CHAPTER 5

HAEMODIALYSIS

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Definitions

Quotidian HD	**≥ 5 HD treatments per week**
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**

STOCK AND FLOW

AUSTRALIA

The annual stock and flow of HD patients during the period 2001-2005 is shown in Figures 5.1, 5.2 and 5.3

There were 6,717 patients (330 per million) receiving HD treatment at 31st December 2005, an increase of 8%; of these 34% were hospital based (33% in 2004), 54% were in satellite centres (the same as last year) and 12% at home (13% in 2004).

The proportion of all HD patients who were using home HD in each State was 16% for New South Wales, 9% for the ACT, 8% for Queensland and Victoria, 6% for Tasmania and 2% for the other States. These proportions were lower among older people (Figure 5.6).

A total of 1,957 patients received HD for the first time during the year, a 13% increase from 2004 (1,731 patients) after only a 2% increase from 2003 to 2004 (1,695 patients).

The proportion of all HD patients in each age group is shown in Figure 5.8.

There were 413 transplant operations, a 5% decrease from 2004, after a 17% increase from 2003, representing 6% of all HD patients dialysing and 10% of those patients <65 years. Thirty six patients aged >=65 years were transplanted.

There were 925 deaths, representing 14.2 deaths per 100 patient years (Figure 3.8).

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 2001 - 2005

	2001	2002	2003	2004	2005
Australia					
Patients new to HD	1611	1568	1695	1731	1957
First Dialysis Treatment	1384	1341	1437	1456	1671
Previous Dialysis (PD)	198	200	227	238	253
Failed Transplant	29	27	30	37	33
Transplanted	382	394	372	437	413
Deaths	770	714	831	920	925
Never Transplanted	706	653	756	853	857
Previous Transplant	64	61	75	67	68
Permanent Transfers Out (>12 months)	229	189	223	276	392
Temporary Transfers (12 months)	128	115	98	131	75
Patients Dialysing (HD) at 31 December	5048	5482	5887	6206	6717
Patients Dialysing (HD) at Home 31 December	773	779	778	797	799
% of all Home Dialysis (HD and PD) Patients	30%	31%	30%	31%	31%
New Zealand					
Patients new to HD	334	340	365	352	361
First Dialysis Treatment	275	292	299	273	279
Previous Dialysis (PD)	53	41	61	77	68
Failed Transplant	6	7	5	2	14
Transplanted	61	61	64	54	45
Deaths	127	109	133	153	149
Never Transplanted	114	99	116	142	136
Previous Transplant	13	10	17	11	13
Permanent Transfers Out (>12 months)	85	96	100	107	123
Temporary Transfers (<12 months)	18	30	20	26	10
Patients Dialysing (HD) at 31 December	752	830	946	1031	1134
Patients Dialysing (HD) at Home 31 December	201	230	240	259	290
% of all Home Dialysis (HD and PD) Patients	22%	23%	24%	26%	29%

NEW ZEALAND

The annual stock and flow of haemodialysis patients during the period 2001-2005 is shown in Figures 5.1, 5.4 and 5.5.

There were 1,134 patients (277 per million) receiving treatment at 31st December 2005, a 10% increase compared to 2004.

Hospital based haemodialysis increased from last year to 48% (47% in 2004), satellite haemodialysis decreased from 28% to 26% in 2005 and home haemodialysis increased from 25% in 2004 to 26% this year.

New Zealand is continued on page 66.

Figure 5.2

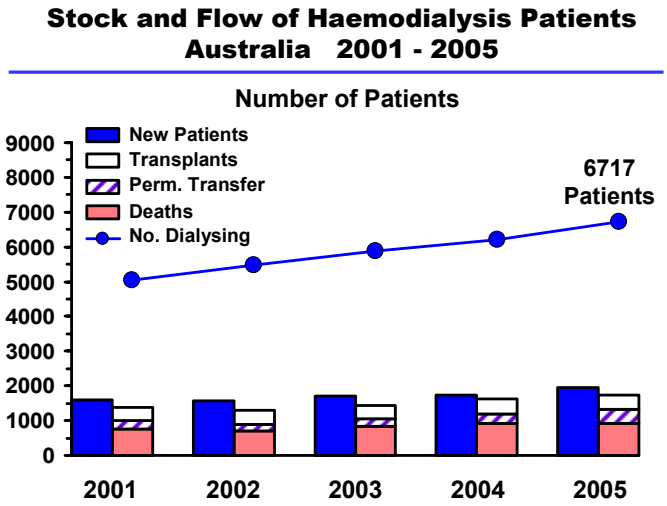


Figure 5.3

Stock and Flow of Haemodialysis Patients Australia 2001 - 2005
Number (%)

Age Groups	2001	2002	2003	2004	2005
New Patients *					
00-14 years	13 (<1%)	11 (<1%)	9 (<1%)	11 (<1%)	14 (<1%)
15-24 years	43 (3%)	38 (3%)	48 (3%)	46 (3%)	38 (2%)
25-34 years	106 (7%)	85 (5%)	91 (5%)	86 (5%)	104 (5%)
35-44 years	178 (11%)	135 (9%)	161 (10%)	166 (10%)	170 (9%)
45-54 years	275 (17%)	267 (17%)	278 (16%)	260 (15%)	303 (15%)
55-64 years	320 (20%)	321 (20%)	321 (19%)	345 (20%)	414 (21%)
65-74 years	416 (26%)	420 (27%)	413 (24%)	456 (26%)	514 (26%)
75-84 years	250 (15%)	270 (17%)	355 (21%)	332 (19%)	363 (19%)
>=85 years	10 (<1%)	21 (1%)	19 (1%)	29 (2%)	37 (2%)
Total	**1611 (100%)**	**1568 (100%)**	**1695 (100%)**	**1731 (100%)**	**1957 (100%)**
Patients Dialysing					
00-14 years	13 (<1%)	11 (<1%)	3 (<1%)	6 (<1%)	6 (<1%)
15-25 years	94 (2%)	102 (2%)	101 (2%)	106 (2%)	96 (1%)
25-34 years	356 (7%)	348 (6%)	340 (6%)	340 (5%)	351 (5%)
35-44 years	605 (12%)	568 (10%)	609 (10%)	629 (10%)	661 (10%)
45-54 years	894 (18%)	948 (17%)	1000 (17%)	1034 (17%)	1092 (16%)
55-64 years	1020 (20%)	1160 (21%)	1228 (21%)	1292 (21%)	1412 (21%)
65-74 years	1297 (26%)	1402 (26%)	1464 (25%)	1489 (24%)	1616 (24%)
75-84 years	740 (15%)	885 (16%)	1067 (18%)	1196 (19%)	1334 (20%)
>=85 years	29 (<1%)	58 (1%)	75 (1%)	114 (2%)	149 (2%)
Total	**5048 (100%)**	**5482 (100%)**	**5887 (100%)**	**6206 (100%)**	**6717 (100%)**
Primary Renal Disease *					
Glomerulonephritis	459 (28%)	418 (27%)	453 (27%)	446 (26%)	456 (23%)
Analgesic Nephropathy	86 (5%)	65 (4%)	68 (4%)	47 (3%)	55 (3%)
Hypertension	218 (13%)	242 (16%)	271 (16%)	233 (13%)	300 (15%)
Polycystic Disease	101 (6%)	89 (6%)	80 (5%)	97 (6%)	142 (7%)
Reflux Nephropathy	60 (4%)	57 (3%)	61 (4%)	53 (3%)	51 (3%)
Diabetic Nephropathy	384 (24%)	427 (27%)	440 (26%)	519 (30%)	617 (32%)
Miscellaneous	179 (11%)	179 (11%)	206 (12%)	212 (12%)	222 (11%)
Uncertain	124 (8%)	91 (6%)	116 (6%)	124 (7%)	114 (6%)
Total	**1611 (100%)**	**1568 (100%)**	**1695 (100%)**	**1731 (100%)**	**1957 (100%)**

* New patients receiving first haemodialysis treatment

Figure 5.4

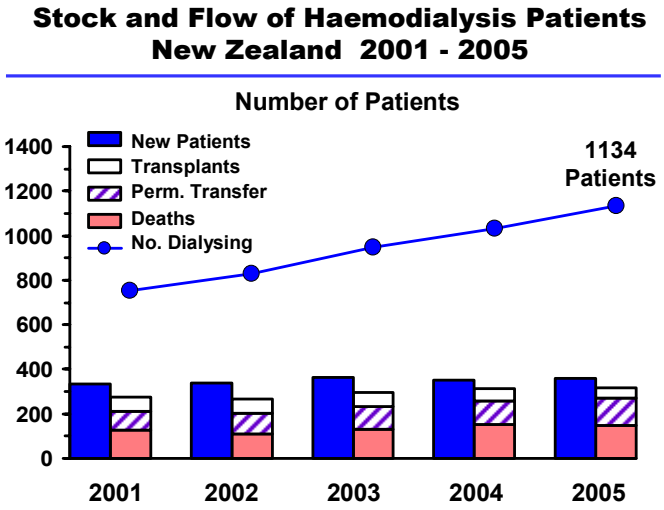


Figure 5.5

Stock and Flow of Haemodialysis Patients New Zealand 2001 - 2005
Number (%)

Age Groups	2001	2002	2003	2004	2005
New Patients *					
00-14 years	5 (1%)	1 (<1%)	- (-)	1 (<1%)	2 (<1%)
15-24 years	9 (3%)	13 (4%)	21 (6%)	10 (3%)	12 (3%)
25-34 years	18 (6%)	20 (6%)	14 (4%)	25 (7%)	14 (4%)
35-44 years	43 (13%)	33 (10%)	37 (10%)	44 (12%)	39 (11%)
45-54 years	78 (23%)	76 (22%)	70 (19%)	77 (22%)	75 (21%)
55-64 years	84 (25%)	113 (34%)	92 (26%)	95 (27%)	112 (31%)
65-74 years	74 (22%)	66 (19%)	9 (25%)	69 (20%)	83 (23%)
75-84 years	22 (7%)	16 (5%)	38 (10%)	26 (7%)	20 (6%)
>=85 years	1 (<1%)	2 (<1%)	- (-)	5 (1%)	4 (1%)
Total	**334 (100%)**	**340 (100%)**	**365 (100%)**	**352 (100%)**	**361 (100%)**
Patients Dialysing					
00-14 years	3 (<1%)	2 (<1%)	- (-)	1 (<1%)	2 (<1%)
15-25 years	30 (4%)	29 (3%)	33 (3%)	33 (3%)	32 (3%)
25-34 years	57 (8%)	63 (8%)	64 (7%)	75 (7%)	82 (7%)
35-44 years	124 (16%)	116 (14%)	118 (12%)	138 (13%)	147 (13%)
45-54 years	184 (24%)	189 (23%)	214 (23%)	221 (21%)	243 (21%)
55-64 years	192 (26%)	230 (28%)	261 (28%)	285 (28%)	315 (28%)
65-74 years	126 (17%)	161 (19%)	195 (20%)	207 (20%)	234 (21%)
75-84 years	36 (5%)	40 (5%)	61 (6%)	68 (7%)	74 (7%)
>=85 years	- (-)	- (-)	- (-)	3 (<1%)	5 (<1%)
Total	**752 (100%)**	**830 (100%)**	**946 (100%)**	**1031 (100%)**	**1134 (100%)**
Primary Renal Disease *					
Glomerulonephritis	95 (29%)	79 (23%)	88 (24%)	91 (26%)	95 (26%)
Analgesic Nephropathy	- (-)	- (-)	- (-)	1 (<1%)	- (-)
Hypertension	37 (11%)	32 (10%)	39 (11%)	42 (12%)	35 (10%)
Polycystic Disease	24 (7%)	13 (4%)	14 (4%)	19 (5%)	28 (8%)
Reflux Nephropathy	7 (2%)	11 (3%)	3 (<1%)	12 (3%)	8 (2%)
Diabetic Nephropathy	123 (37%)	156 (46%)	156 (43%)	153 (43%)	143 (40%)
Miscellaneous	31 (9%)	38 (11%)	39 (11%)	18 (5%)	34 (9%)
Uncertain	17 (5%)	11 (3%)	26 (7%)	16 (5%)	18 (5%)
Total	**334 (100%)**	**340 (100%)**	**365 (100%)**	**352 (100%)**	**361 (100%)**

* New patients receiving first haemodialysis treatment

Figure 5.6

Proportion (%) of Prevalent Patients aged >=65 years Treated with Home Haemodialysis 2001 - 2005

State	2001	2002	2003	2004	2005
Queensland	1%	2%	2%	2%	3%
New South Wales	6%	6%	7%	7%	6%
Aust. Capital Territory	8%	7%	7%	5%	3%
Victoria	3%	2%	2%	2%	2%
Tasmania	-	-	-	-	1%
South Australia	2%	2%	<1%	2%	1%
Northern Territory	-	-	-	-	-
Western Australia	<1%	<1%	<1%	<1%	<1%
Australia	**4%**	**4%**	**4%**	**3%**	**3%**
New Zealand	**5%**	**5%**	**5%**	**5%**	**5%**

Figure 5.7

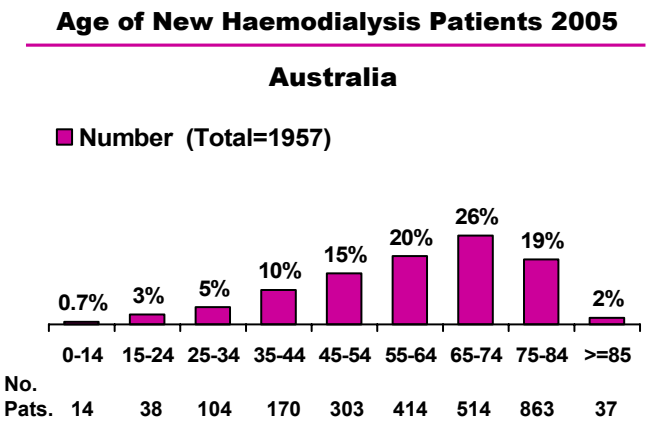
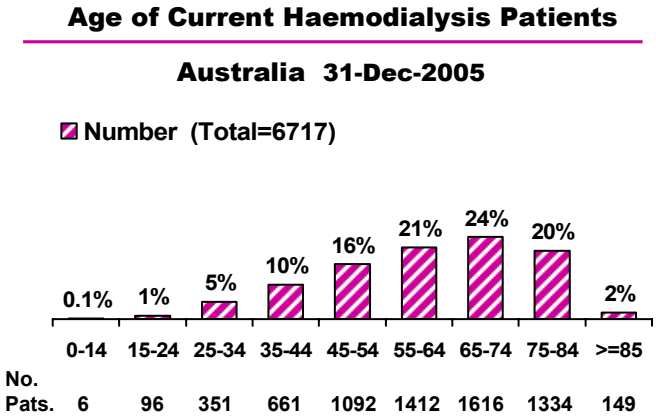


Figure 5.8



NEW ZEALAND (continued from page 62)

There were 361 patients who received HD for the first time, a 3% increase in numbers from 2004. Nineteen percent of these were previously dialysing with peritoneal dialysis, 4% failed transplants and 77% having their initial dialysis treatment. The modal age group was 55-64 years (31%), 8% were <35 years and 30% >=65 years (fig 5.5 and 5.9).

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

Forty five HD patients received transplants in 2005 (54 in 2004), representing 4% of all HD patients dialysing and 5% of those patients <65 years. Three patients ≥65 years were transplanted.

There were 149 deaths, a rate of 14.0 deaths per 100 patient years of treatment (Figure 3.10).

Figure 5.9

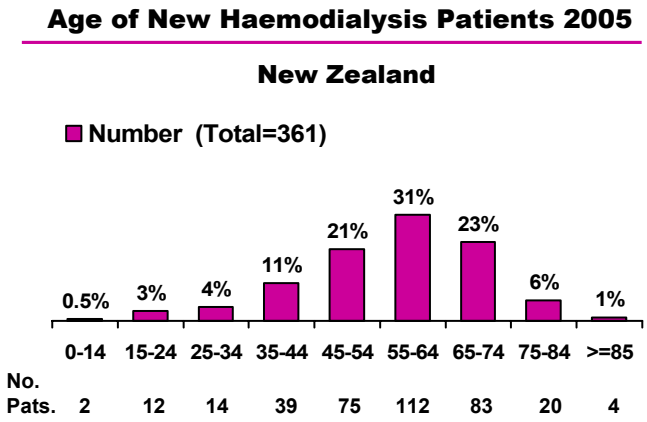
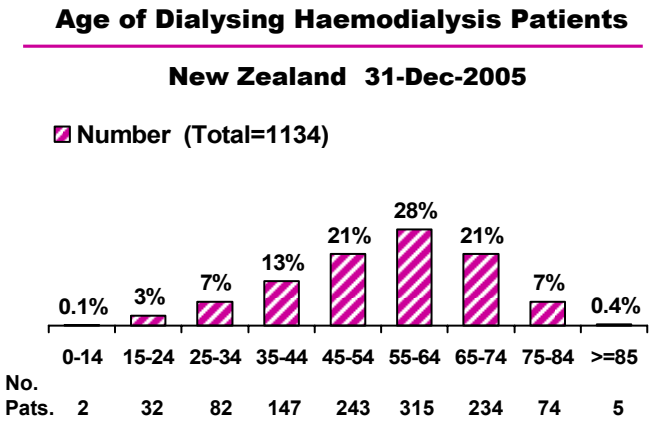


Figure 5.10



AUSTRALIA

The survey dates changed from six to twelve months in 2004, with an interim period of nine months, beginning 1st April 2004 and ending 31st December 2004.

The previous trend towards a prescribed blood flow rate of 300 mls/minute or higher has continued, though slightly lower in 2005 (75%), compared to 77% of all patients in December 2004 and 76% in March 2004. In March 2000 it was 65%. Only 5% were prescribed less than 250 mls/minute (366 patients).

Blood flow rates are lower in patients dialysing using CVCs venous catheters than in those using AVFs or AVGs (Figure 5.12).

NEW ZEALAND

In December 2005, 67% of patients were prescribed 300 mls/minute or higher compared to 64% in December 2004 and 71% in March 2004. There were 10% using <250 mls/minute, compared to 11% in December 2004, many of these receiving long hour HD.

Figure 5.11

Blood Flow Rates (mls/minute) 2000 - December 2005

Country		No. Pts	Mls/Minute					
			<200	200-249	250-299	300-349	350-399	>400
Aust	December 2005	6717	<1%	5%	19%	53%	18%	4%
	December 2004	6206	<1%	5%	18%	55%	18%	4%
	March 2004	5924	<1%	6%	18%	55%	17%	4%
	March 2003	5502	<1%	6%	18%	57%	16%	3%
	March 2002	5128	<1%	6%	20%	56%	15%	3%
	March 2001	4717	<1%	7%	23%	55%	11%	3%
	March 2000	4374	1%	8%	26%	54%	9%	2%
NZ	December 2005	1134	<1%	9%	24%	43%	22%	2%
	December 2004	1031	1%	10%	25%	42%	20%	2%
	March 2004	938	<1%	8%	21%	45%	23%	3%
	March 2003	826	<1%	10%	23%	43%	23%	1%
	March 2002	761	<1%	15%	30%	37%	17%	1%
	March 2001	679	1%	13%	34%	36%	15%	1%
	March 2000	575	1%	19%	37%	35%	8%	<1%

Figure 5.12

Blood Flow Rate by Type of Access December 2005

Blood Flow Rate	Australia			New Zealand		
	AVF	AVG	CVC	AVF	AVG	CVC
<200	23 (<1%)	-	13 (2%)	3 (<1%)	-	3 (1%)
200-249	204 (4%)	26 (3%)	98 (13%)	69 (9%)	5 (7%)	33 (12%)
250-299	843 (17%)	159 (19%)	307 (39%)	132 (17%)	23 (33%)	112 (41%)
300-349	2762 (54%)	526 (63%)	287 (37%)	337 (43%)	34 (50%)	114 (41%)
350-399	1042 (20%)	109 (13%)	72 (9%)	226 (29%)	7 (10%)	13 (5%)
>=400	229 (4%)	13 (2%)	2 (<1%)	22 (2%)	-	1 (<1%)
Total	**5103 (100%)**	**833 (100%)**	**781 (100%)**	**789 (100%)**	**69 (100%)**	**276 (100%)**

Figure 5.13

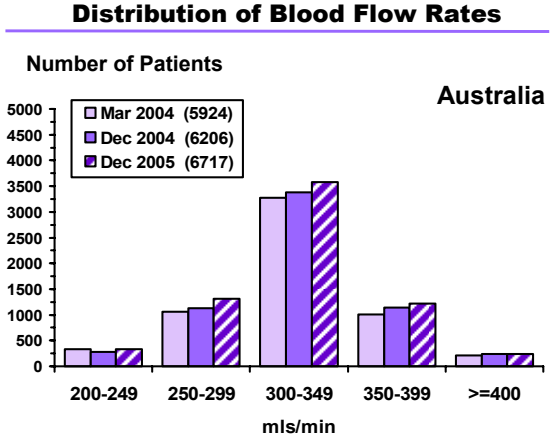


Figure 5.14

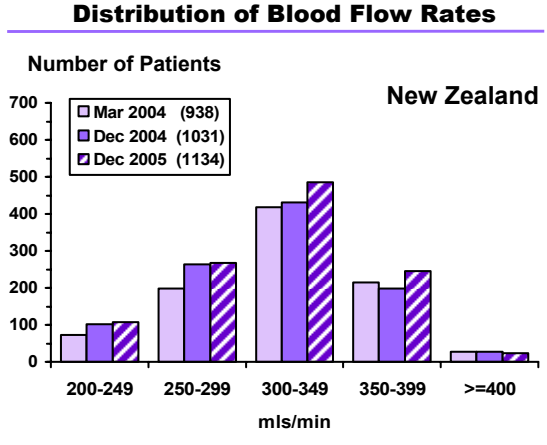


Figure 5.15

Duration and Number of Sessions Per Week
December 2005

Sessions Per week	Hours of Each Treatment						Total
	<3	3.1-3.9	4-4.4	4.5-4.9	5-5.9	>=6	
Australia							
<3	34 (23%)	6 (4%)	70 (48%)	12 (8%)	23 (16%)	2 (1%)	**147**
3	221 (3%)	292 (4%)	3310 (45%)	1328 (18%)	2033 (28%)	186 (2%)	**7370**
3.5-4.5	38 (10%)	22 (6%)	70 (18%)	37 (10%)	71 (18%)	146 (38%)	**384**
>=5	118 (66%)	4 (2%)	17 (10%)	-	2 (1%)	37 (21%)	**178**
Total	**411 (5%)**	**324 (4%)**	**3467 (43%)**	**1377 (17%)**	**2129 (26%)**	**371 (5%)**	**8079**
New Zealand							
<3	3 (11%)	-	12 (43%)	-	13 (46%)	-	**28**
3	23 (2%)	12 (<1%)	480 (39%)	234 (19%)	413 (34%)	70 (6%)	**1232**
3.5-4.5	6 (10%)	1 (2%)	6 (10%)	3 (5%)	22 (36%)	23 (38%)	**61**
>=5	10 (63%)	-	4 (25%)	-	2 (13%)	-	**16**
Total	**42 (3%)**	**13 (<1%)**	**502 (38%)**	**237 (18%)**	**450 (34%)**	**93 (7%)**	**1337**

Figures 5.15 - 5.23

While overall there were no strong trends towards more frequent or longer HD sessions, there was a strong trend in this direction among home HD patients.

In Australia, the proportion of patients on quotidian HD or long hour HD have steadily increased, although from a low baseline.

In New Zealand the proportion of patients on quotidian HD has increased marginally, and the proportion on long hour HD has remained stable.

Figure 5.16

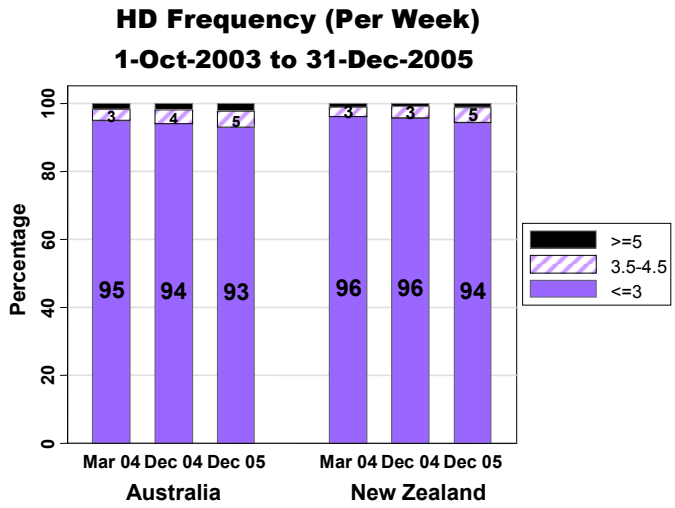


Figure 5.17

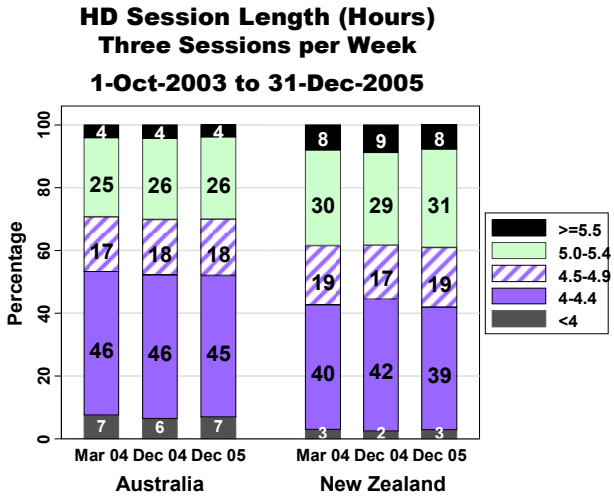


Figure 5.18

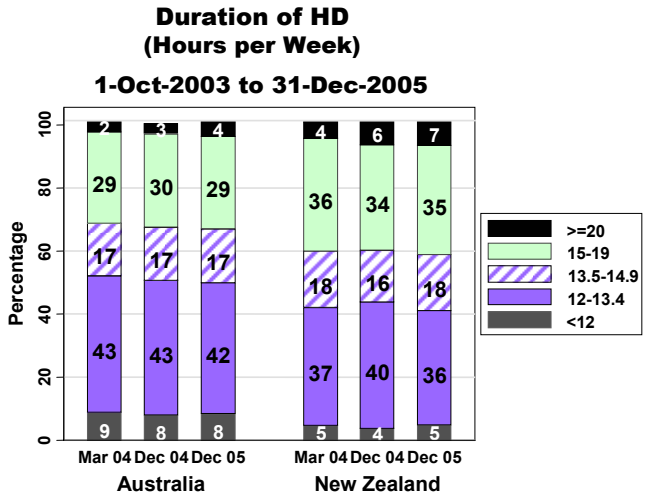


Figure 5.19

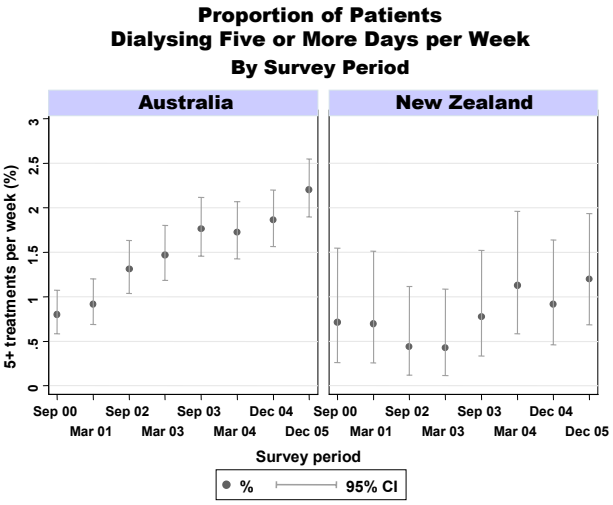


Figure 5.20

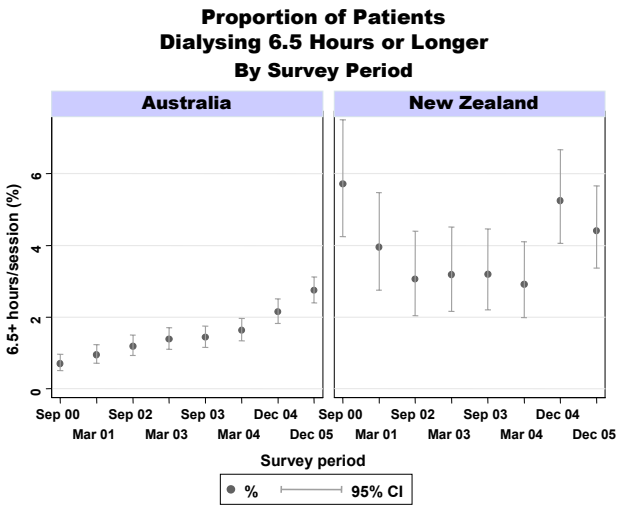


Figure 5.21

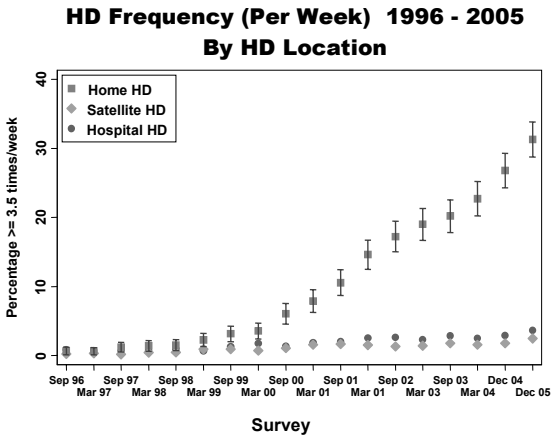


Figure 5.22

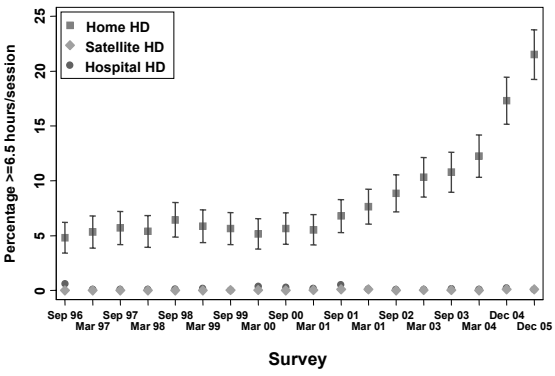
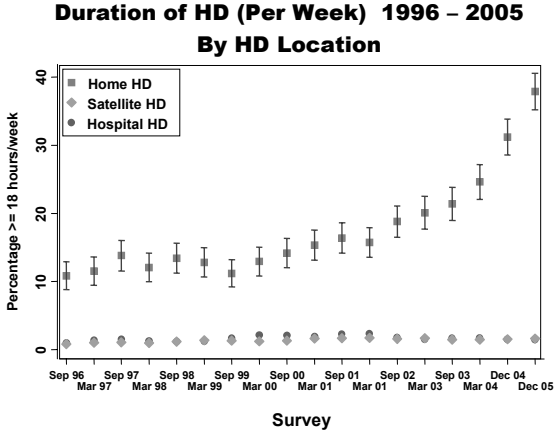


Figure 5.23



Figures 5.24 -5.26

Dialysis frequency and session length vary among the Australian States. Patients in Queensland, Victoria and South Australia tend to dialyse more frequently, while patients in New South Wales/ACT and the Northern Territory tend to dialyse longer per session.

In most States there is a trend to longer hours (per week) over the three most recent surveys.

Figures 5.27 - 5.37

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 better survival.

In both countries, diabetes status and age have marked effects on haemodialysis patient survival.

Figure 5.24

Haemodialysis Percentage >3 Sessions Per Week By Australian State and Country

	Australia							New Zealand
	Qld	NSW/ACT	Vic	Tas	SA	NT	WA	
Mar 04	102 (9%)	83 (4%)	90 (5%)	4 (4%)	32 (7%)	7 (3%)	20 (3%)	41 (4%)
Dec 04	130 (10%)	101 (4%)	118 (6%)	7 (5%)	41 (8%)	8 (3%)	29 (4%)	52 (4%)
Dec 05	160 (11%)	139 (5%)	162 (8%)	14 (9%)	46 (8%)	3 (<1%)	38 (5%)	77 (6%)

Figure 5.25

Haemodialysis Percentage >=5 Hours Per Session By Australian State and Country

	Australia							New Zealand
	Qld	NSW/ACT	Vic	Tas	SA	NT	WA	
Mar 04	161 (16%)	1220 (59%)	182 (11%)	13 (9%)	21 (5%)	159 (67%)	50 (8%)	388 (39%)
Dec 04	236 (22%)	1288 (58%)	231 (13%)	18 (13%)	22 (5%)	170 (63%)	59 (9%)	432 (38%)
Dec 05	305 (24%)	1394 (58%)	223 (12%)	21 (15%)	27 (5%)	192 (60%)	57 (7%)	483 (39%)

Figure 5.26

Haemodialysis Percentage >15 Hours Per Week By Australian State and Country

	Australia							New Zealand
	Qld	NSW/ACT	Vic	Tas	SA	NT	WA	
Mar 04	70 (6%)	284 (13%)	61 (3%)	6 (4%)	15 (3%)	18 (7%)	23 (4%)	118 (11%)
Dec 04	89 (7%)	327 (14%)	89 (5%)	6 (4%)	16 (3%)	21 (8%)	28 (4%)	146 (12%)
Dec 05	122 (8%)	352 (14%)	122 (6%)	13 (8%)	23 (4%)	14 (4%)	35 (4%)	161 (12%)

Figure 5.27

Haemodialysis at 90 Days Patient Survival
Censored for Transplant 1993 - 2004
% [95% Confidence Interval]

	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
1993-1995	1907	95 [94, 96]	90 [88, 91]	69 [66, 71]	50 [47, 53]
1996-1998	2462	93 [92, 94]	88 [87, 90]	66 [64, 68]	48 [46, 51]
1999-2001	3156	93 [92, 94]	87 [86, 88]	67 [65, 68]	50 [48, 52]
2002-2004	3506	93 [92, 94]	87 [86, 88]	65 [63, 67]	-
New Zealand					
1993-1995	205	95 [91, 98]	90 [84, 93]	59 [51, 66]	40 [31, 48]
1996-1998	307	92 [89, 95]	88 [83, 91]	61 [54, 67]	45 [38, 51]
1999-2001	504	94 [92, 96]	87 [84, 90]	61 [56, 65]	41 [36, 46]
2002-2004	652	94 [92, 96]	89 [86, 91]	64 [58, 69]	-

Figure 5.28

Patient Survival - HD at 90 days
Censored for Transplant
Australia

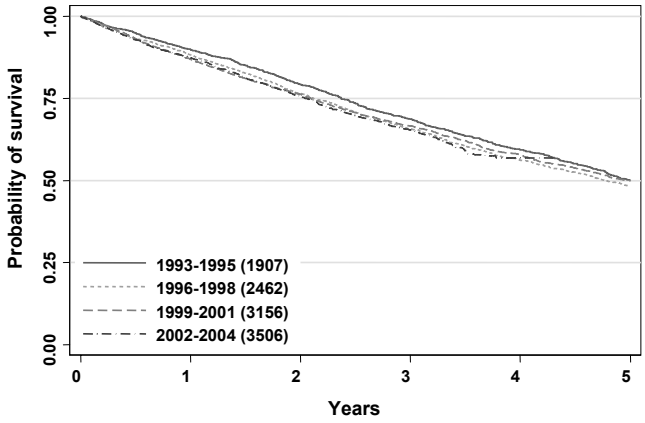


Figure 5.29

Patient Survival - HD at 90 days
Censored for Transplant
New Zealand

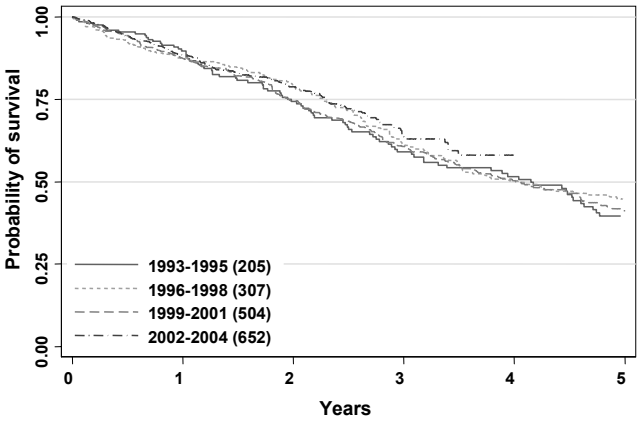


Figure 5.30

Haemodialysis at 90 Days
Patient Survival - Diabetic / Non Diabetic
Censored for Transplant 1993 - 2004
% [95% Confidence Interval]

	Survival			
	6 months	1 year	3 years	5 years
Australia				
Non Diabetic (8629)	94 [93, 94]	89 [88, 89]	68 [67, 70]	52 [50, 53]
Diabetic (2402)	93 [92, 94]	85 [84, 87]	59 [57, 62]	40 [37, 43]
New Zealand				
Non Diabetic (1044)	95 [93, 96]	89 [87, 91]	67 [63, 70]	51 [46, 55]
Diabetic (624)	93 [91, 95]	87 [84, 89]	55 [50, 59]	33 [28, 38]

Figure 5.31

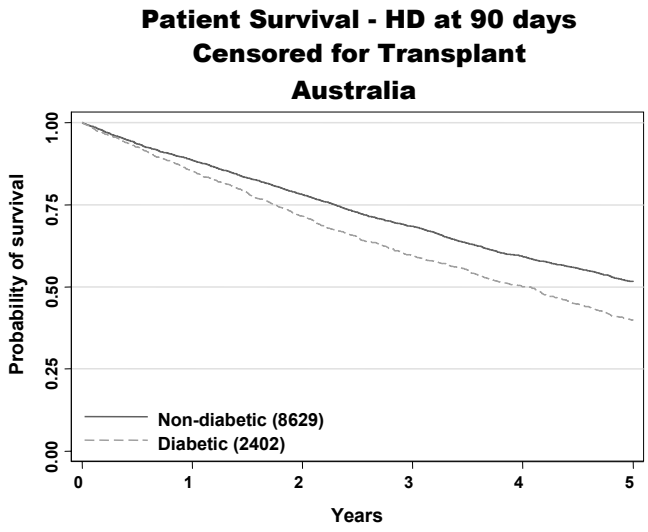


Figure 5.32

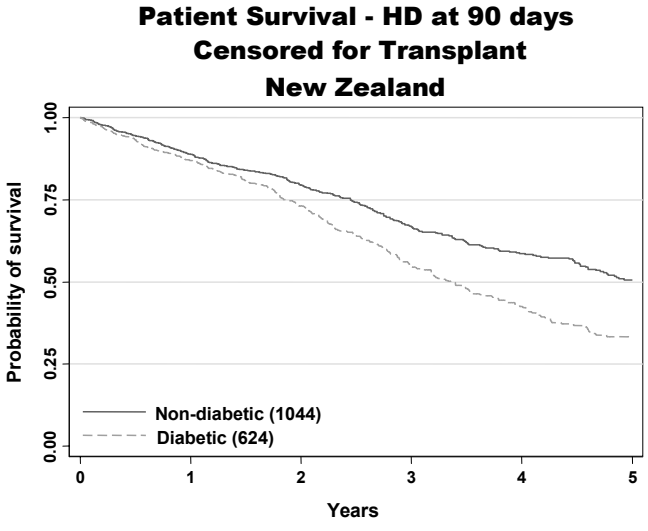


Figure 5.33

Haemodialysis at 90 Days
Patient Survival - By Age Group
Censored for Transplant 1993 - 2004
% [95% Confidence Interval]

Age Groups	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
0-39 years	1751	98 [97, 98]	95 [94, 96]	86 [84, 88]	78 [75, 81]
40-59 years	3802	96 [95, 96]	92 [91, 93]	76 [74, 78]	62 [60, 65]
60-74 years	3926	92 [91, 93]	85 [84, 86]	61 [59, 62]	40 [38, 42]
75 and over	1552	86 [85, 88]	78 [76, 80]	44 [42, 47]	24 [21, 27]
New Zealand					
0-39 years	310	99 [96, 99]	95 [92, 97]	81 [75, 86]	73 [65, 80]
40-59 years	745	96 [94, 97]	91 [89, 93]	67 [63, 71]	48 [42, 53]
60-74 years	518	91 [88, 93]	84 [80, 87]	51 [46, 56]	29 [24, 35]
75 and over	95	85 [76, 91]	68 [58, 77]	31 [21, 42]	17 [8, 30]

Figure 5.34

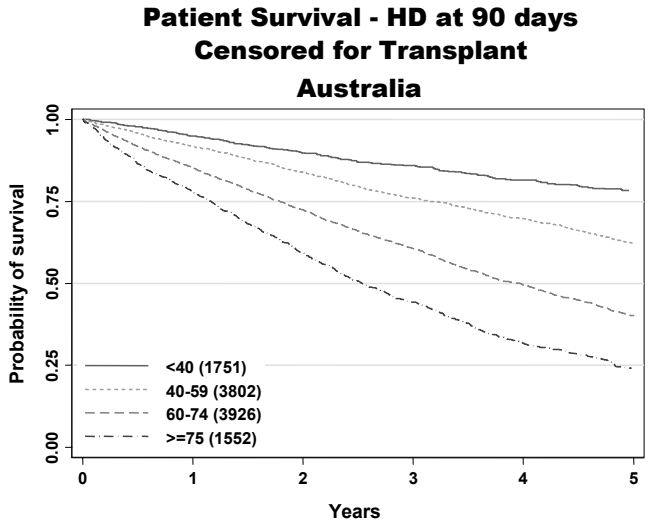


Figure 5.35

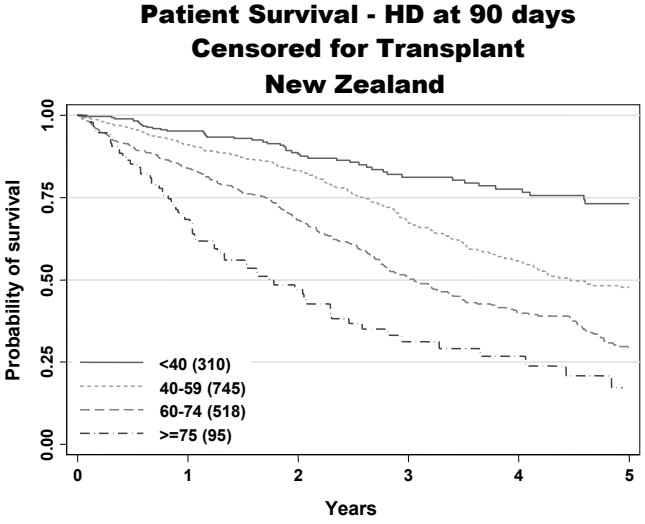


Figure 5.36

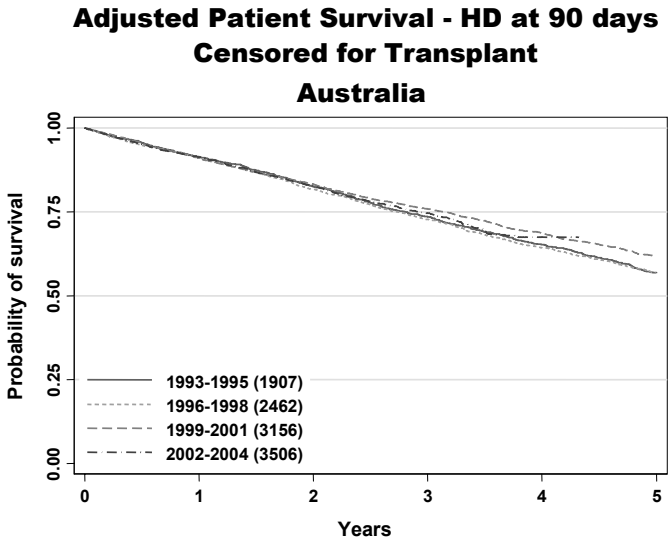
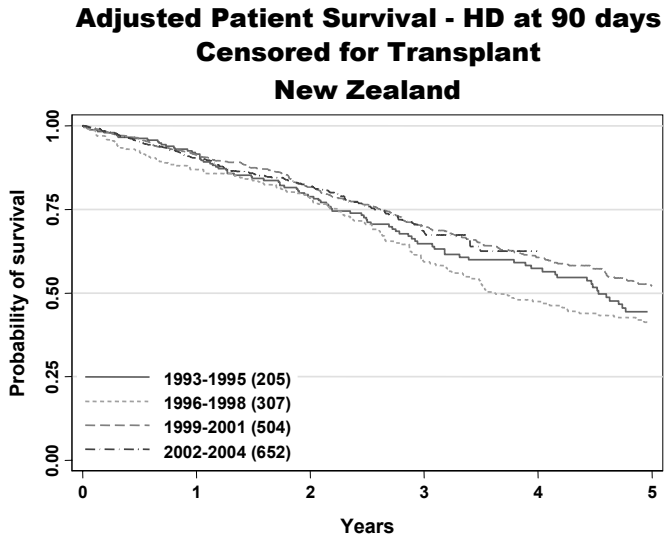


Figure 5.37



Membrane Type and Surface Areas

Australia

Figures 5.38 and 5.39.

Usage of low flux polysulfone dialysers continued to decrease to 19% in December 2005 from 26% in December 2004 and 32% in March 2004, while use of high flux polysulphone decreased to 9% (30% in December 2004 and 25% in March 2004). High flux Polysulphone-Helixone increased to 27% in December 2005 from 1% in December 2004. High flux Polyamix increased to 15% this year from 6% in December 2004. There were no patients using cuprophan at December 2005.

Fifty seven percent of patients received dialysis with high flux dialysers (46% in December 2004, 36% in March 2004). Use of haemophan continues to decrease to <1% in December 2005, from 2% in December 2004 and 8% in March 2004. Seven patients were receiving haemofiltration and 216 haemodiafiltration.

New Zealand

Figures 5.38 and 5.40.

Haemophan decreased to 1% in December 2005 from 18% in December 2004 and 30% in March 2004, while low flux polysulphone remained the same (48% in December 2004 and 2005 and 47% in March 2004).

There were 20% (224 patients) reported as receiving dialysis with high flux dialysers in December 2005, an increase from 15% in December 2004 and 10% in March 2004.

Figure 5.38

Haemodialyser Membrane Types by Surface Area 31-Dec-2005

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**
Cellulose Triacetate	High	-	-	127	130	101	**358**
Cuprophan	Mid	-	-	-	-	-	**-**
Diacetate	Low	2	1	50	-	21	**74**
Exebrane	High	-	-	8	3	-	**11**
Exebrane	Mid	-	-	2	13	-	**15**
Haemophan	Low	-	1	8	1	10	**20**
Polyamide Haemodiafiltration	High	-	5	1	-	2	**8**
Polyamix	High	-	51	538	-	428	**1017**
Polyamix	Low	-	235	989	-	243	**1467**
Polyethersulfone	High	-	-	-	24	-	**24**
Polysulphone	High	1	76	-	309	188	**574**
Polysulphone	Low	7	107	3	621	519	**1257**
Polysulphone-Helixone	High	1	1093	-	714	10	**1818**
Polysynthane	Low	-	12	31	-	30	**73**
Total		**11**	**1581**	**1758**	**1815**	**1552**	**6717**
New Zealand							
Cellulose Triacetate	Low	-	-	1	-	-	**1**
Haemophan	Low	-	1	-	-	12	**13**
Polyamide Haemodiafiltration	High	-	-	3	-	8	**11**
Polyamix	High	-	2	22	-	91	**115**
Polyamix	Low	-	13	209	-	134	**356**
Polycarbonate/Poly/Copolymer	Low	-	-	-	1	-	**1**
Polysulphone	High	-	7	-	91	-	**98**
Polysulphone	Low	-	21	2	367	149	**539**
Total		**-**	**44**	**237**	**459**	**394**	**1134**

Figure 5.39

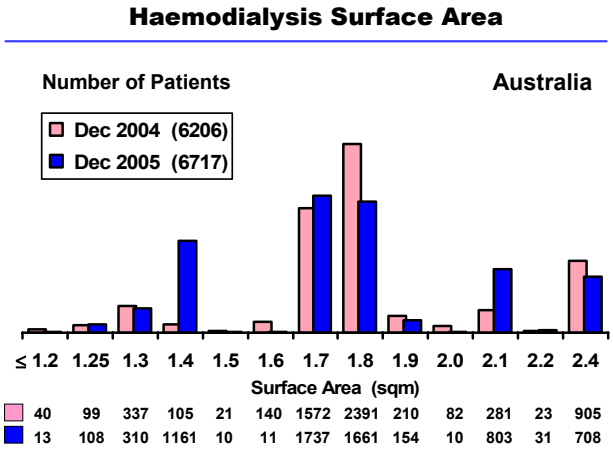
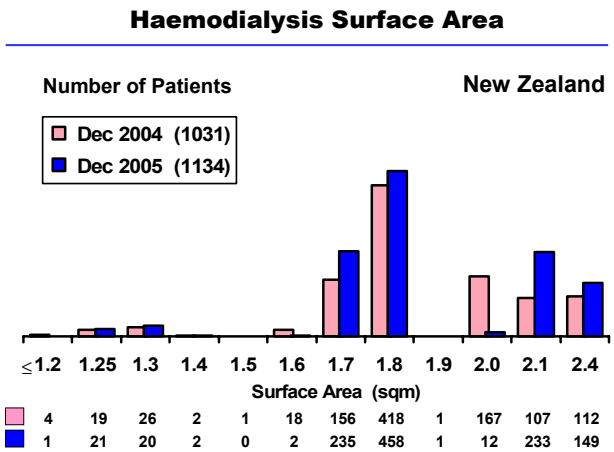


Figure 5.40



CALCIUM AND PHOSPHATE

In both countries, the proportion of patients with low or low-normal serum calcium have increased, although that of hypercalcaemia has remained unchanged. In spite of the availability of new phosphate binders in Australia, phosphate control and calcium phosphate products have not changed (Figures 5.41 - 5.43).

Peritoneal dialysis patients tend to have better calcium and phosphate control than HD patients. The possibility of confounding by patient size, gender and residual renal function should be

In New Zealand, calcium and phosphate control is worse than in Australia.

This may relate to differences in diet, or the lack of availability of newer phosphate binders, vitamin D analogues and calcimimetic agents in New Zealand.

Figure 5.41

Calcium (mmol/l)
1-Oct-2003 to 31-Dec-2005

Calcium (mmol/l)	Modality					
	HD - 3 Sessions per week			PD - as Prescribed		
	Mar 04	Dec 04	Dec 05	Mar 04	Dec 04	Dec 05
Australia						
<2.0	288 (5%)	350 (5%)	430 (6%)	111 (5%)	151 (7%)	173 (8%)
2.0-2.1	847 (14%)	1112 (17%)	1331 (18%)	356 (18%)	384 (18%)	405 (18%)
2.2-2.3	2147 (35%)	2361 (35%)	2625 (36%)	685 (34%)	726 (34%)	758 (34%)
2.4-2.5	1817 (29%)	1968 (29%)	2084 (28%)	528 (26%)	586 (27%)	589 (27%)
>=2.6	830 (13%)	847 (13%)	857 (12%)	241 (12%)	271 (13%)	265 (12%)
Missing	228 (4%)	57 (<1%)	43 (<1%)	109 (5%)	34 (1%)	24 (1%)
Total	**6157 (100%)**	**6695 (100%)**	**7370 (100%)**	**2030 (100%)**	**2152 (100%)**	**2214 (100%)**
New Zealand						
<2.0	30 (3%)	49 (4%)	53 (4%)	41 (5%)	49 (6%)	59 (7%)
2.0-2.1	92 (9%)	121 (11%)	162 (13%)	156 (18%)	141 (16%)	170 (19%)
2.2-2.3	270 (27%)	324 (29%)	341 (28%)	266 (31%)	288 (32%)	292 (32%)
2.4-2.5	354 (35%)	391 (35%)	437 (36%)	256 (30%)	252 (28%)	265 (29%)
>=2.6	215 (21%)	228 (20%)	233 (19%)	119 (14%)	146 (17%)	110 (12%)
Missing	45 (5%)	16 (1%)	6 (<1%)	19 (2%)	11 (1%)	8 (<1%)
Total	**1006 (100%)**	**1129 (100%)**	**1232 (100%)**	**857 (100%)**	**887 (100%)**	**904 (100%)**

Figure 5.42

Phosphate (mmol/l)
1-Oct-2003 to 31-Dec-2005

Phosphate (mmol/l)	Modality					
	HD - 3 Sessions per week			PD - As Prescribed		
	Mar 04	Dec 04	Dec 05	Mar 04	Dec 04	Dec 05
Australia						
<1.4	2036 (33%)	2205 (33%)	2556 (35%)	660 (32%)	696 (32%)	726 (33%)
1.4-1.5	864 (14%)	964 (14%)	1054 (14%)	323 (16%)	335 (16%)	365 (17%)
1.6-1.7	870 (14%)	918 (14%)	975 (13%)	276 (14%)	297 (14%)	316 (14%)
>=1.8	2238 (36%)	2555 (38%)	2768 (38%)	673 (33%)	792 (37%)	782 (35%)
Missing	149 (2%)	53 (<1%)	17 (<1%)	98 (5%)	32 (1%)	25 (1%)
Total	**6157 (100%)**	**6695 (100%)**	**7370 (100%)**	**2030 (100%)**	**2152 (100%)**	**2214 (100%)**
New Zealand						
<1.4	212 (21%)	240 (21%)	275 (22%)	236 (28%)	211 (24%)	237 (26%)
1.4-1.5	128 (13%)	131 (12%)	142 (12%)	124 (14%)	127 (14%)	135 (15%)
1.6-1.7	121 (12%)	148 (13%)	159 (13%)	119 (14%)	136 (15%)	133 (15%)
>=1.8	500 (50%)	597 (53%)	651 (53%)	359 (42%)	402 (45%)	389 (43%)
Missing	45 (4%)	13 (1%)	5 (<1%)	19 (2%)	11 (1%)	10 (1%)
Total	**1006 (100%)**	**1129 (100%)**	**1232 (100%)**	**857 (100%)**	**887 (100%)**	**904 (100%)**

Figure 5.43

Calcium *Phosphate (mmol^2/l^2)
1-Oct-2003 to 31-Dec-2005

Calcium Phosphate Product	Modality					
	HD - 3 Sessions per week			PD - As Prescribed		
	Mar 04	Dec 04	Dec 05	Mar 04	Dec 04	Dec 05
Australia						
<3.5	2447 (40%)	2727 (41%)	3155 (43%)	821 (40%)	890 (41%)	956 (43%)
3.5-3.9	893 (14%)	980 (15%)	1025 (14%)	347 (17%)	315 (15%)	335 (15%)
4.0-4.4	764 (12%)	849 (13%)	882 (12%)	217 (11%)	271 (13%)	277 (13%)
4.5-4.9	601 (10%)	663 (10%)	782 (11%)	205 (10%)	222 (10%)	198 (9%)
>=5.0	1217 (20%)	1417 (21%)	1478 (20%)	327 (16%)	419 (19%)	420 (19%)
Missing	235 (4%)	59 (<1%)	48 (<1%)	113 (6%)	35 (2%)	28 (1%)
Total	**6157 (100%)**	**6695 (100%)**	**7370 (100%)**	**2030 (100%)**	**2152 (100%)**	**2214 (100%)**
New Zealand						
<3.5	263 (26%)	290 (26%)	343 (28%)	311 (36%)	306 (35%)	324 (36%)
3.5-3.9	121 (12%)	151 (13%)	163 (13%)	128 (15%)	133 (15%)	151 (17%)
4.1-4.4	128 (13%)	134 (12%)	165 (13%)	110 (13%)	116 (13%)	105 (12%)
4.5-4.9	111 (11%)	132 (12%)	144 (12%)	93 (11%)	104 (12%)	93 (10%)
>=5.0	338 (34%)	406 (36%)	411 (33%)	196 (23%)	217 (24%)	221 (24%)
Missing	45 (4%)	16 (1%)	6 (<1%)	19 (2%)	11 (1%)	10 (1%)
Total	**1006 (100%)**	**1129 (100%)**	**1232 (100%)**	**857 (100%)**	**887 (100%)**	**904 (100%)**

Figure 5.44

Duration of Treatments and Serum Phosphate Levels
Haemodialysis - Three Sessions Per Week
December 2005

Hours Per Session	Australia			New Zealand		
	<1.8 mmol/l	1.8-2.2 mmol/l	>2.2 mmol/l	<1.8 mmol/l	1.8-2.2 mmol/l	>2.2 mmol/l
<3.5	146 (64%)	43 (19%)	38 (17%)	15 (62%)	6 (25%)	3 (13%)
3.5 - 3.9	193 (68%)	36 (13%)	55 (19%)	3 (27%)	5 (46%)	3 (27%)
4.0 - 4.4	2196 (66%)	580 (18%)	529 (16%)	252 (53%)	105 (22%)	122 (25%)
4.5 - 4.9	829 (62%)	248 (19%)	248 (19%)	110 (47%)	56 (24%)	68 (29%)
>=5	1341 (61%)	429 (19%)	442 (20%)	213 (45%)	117 (24%)	149 (31%)
Total	**4705 (64%)**	**1336 (18%)**	**1312 (18%)**	**593 (48%)**	**289 (24%)**	**345 (38%)**

Contrary to expectations, longer HD sessions were not associated with better phosphate control (Figure 5.44).

The possibility of reverse causation (poor phosphate control leading to longer session length being prescribed) should be considered.

Figure 5.45

Percentage of Patients in each Previous CARI Guideline Category.
Haemodialysis - Three Sessions Per Week

		Australia			New Zealand		
		Mar 04	Dec 04	Dec 05	Mar 04	Dec 04	Dec 05
Calcium [mmol/l] CARI	0 - 2.1	1135 (18%)	1462 (22%)	1761 (24%)	122 (12%)	170 (15%)	215 (18%)
	2.2 - 2.5	3964 (64%)	4329 (65%)	4709 (64%)	624 (62%)	715 (63%)	778 (63%)
	>= 2.6	830 (14%)	847 (13%)	857 (12%)	215 (21%)	228 (20%)	233 (19%)
	Missing	228 (4%)	57 (<1%)	43 (<1%)	45 (5%)	16 (1%)	6 (<1%)
	Total	**6157 (100%)**	**6695 (100%)**	**7370 (100%)**	**1006 (100%)**	**1129 (100%)**	**1232 (100%)**
Phosphate [mmol/l] CARI	0 - 1.7	3770 (61%)	4087 (61%)	4585 (62%)	461 (46%)	519 (46%)	576 (47%)
	1.8 - 2.1	1218 (20%)	1336 (20%)	1456 (20%)	252 (25%)	271 (24%)	306 (25%)
	>= 2.2	1020 (17%)	1219 (18%)	1312 (18%)	248 (25%)	326 (29%)	345 (28%)
	Missing	149 (2%)	53 (<1%)	17 (<1%)	45 (4%)	13 (1%)	5 (<1%)
	Total	**6157 (100%)**	**6695 (100%)**	**7370 (100%)**	**1006 (100%)**	**1129 (100%)**	**1232 (100%)**
Calcium x Phosphate Product	0 - 4.1	3678 (60%)	4055 (61%)	4558 (62%)	437 (43%)	497 (44%)	581 (47%)
	4.2 - 5.7	1639 (26%)	1876 (28%)	2021 (27%)	355 (35%)	403 (36%)	413 (34%)
	>= 5.8	605 (10%)	705 (11%)	743 (10%)	169 (17%)	213 (19%)	232 (19%)
	Missing	235 (4%)	59 (<1%)	48 (<1%)	45 (5%)	16 (1%)	6 (<1%)
	Total	**6157 (100%)**	**6695 (100%)**	**7370 (100%)**	**1006 (100%)**	**1129 (100%)**	**1232 (100%)**

UREA REDUCTION RATIO

In Australia, 8% of patients on three HD sessions per week are reported as receiving a low HD dose, as defined by URR of 65%. In New Zealand, this proportion is 19%. Low HD dose was associated with the use of CVCs.

Figure 5.46

Urea Reduction Ratio (URR) of Prevalent Patients
Haemodialysis - Three Sessions Per Week
31-Mar-2004 to 31-Dec-2005

Reported URR	Australia			New Zealand		
	31-Mar-04	31-Dec-04	31-Dec-05	31-Mar-04	31-Dec-04	31-Dec-05
00-39%	<1%	<1%	<1%	<1%	<1%	<1%
40-49%	<1%	<1%	<1%	2%	2%	1%
50-59%	4%	3%	3%	14%	12%	10%
60-64%	8%	6%	5%	16%	15%	12%
65-69%	18%	15%	15%	24%	24%	23%
70-74%	29%	27%	26%	20%	18%	24%
75-79%	23%	26%	27%	13%	15%	18%
80-100%	17%	22%	22%	10%	13%	12%
Total Pts	**4914**	**5113**	**5447**	**709**	**806**	**861**
Median	**73**	**74**	**74**	**68**	**69**	**71**
25th Percentile	**68**	**70**	**70**	**62**	**63**	**65**
75th Percentile	**77**	**79**	**79**	**74**	**75**	**75**

Figure 5.47

Urea Reduction Ratio and Type of Access
Haemodialysis - Three Sessions Per Week
December 2005

URR	Australia				New Zealand			
	AVF	AVG	CVC	Total	AVF	AVG	CVC	Total
<60	142 (3%)	13 (2%)	58 (8%)	**213 (4%)**	54 (8%)	1 (2%)	43 (17%)	**98 (9%)**
60-64	222 (5%)	30 (4%)	48 (7%)	**300 (5%)**	79 (11%)	2 (3%)	21 (8%)	**102 (10%)**
65-69	664 (14%)	65 (8%)	128 (18%)	**857 (14%)**	126 (18%)	17 (27%)	54 (21%)	**197 (19%)**
70-74	1140 (25%)	146 (19%)	139 (19%)	**1425 (23%)**	151 (21%)	11 (18%)	40 (15%)	**202 (19%)**
>=75	2068 (45%)	476 (61%)	208 (28%)	**2752 (45%)**	185 (26%)	21 (33%)	56 (22%)	**262 (25%)**
Unknown	382 (8%)	44 (6%)	150 (20%)	**579 (10%)**	126 (18%)	11 (18%)	45 (17%)	**182 (17%)**
Total	**4618 (100%)**	**777 (100%)**	**731 (100%)**	**6126 (100%)**	**721 (100%)**	**63 (100%)**	**259 (100%)**	**1043 (100%)**

ACCESS AT FIRST TREATMENT

Figure 5.48

First Access
Haemodialysis as Initial Modality
1-Oct-2003 to 31-Dec-2005

First Access	Australia			New Zealand		
	Mar 04	Dec 04	Dec 05	Mar 04	Dec 04	Dec 05
AVF	274 (38%)	388 (35%)	586 (35%)	44 (32%)	59 (28%)	74 (27%)
AVG	20 (3%)	33 (3%)	35 (2%)	2 (1%)	2 (<1%)	4 (1%)
Tunnel CVC	264 (37%)	402 (36%)	625 (37%)	37 (27%)	60 (28%)	76 (27%)
Non Tunnel CVC	155 (22%)	298 (26%)	425 (25%)	54 (39%)	91 (43%)	125 (45%)
Total	**713 100%)**	**1121 (100%)**	**1671 (100%)**	**137 (100%)**	**212 (100%)**	**279 (100%)**

Data collection for access used at first HD commenced from 1st October 2003. These results are summarised in Figures 5.48 - 5.50.

Overall, the use of AVF as initial access is decreasing, while that of CVCs is increasing (Figures 5.51 - 5.52). This trend is particularly obvious among diabetics.

The trend is seen even in patients referred early (> three months prior to starting RRT) Figures 5.54 - 5.55..

Figure 5.49

First Haemodialysis Access – Initial RRT
By Diabetic Status and Gender - Australia

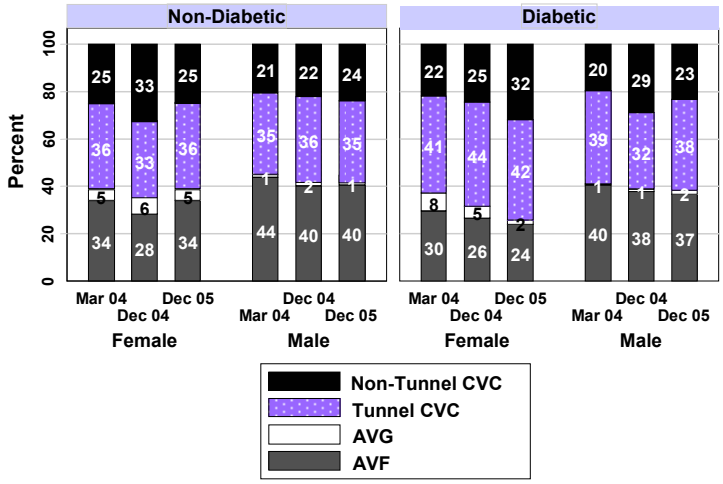


Figure 5.50

First Haemodialysis Access – Initial RRT
By Diabetic Status and Gender - New Zealand

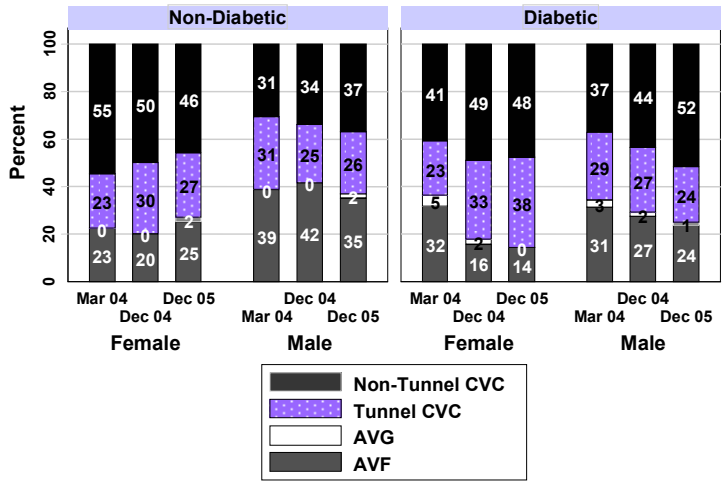


Figure 5.51

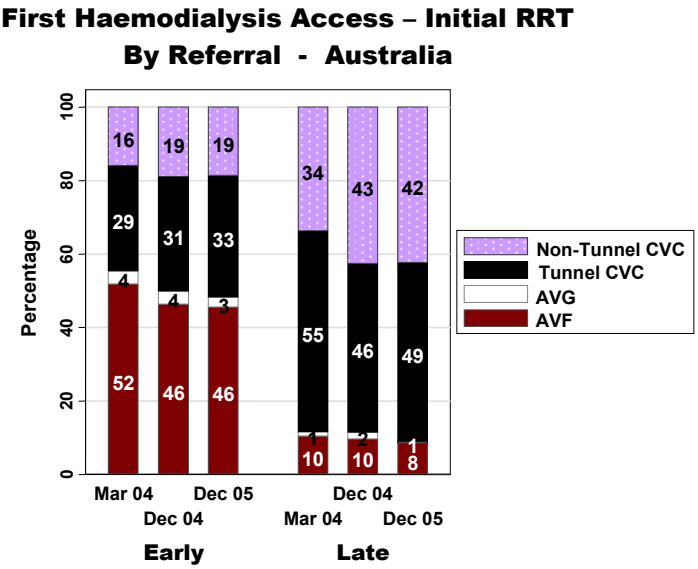


Figure 5.52

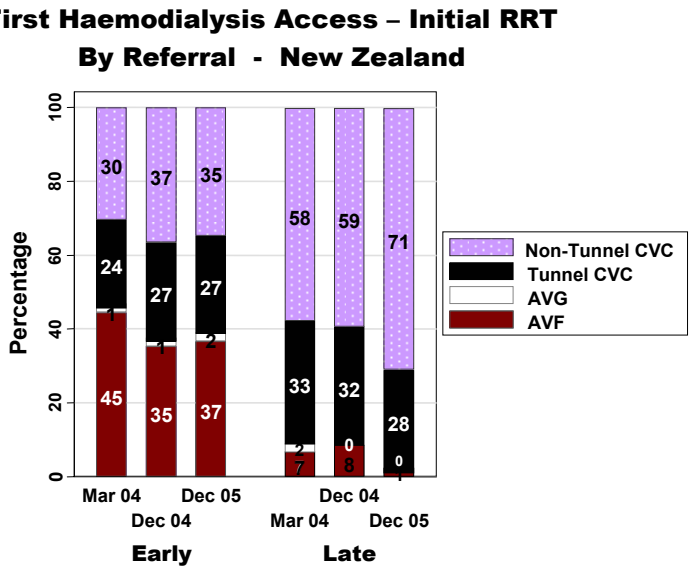


Figure 5.53

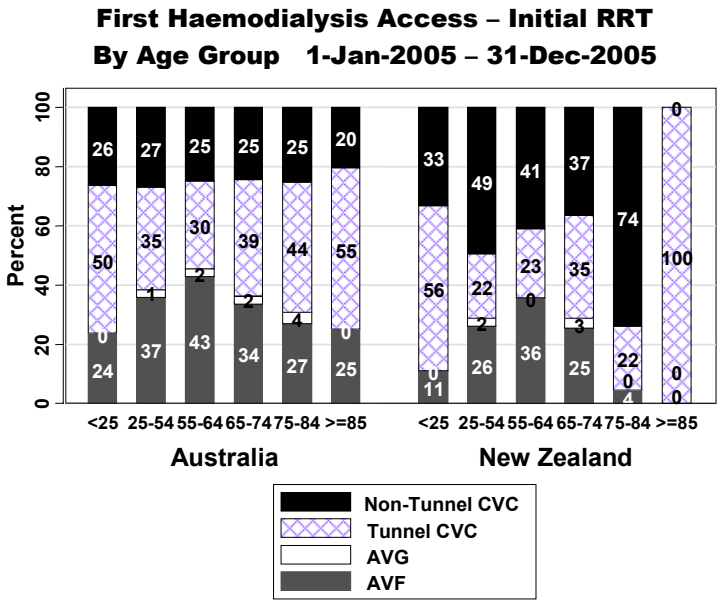


Figure 5.54

First Haemodialysis Access
Haemodialysis as Initial Modality
1-Oct-2003 to 31-Dec-2005

	Mar 04		Dec 04		Dec 05	
	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC
Australia						
Queensland	61 (44%)	77 (56%)	86 (37%)	145 (63%)	123 (38%)	205 (62%)
NSW/ACT	71 (32%)	153 (68%)	114 (35%)	216 (65%)	175 (33%)	362 (67%)
Victoria	89 (49%)	93 (51%)	109 (41%)	155 (59%)	164 (44%)	212 (56%)
Tasmania	1 (14%)	6 (86%)	7 (35%)	13 (65%)	13 (45%)	16 (55%)
South Australia	36 (57%)	27 (43%)	41 (47%)	46 (53%)	73 (53%)	66 (47%)
Northern Territory	14 (42%)	19 (58%)	24 (42%)	33 (58%	21 (27%)	58 (73%)
Western Australia	22 (33%)	44 (67%)	40 (30%)	92 (70%)	52 (28%)	131 (72%)
New Zealand						
	46 (34%)	91 (66%)	61 (29%)	151 (71%)	78 (28%)	201 (72%)

Figure 5.55

First Haemodialysis Access
Early Referrals Only
1-Oct-2003 to 31-Dec-2005

	Mar 04		Dec 04		Dec 05	
	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC
Australia						
Queensland	56 (64%)	32 (36%)	75 (50%)	75 (50%)	108 (47%)	120 (53%)
NSW/ACT	61 (43%)	80 (57%)	100 (45%)	121 (55%)	162 (41%)	229 (59%)
Victoria	85 (67%)	42 (33%)	104 (55%)	85 (45%)	154 (56%)	120 (44%)
Tasmania	1 (25%)	3 (75%)	7 (41%)	10 (59%)	13 (50%)	13 (50%)
South Australia	33 (67%)	16 (33%)	39 (59%)	27 (41%)	70 (70%)	30 (30%)
Northern Territory	11 (46%)	13 (54%)	18 (55%)	15 (45%)	20 (38%)	33 (62%)
Western Australia	20 (41%)	29 (59%)	37 (44%)	48 (56%)	51 (41%)	73 (59%)
New Zealand						
	42 (46%)	50 (54%)	56 (37%)	97 (63%)	77 (39%)	122 (61%)

ACCESS IN USE AT 31ST DECEMBER 2005

Figure 5.56

Percentage AVGs December 2005
Number of Patients (% Patients)

	No. of Pts.	Diabetic	Non Diabetic
Queensland	1208	304 (11%)	904 (11%)
New South Wales	2037	387 (17%)	1650 (20%)
Aust. Capital Territory	142	28 (36%)	114 (36%)
Victoria	1773	439 (7%)	1334 (8%)
Tasmania	132	27 (11%)	105 (8%)
South Australia	473	98 (9%)	375 (10%)
Northern Territory	282	149 (3%)	133 (3%)
Western Australia	670	228 (6%)	442 (9%)
Australia	**6717**	**1660 (10%)**	**5057 (13%)**
December 2004	*6206*	*1418 (12%)*	*4788(15%)*
New Zealand	**1134**	**439 (5%)**	**695 (7%)**
December 2004	*1031*	*405 (5%)*	*626 (8%)*

Figure 5.57

Percentage of Non AVF Access December 2005
n = Number of Patients

	Australia (n=6717)		New Zealand (n=1134)	
	AVG	CVC	AVG	CVC
Total HD Population	12%	12%	6%	24%
Diabetics	10%	16%	5%	28%
Female	18%	15%	11%	32%

Figures 5.56 to 5.60 describe the data about prevalent haemodialysis access (i.e. access in use at 31st December 2005). AVFs predominate.

The proportion of patients with CVCs continues to be higher in New Zealand.

Figure 5.58

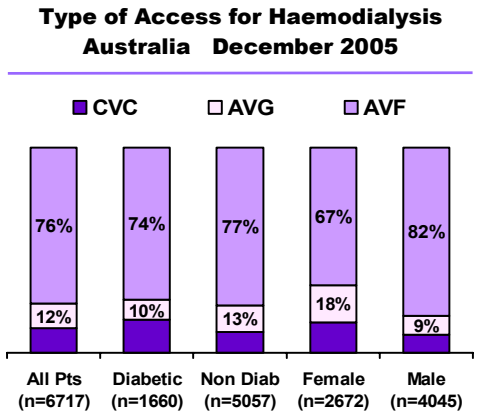


Figure 5.59

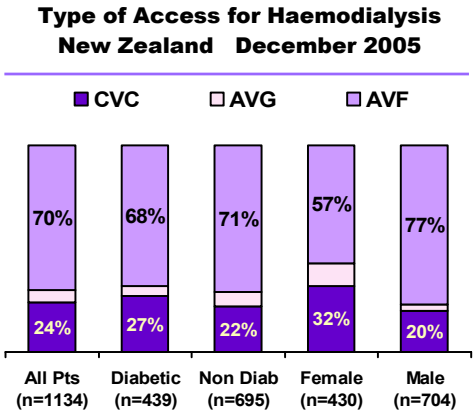


Figure 5.60

Access Intervention in Previous Twelve Months - December 2005
n = Number of Patients

		Revision of Access			Declotting of Access		
		AVF	AVG	CVC	AVF	AVG	CVC
Australia	**n=6717**	**12%**	**35%**	**18%**	**5%**	**26%**	**14%**
Diabetics	n=1660	12%	41%	17%	6%	29%	13%
Female	n=2672	13%	35%	18%	6%	25%	**15%**
New Zealand	**n=1134**	**15%**	**23%**	**8%**	**5%**	**23%**	**11%**