear trends towards growth.

Figure 5.106

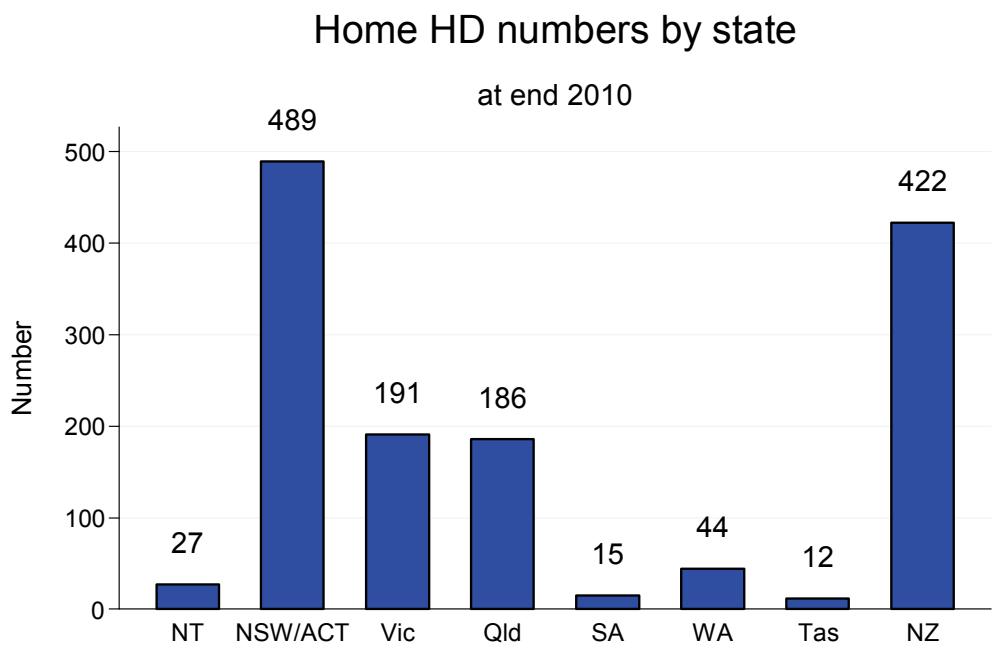
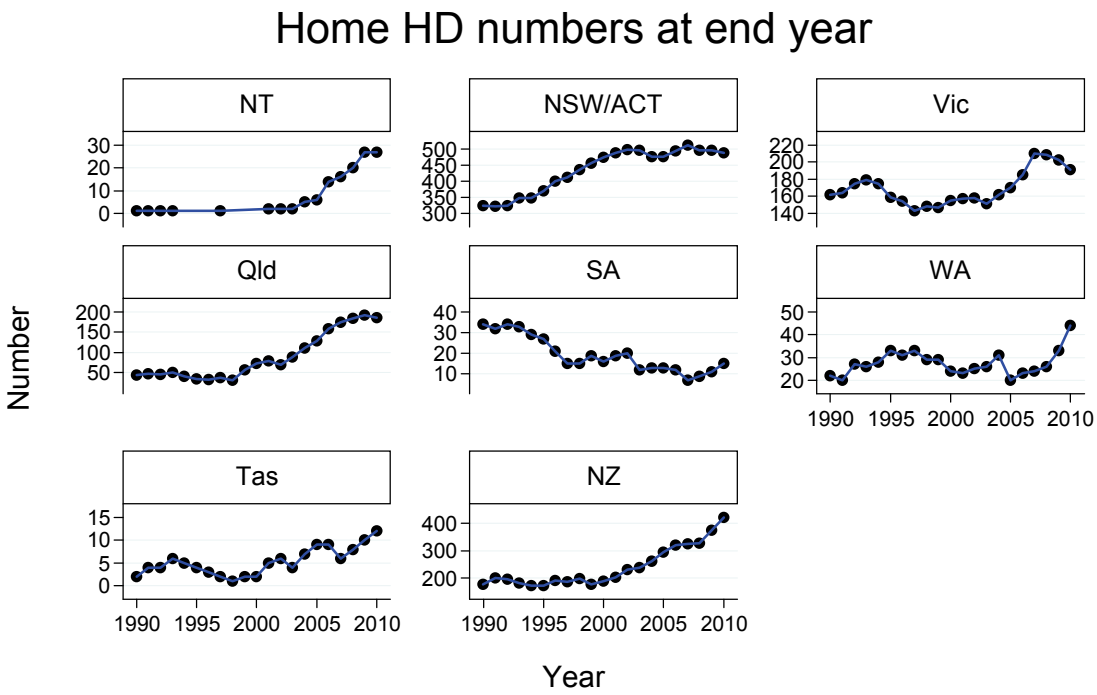


Figure 5.107



The distribution of prevalent home dialysis patients by age group is shown in Figure 5.108.

Figure 5.108

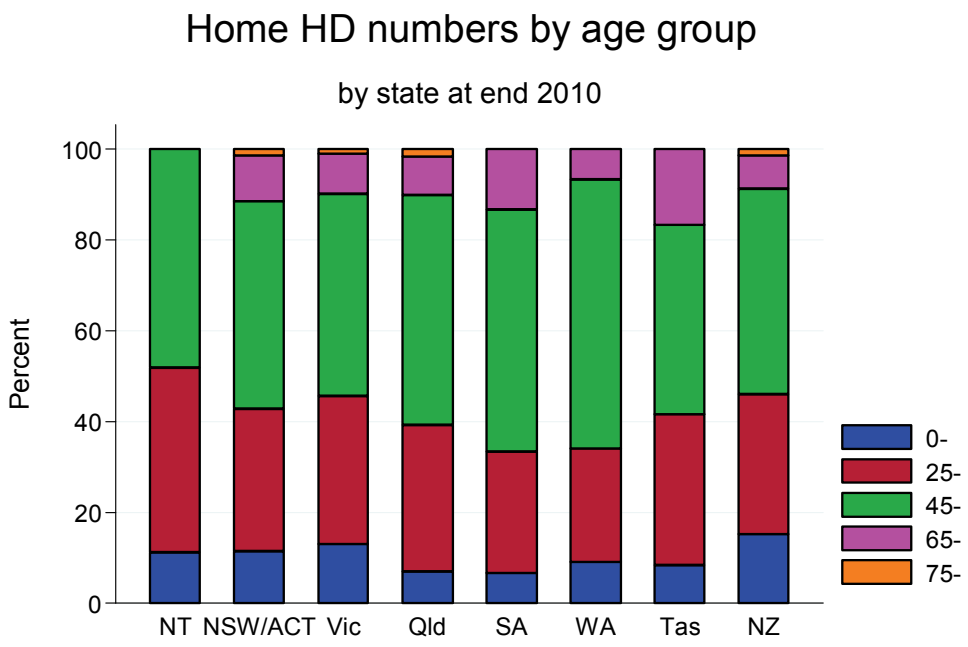


Figure 5.109

Proportion (%) of Prevalent Patients aged ≥ 65 years Treated with Home Haemodialysis 2006 - 2010

State	2006	2007	2008	2009	2010
Queensland	3.50%	3.60%	4.10%	4%	4.30%
New South Wales	4.90%	5.40%	5.50%	5.40%	5.20%
Australian Capital Territory	4.20%	3.80%	4.40%	5.70%	6.60%
Victoria	2.10%	2.90%	3.50%	3.40%	3.40%
Tasmania	3%	2.60%	2.70%	2.40%	3.30%
South Australia	-	-	-	-	0.80%
Northern Territory	2.10%	2%	2%	2.30%	1.90%
Western Australia	0.30%		0.90%	1.10%	1.80%
Australia	3.10%	3.40%	3.80%	3.80%	3.90%
New Zealand	6.60%	8.10%	8.20%	8.60%	8.50%

The trend is for different age groups are illustrated for Australia and New Zealand in the Figure 5.110 and 5.111. The Y axes for individual grafts vary – the absolute numbers in the age groups 25 to 64 years are substantially greater than among older patients.

Figure 5.110

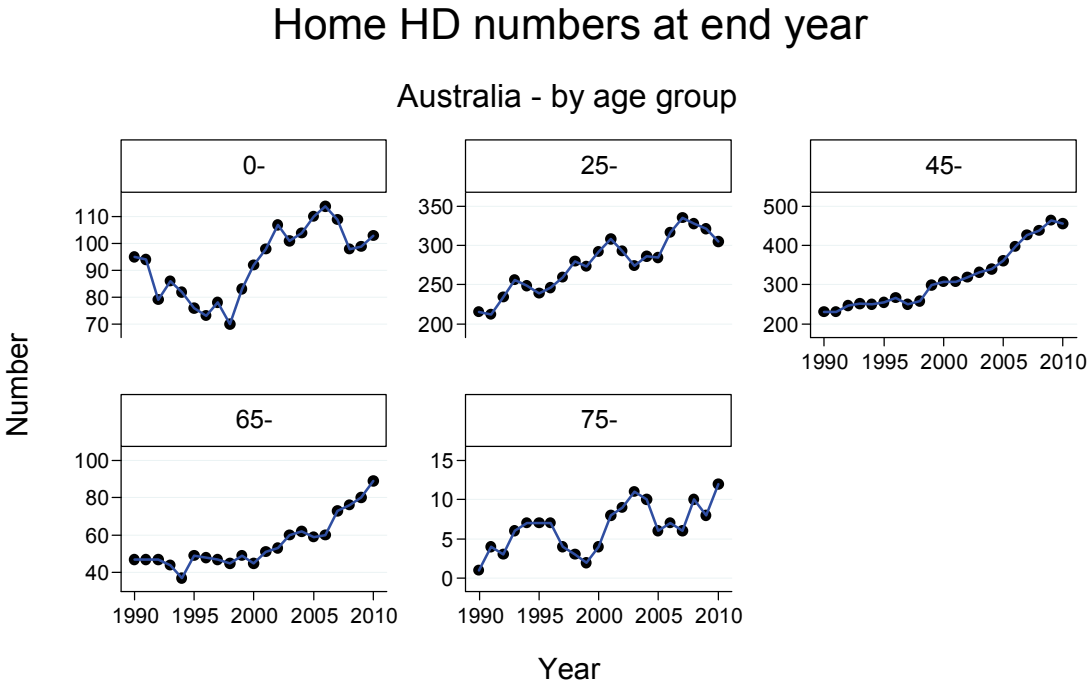
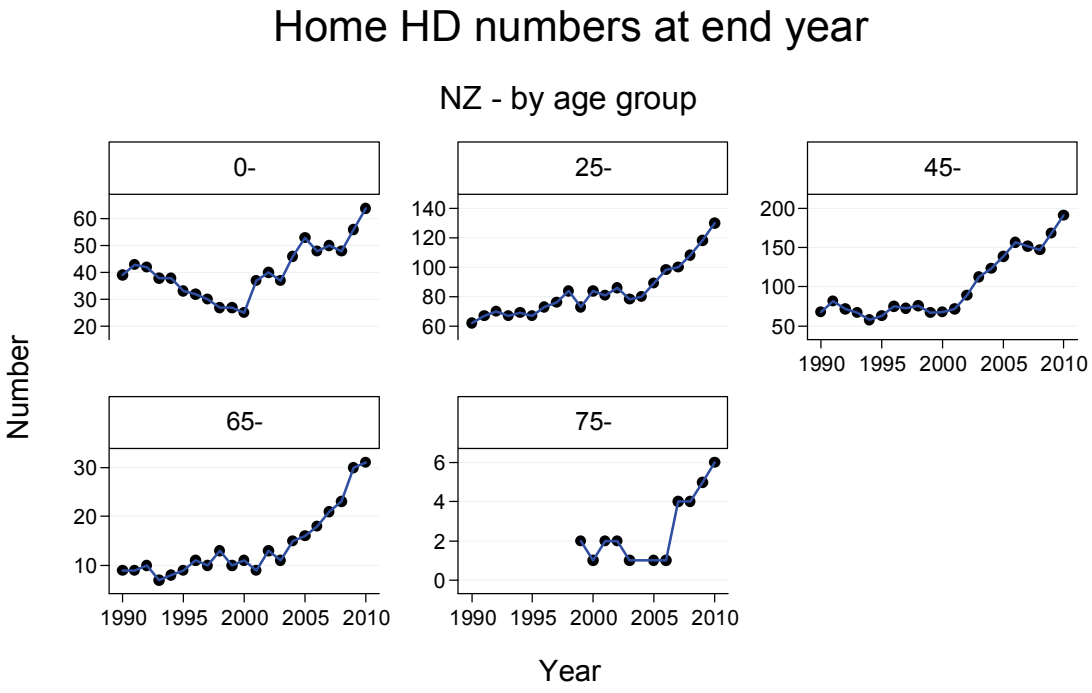


Figure 5.111



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 2010.

Figure 5.112

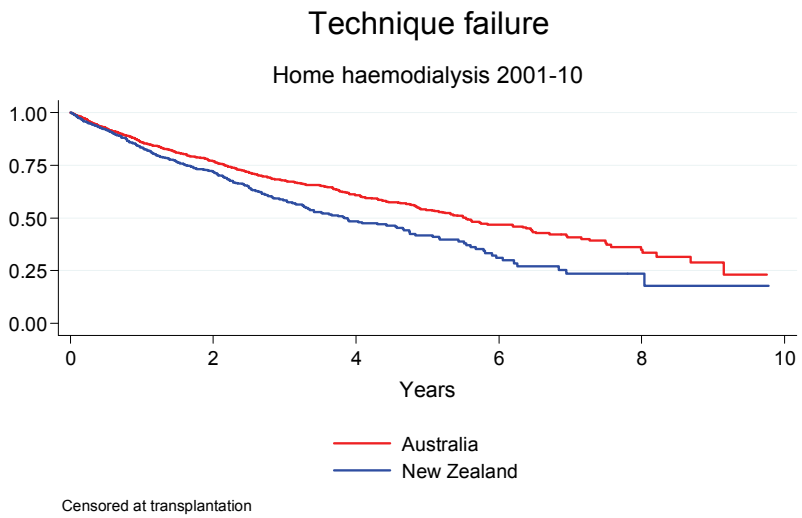
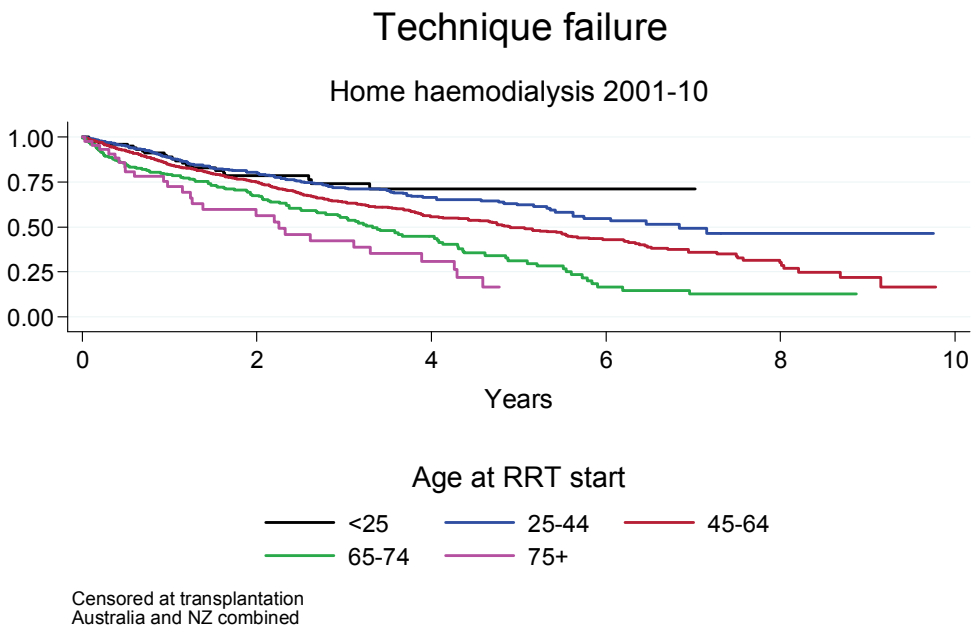
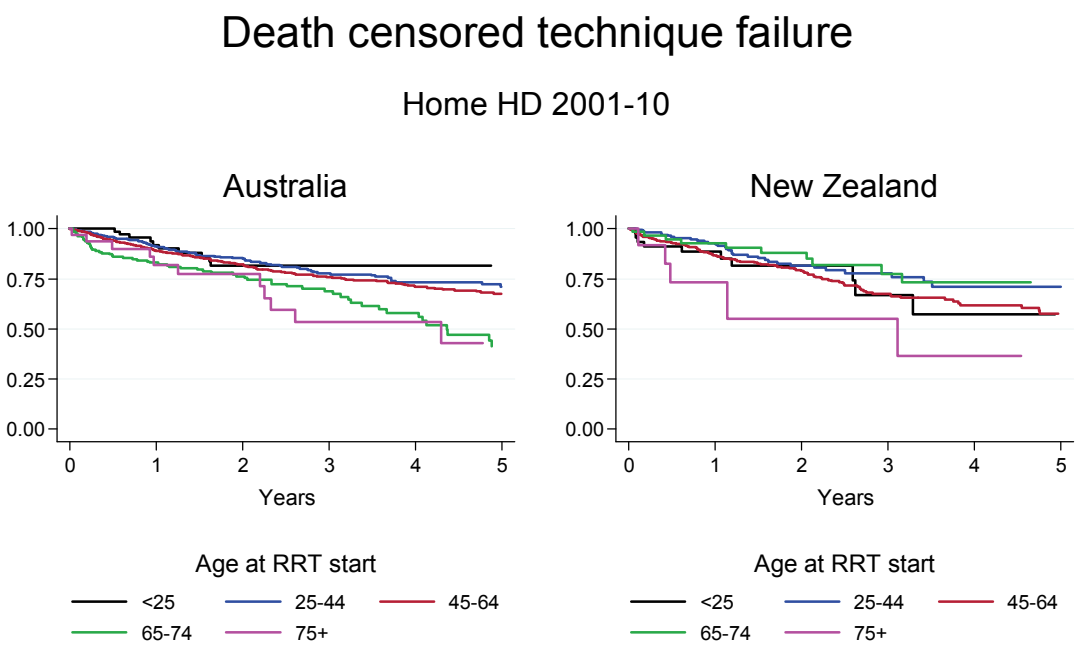


Figure 5.113



When death of patient is counted as a censoring event (rather than "failure"), the differences between the age groups become less apparent (Figure 5.114). 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 5.114



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 Obe\sity	**BMI ≥ 35**