

# **CHAPTER 5**

## **HAEMODIALYSIS**

**Peter Kerr**



## STOCK AND FLOW

### AUSTRALIA

The annual stock and flow of haemodialysis patients during the period 1998-2002 is shown in Figures 5.1 and 5.2.

There were 5,435 patients (276 per million) receiving treatment at 31<sup>st</sup> December 2002, an increase of 8%; 37% were hospital based (36% in 2001), 49% were in satellite centres (limited or self care) (48% in 2001) and 14% at home (15% in 2001). The proportion of patients receiving satellite haemodialysis increased by 9%, slightly less than the previous two years (10% in both 2001 and 2000).

The proportion of all dialysis patients who were using home haemodialysis in each State was 20% for New South Wales, 11% for the ACT and less than 8% for the other States; this is mirrored by an increase in satellite haemodialysis (fig 4.1).

A total of 1,543 patients received haemodialysis for the first time during the year, a **4% decrease** from last year; this is the first decrease ever recorded. However, this decrease is balanced by a low number of deaths and a lack of increase in transplants, resulting in an increase in the total number of prevalent patients. The modal age group was 65-74 years (27%).

Of the 5,435 patients dialysing, 43% were 65 years or older and 8% less than 35 years old. There was a 24% decrease in the number of new patients commencing haemodialysis aged between 35-44 years and a 20% decrease in the age group 25-34 years from 2001. In absolute terms there were 135 new patients aged 35-44 years, compared to 177 and 84 new patients compared to 105 aged 25-34 years in 2001. There was an 11% increase in patients >75 years (fig 5.3).

The proportion of all dialysis patients in each age group who were using haemodialysis is shown in Figure 5.6.

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

There were 394 transplant operations, a 3% increase from 2001; representing 7% of all patients dialysing and 8% of those patients <65 years. Twenty seven patients aged > 65 years were transplanted.

There were 712 deaths, representing 13.6 deaths per 100 patient years (10.4% of patients at risk) (fig 3.6).

For more detail of cause of death see Appendix II at the Website ([www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm](http://www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm)).

### NEW ZEALAND

The annual stock and flow of haemodialysis patients during the period 1998-2002 is shown in Figure 5.4 and 5.5.

There were 819 patients (208 per million) receiving treatment at 31<sup>st</sup> December 2002, an 8% increase compared to 2001. Hospital based haemodialysis decreased from last year to 45% (49% in 2001), satellite haemodialysis increased to 28% from 24% in 2001 and home haemodialysis increased to 27% (26% in 2001).

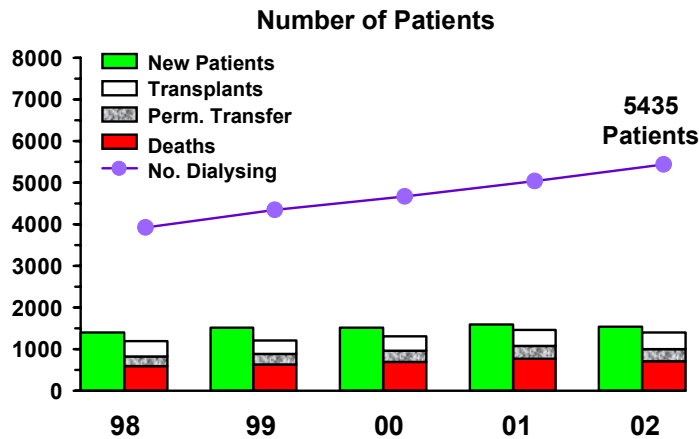
Similar to Australia, there was a decrease in new haemodialysis patients in the survey period for the first time since 1994.

Modal age group 55-64 years (28%); 24% were >65 years and 11% <35 years (fig 5.5).

**Figure 5.1**

#### Stock and Flow of Haemodialysis Patients 1998 - 2002

	1998	1999	2000	2001	2002
<b>Australia</b>					
<b>Patients new to HD</b>	1400	1521	1520	1600	1543
First Dialysis Treatment	1174	1298	1287	1373	1317
Previous Dialysis (PD)	200	188	207	198	200
Failed Transplant	26	35	26	29	26
<b>Transplanted</b>	358	329	362	382	394
<b>Deaths</b>	598	644	684	770	712
Never Transplanted	534	575	619	706	651
Previous Transplant	64	69	65	64	61
<b>Permanent Transfers Out (&gt;12 months)</b>	228	241	270	310	294
<b>Temporary Transfers (&lt;12 months)</b>	137	153	156	128	98
Patients Dialysing at 31 December	3920	4339	4670	5033	5435
Patients Dialysing at Home 31 December	657	705	737	767	763
% of all Home Dialysis Patients	30%	30%	30%	30%	31%
<b>New Zealand</b>					
<b>Patients new to HD</b>	266	259	356	336	328
First Dialysis Treatment	203	189	264	277	280
Previous Dialysis (PD)	54	62	81	53	41
Failed Transplant	9	8	11	6	7
<b>Transplanted</b>	59	62	50	60	61
<b>Deaths</b>	73	93	106	127	109
Never Transplanted	65	85	95	114	99
Previous Transplant	8	8	11	13	10
<b>Permanent Transfers Out (&gt;12 months)</b>	79	80	127	103	145
<b>Temporary Transfers (&lt;12 months)</b>	35	32	37	18	15
Patients Dialysing at 31 December	495	562	656	755	819
Patients Dialysing at Home 31 December	200	179	188	199	224
% of all Home Dialysis Patients	24%	21%	22%	22%	23%

**Figure 5.2**
**Stock and Flow of Haemodialysis Patients  
Australia 1998 - 2002**

**Figure 5.3**
**Australia**
**Stock and Flow of Haemodialysis 1998 - 2002  
Number (%)**

Age Groups	1998	1999	2000	2001	2002
<b>New Patients *</b>					
00-14 years	6 (<1%)	10 (<1%)	5 (<1%)	13 (<1%)	11 (<1%)
15-24 years	43 (3%)	47 (3%)	56 (4%)	42 (3%)	37 (3%)
25-34 years	107 (8%)	102 (7%)	107 (7%)	105 (7%)	84 (5%)
35-44 years	180 (13%)	173 (11%)	150 (10%)	177 (11%)	135 (9%)
45-54 years	254 (18%)	268 (17%)	255 (17%)	271 (17%)	266 (17%)
55-64 years	295 (21%)	301 (20%)	297 (19%)	318 (20%)	310 (20%)
65-74 years	360 (26%)	419 (28%)	406 (27%)	417 (26%)	414 (27%)
75-84 years	151 (11%)	193 (13%)	236 (16%)	247 (15%)	266 (17%)
> 85 years	4 (<1%)	8 (<1%)	8 (<1%)	10 (<1%)	20 (1%)
<b>Total</b>	<b>1400 (100%)</b>	<b>1521 (100%)</b>	<b>1520 (100%)</b>	<b>1600 (100%)</b>	<b>1543 (100%)</b>
<b>Patients Dialysing</b>					
00-14 years	6 (<1%)	10 (<1%)	7 (<1%)	13 (<1%)	11 (<1%)
15-24 years	94 (2%)	98 (2%)	93 (2%)	93 (2%)	100 (2%)
25-34 years	324 (8%)	345 (8%)	354 (8%)	355 (7%)	346 (6%)
35-44 years	524 (13%)	563 (13%)	594 (13%)	603 (12%)	565 (10%)
45-54 years	705 (18%)	784 (18%)	816 (17%)	892 (18%)	942 (17%)
55-64 years	839 (21%)	891 (21%)	945 (20%)	1017 (20%)	1150 (21%)
65-74 years	1008 (26%)	1105 (26%)	1185 (25%)	1296 (26%)	1386 (26%)
75-84 years	403 (10%)	524 (12%)	647 (14%)	735 (15%)	878 (16%)
> 85 years	17 (<1%)	19 (<1%)	29 (<1%)	29 (<1%)	57 (1%)
<b>Total</b>	<b>3920 (100%)</b>	<b>4339 (100%)</b>	<b>4670 (100%)</b>	<b>5033 (100%)</b>	<b>5435 (100%)</b>
<b>Primary Renal Disease *</b>					
Glomerulonephritis	465 (33%)	475 (32%)	482 (32%)	453 (28%)	417 (27%)
Analgesic Nephropathy	84 (6%)	82 (5%)	62 (4%)	86 (5%)	63 (4%)
Hypertension	166 (12%)	167 (11%)	199 (13%)	216 (14%)	237 (15%)
Polycystic Disease	92 (7%)	105 (7%)	99 (6%)	100 (6%)	86 (6%)
Reflux Nephropathy	62 (4%)	67 (4%)	70 (5%)	58 (4%)	57 (4%)
Diabetic Nephropathy	310 (22%)	354 (23%)	332 (22%)	380 (24%)	413 (27%)
Miscellaneous	138 (10%)	158 (10%)	179 (12%)	183 (11%)	178 (11%)
Uncertain	83 (6%)	113 (8%)	97 (6%)	124 (8%)	92 (6%)
<b>Total</b>	<b>1400 (100%)</b>	<b>1521 (100%)</b>	<b>1520 (100%)</b>	<b>1600 (100%)</b>	<b>1543 (100%)</b>

\* New patients receiving first haemodialysis treatment



Figure 5.4

**Stock and Flow of Haemodialysis Patients  
New Zealand 1998 - 2002**

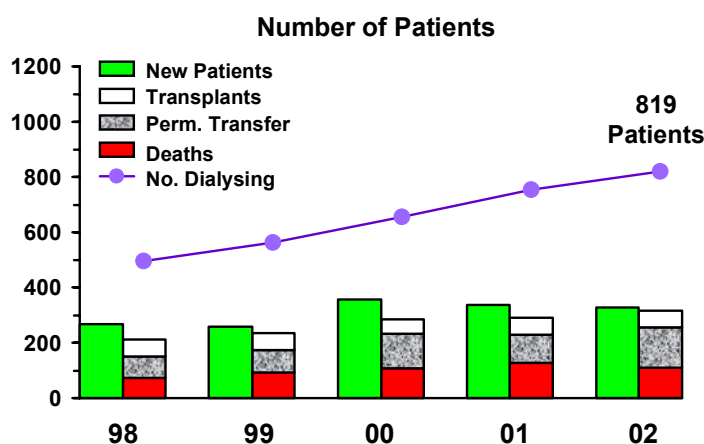


Figure 5.5

New Zealand

**Stock and Flow of Haemodialysis 1998 - 2002  
Number (%)**

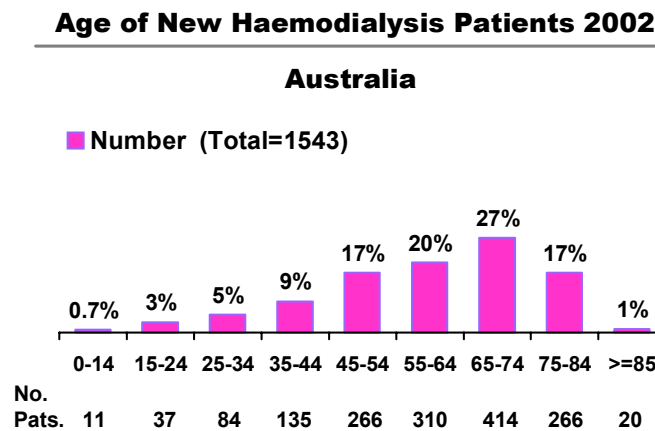
Age Groups	1998	1999	2000	2001	2002
<b>New Patients *</b>					
00-14 years	3 (1%)	2 (<1%)	2 (<1%)	5 (1%)	1 (<1%)
15-24 years	12 (4%)	8 (3%)	21 (6%)	9 (3%)	11 (3%)
25-34 years	24 (9%)	21 (8%)	29 (8%)	19 (6%)	18 (5%)
35-44 years	35 (13%)	25 (10%)	36 (10%)	43 (13%)	32 (10%)
45-54 years	54 (21%)	58 (22%)	78 (22%)	78 (23%)	76 (23%)
55-64 years	81 (30%)	76 (29%)	107 (30%)	84 (25%)	109 (33%)
65-74 years	47 (18%)	42 (16%)	57 (16%)	75 (22%)	63 (19%)
75-84 years	10 (4%)	26 (10%)	26 (7%)	22 (7%)	16 (5%)
> 85 years	0 (0%)	1 (<1%)	0 (0%)	1 (<1%)	2 (<1%)
<b>Total</b>	<b>266 (100%)</b>	<b>259 (100%)</b>	<b>356 (100%)</b>	<b>336 (100%)</b>	<b>328 (100%)</b>
<b>Patients Dialysing</b>					
00-14 years	4 (<1%)	4 (<1%)	2 (<1%)	3 (<1%)	2 (<1%)
15-24 years	18 (4%)	22 (4%)	36 (6%)	30 (4%)	28 (3%)
25-34 years	52 (11%)	51 (9%)	63 (9%)	58 (8%)	61 (7%)
35-44 years	104 (21%)	100 (18%)	96 (15%)	124 (16%)	114 (14%)
45-54 years	100 (20%)	126 (22%)	145 (22%)	184 (24%)	189 (23%)
55-64 years	127 (26%)	137 (24%)	180 (27%)	193 (26%)	227 (28%)
65-74 years	75 (15%)	95 (17%)	95 (15%)	126 (17%)	158 (19%)
75-84 years	15 (3%)	27 (5%)	39 (6%)	37 (5%)	40 (5%)
> 85 years	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
<b>Total</b>	<b>495 (100%)</b>	<b>562 (100%)</b>	<b>656 (100%)</b>	<b>755 (100%)</b>	<b>819 (100%)</b>
<b>Primary Renal Disease *</b>					
Glomerulonephritis	56 (21%)	75 (29%)	103 (29%)	97 (29%)	77 (23%)
Analgesic Nephropathy	2 (<1%)	2 (<1%)	0 (0%)	0 (0%)	0 (0%)
Hypertension	30 (11%)	26 (11%)	52 (15%)	37 (11%)	31 (10%)
Polycystic Disease	17 (6%)	14 (5%)	11 (3%)	24 (7%)	12 (4%)
Reflux Nephropathy	11 (4%)	6 (2%)	19 (5%)	7 (2%)	10 (3%)
Diabetic Nephropathy	108 (41%)	102 (39%)	124 (35%)	123 (37%)	151 (46%)
Miscellaneous	22 (8%)	21 (8%)	30 (8%)	31 (9%)	36 (11%)
Uncertain	20 (8%)	13 (5%)	17 (5%)	17 (5%)	11 (3%)
<b>Total</b>	<b>266 (100%)</b>	<b>259 (100%)</b>	<b>356 (100%)</b>	<b>336 (100%)</b>	<b>328 (100%)</b>

\* New patients receiving first haemodialysis treatment

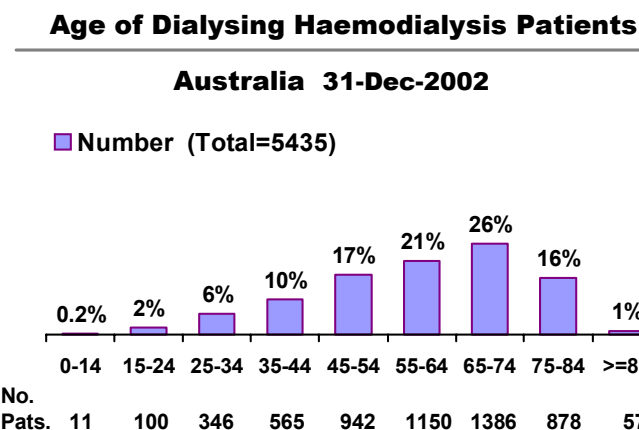
**Figure 5.6**

<b>Proportion (%) of Patients aged &gt; 65 years Having Home Haemodialysis 1998 - 2002</b>					
<b>State</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Queensland	1%	1%	1.5%	1.25%	1.5%
New South Wales	7%	7%	7%	6.5%	6.4%
Aust.Capital Territory	2%	6%	5%	8%	8.4%
Victoria	4%	3%	2%	2.5%	2.4%
Tasmania	0%	0%	0%	0%	0%
South Australia	<1%	2%	<1%	1.5%	2.4%
Northern Territory	0%	0%	0%	0%	0%
Western Australia	1%	<1%	<1%	<1%	<1%
<b>Australia</b>	<b>4%</b>	<b>4%</b>	<b>3%</b>	<b>4%</b>	<b>4%</b>
<b>New Zealand</b>	<b>8%</b>	<b>7%</b>	<b>5%</b>	<b>5%</b>	<b>5%</b>

**Figure 5.7**



**Figure 5.8**





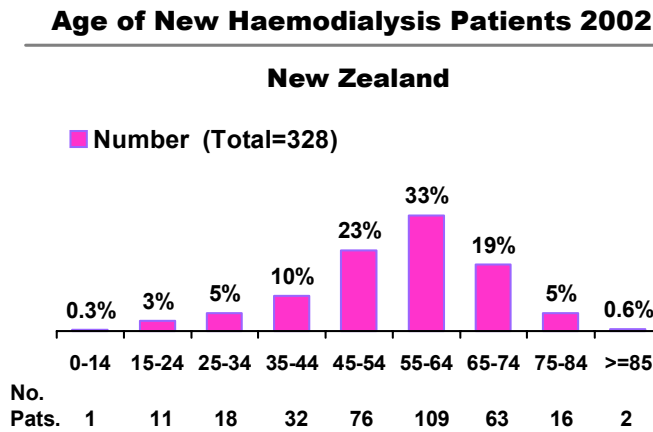
**NEW ZEALAND (continued)**

There were 328 patients who received haemodialysis for the first time, a 2% decrease from 2001, 85% having their initial dialysis treatment. Modal age group 45-74 years (75%), 9% were <35 years and 25% >65 years (fig 5.5 and 5.9, and Appendix III at the Website ([www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm](http://www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm))).

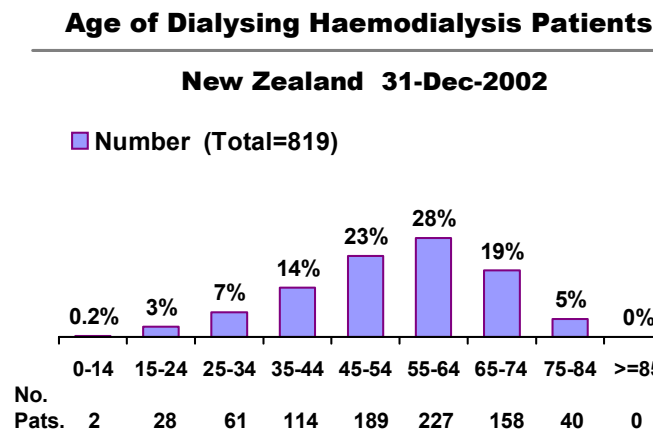
Sixty one haemodialysis patients received transplants in 2002 (60 in 2001), representing 7% of all patients dialysing and 9% of those patients <65 years.

There were 109 deaths, 13.9 deaths per 100 patient years, (9.6% of patients at risk) (fig 3.6).

**Figure 5.9**



**Figure 5.10**



## BLOOD FLOW RATES

### AUSTRALIA

The trend towards a prescribed blood flow rate of 300 mls/minute or higher has accelerated rapidly from approximately 36% of all patients in 1996 to 76% in March 2003; only 7% were now prescribed less than 250 mls/minute.

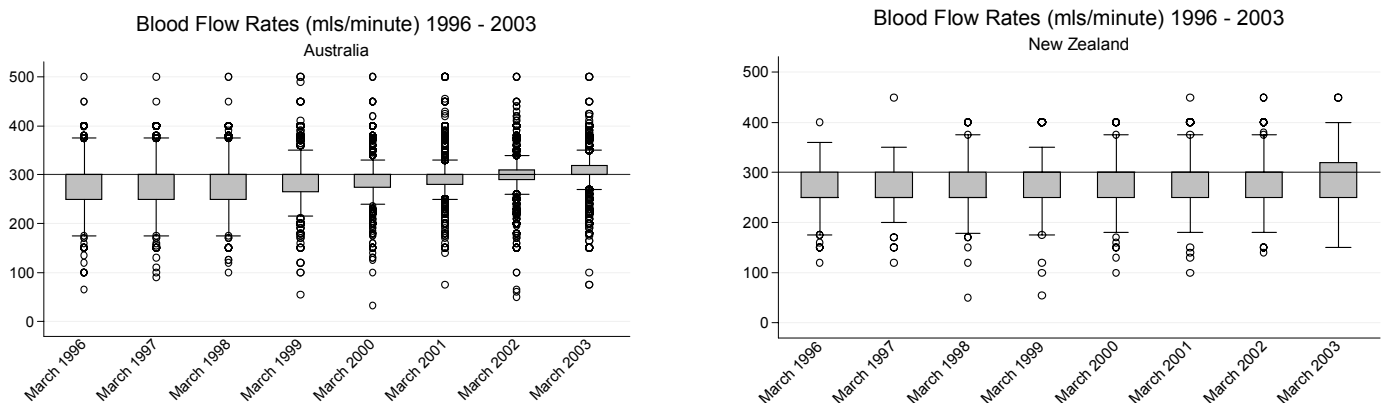
### NEW ZEALAND

In March 2003, 67% of patients were using 300 mls/minute or higher compared to 55% in 2002 and 21% in 1997. There were 11% still using <250 mls/minute, many of these receiving long session duration dialysis.

**Figure 5.11**

### Blood Flow Rates (mls/minute) 1996 - 2003

Country	No. Pts	Mls/Minute						
		<200	200-249	250-299	300-349	350-399	>400	
Aust.	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%
	March 1999	4029	1%	10%	29%	51%	8%	1%
	March 1998	3590	1%	10%	33%	49%	6%	1%
	March 1997	3342	<1%	15%	37%	43%	4%	<1%
	March 1996	3041	<1%	18%	45%	33%	3%	<1%
N.Z.	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%
	March 1999	501	1%	25%	40%	26%	8%	0%
	March 1998	441	1%	25%	44%	28%	2%	0%
	March 1997	390	1%	30%	47%	21%	<1%	0%
	March 1996	352	1%	42%	51%	5%	<1%	0%

**Figure 5.12**




## FREQUENCY AND HOURS OF DIALYSIS

### AUSTRALIA

Figures 5.13-5.16.

Of the 5,502 patients, there were still 73 receiving dialysis twice a week (1%); almost all patients (94%) dialysed three times per week. There has not yet been a significant trend to daily dialysis.

Of the patients dialysing three times per week 30% were dialysing for five hours or longer (29% 2001); only 7% (7% 2001) received less than four hours. Forty five percent of patients dialysed for 4-4.4 hours.

The median weekly dialysis treatment period of all haemodialysis patients was 12 hours; range 2-60 hours.

**Figure 5.13**

**Duration and Number of Treatments Per Week 31-Mar-2003**

Sessions per week	Hours of Each Treatment										Total
	<2.5	2.5-2.9	3-3.4	3.5-3.9	4-4.4	4.5-4.9	5-5.4	5.5-5.9	6-6.4	> 6.5	
<b>Australia</b>											
1	0	1	1	0	2	0	0	0	1	0	5
2	2	1	15	3	37	5	9	1	0	0	73
3	7	5	133	240	2335	897	1325	113	83	26	5164
3.5	0	0	1	0	26	13	22	1	8	30	101
4	0	2	10	7	31	15	10	5	2	1	83
5	1	4	15	2	3	0	1	0	0	2	28
6	7	15	5	0	1	0	1	0	0	16	45
7	0	1	2	0	0	0	0	0	0	0	3
<b>Total</b>	<b>17</b>	<b>29</b>	<b>182</b>	<b>252</b>	<b>2435</b>	<b>930</b>	<b>1368</b>	<b>120</b>	<b>94</b>	<b>75</b>	<b>5502</b>
<b>New Zealand</b>											
1	0	0	0	0	2	0	0	0	0	0	2
2	0	0	1	0	7	0	5	0	0	0	13
3	0	0	15	11	304	144	236	28	29	27	794
3.5	0	0	0	0	1	0	2	0	1	0	4
4	0	0	1	0	1	2	5	0	1	0	10
5	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	3	0	0	0	0	0	0	3
<b>Total</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>11</b>	<b>315</b>	<b>146</b>	<b>248</b>	<b>28</b>	<b>31</b>	<b>27</b>	<b>826</b>

**Figure 5.14**

**Duration of Haemodialysis Per Week 31-Mar-2003**

Country	No. Pts	Hours of Haemodialysis Per Week							
		<9	9-11	12-14	15-17	18-20	21-23	24-26	>27
<b>Aust.</b>	5310	1%	7%	60%	28%	2%	<1%	<1%	<1%
<b>N.Z.</b>	820	1%	4%	55%	33%	4%	1%	1%	<1%

Excludes patients on haemofiltration and haemodiafiltration  
Frequency between 2 and 4 sessions weekly



**Figure 5.15**

Number of Sessions Per Week (At 31-Mar ) 1998 - 2003						
Sessions per week	1998	1999	2000	2001	2002	2003
<b>Australia</b>						
1	<1%	<1%	<1%	<1%	<1%	<1%
2	2%	2%	2%	2%	1%	1%
3	97%	97%	96%	95%	94%	94%
3.5	<1%	<1%	<1%	1%	2%	2%
4	<1%	<1%	1%	2%	2%	2%
5	<1%	<1%	<1%	<1%	<1%	<1%
6	0%	<1%	<1%	<1%	<1%	<1%
7	0%	0%	0%	<1%	<1%	<1%
<b>Total</b>	<b>3590</b>	<b>4029</b>	<b>4374</b>	<b>4717</b>	<b>5128</b>	<b>5502</b>
<b>New Zealand</b>						
1	<1%	0%	<1%	<1%	0%	<1%
2	3%	2%	2%	2%	2%	2%
3	95%	97%	97%	97%	96%	96%
3.5	0%	0%	0%	<1%	<1%	<1%
4	2%	1%	1%	<1%	1%	1%
5	0%	0%	0%	0%	<1%	0%
6	0%	0%	0%	0%	<1%	<1%
<b>Total</b>	<b>441</b>	<b>501</b>	<b>575</b>	<b>679</b>	<b>761</b>	<b>826</b>

**NEW ZEALAND**

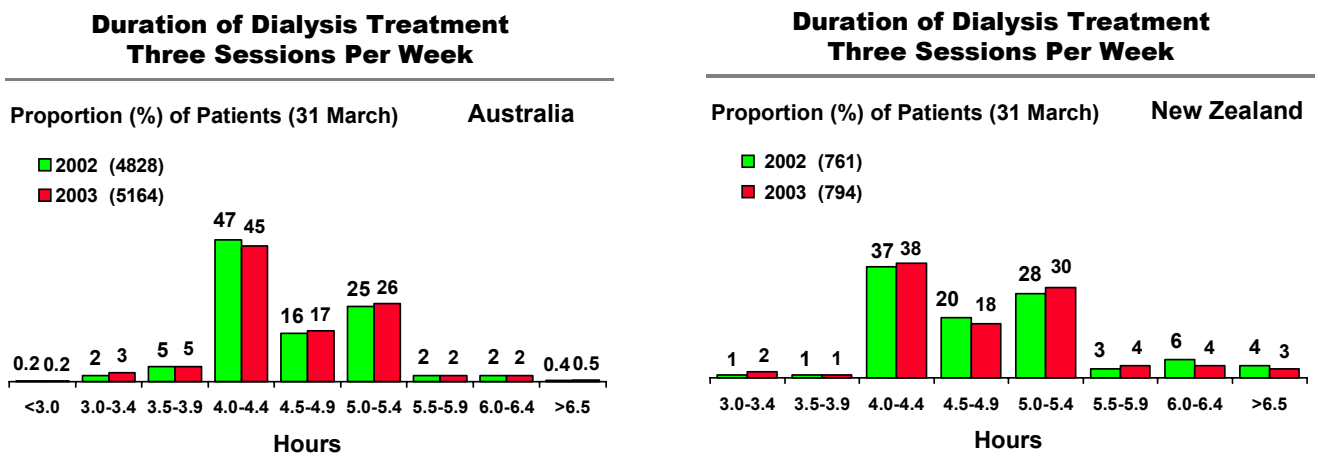
Figures 5.13-5.16.

There were 794 patients (96%) dialysing three times per week.

The majority (86%) dialysed between four and less than five and a half hours, three times a week. Only 26 patients (3%) dialysed for less than four hours. The remainder dialysed for five and a half or more hours, three times a week.

Median weekly treatment for all haemodialysis patients was 13 hours, range 4-30 hours per week.

**Figure 5.16**





## MEMBRANE TYPE AND SURFACE AREAS

### AUSTRALIA

Figures 5.17-5.18.

Usage of low flux polysulfone dialysers decreased to 36% (42% in March 2002), while use of high flux polysulphone increased to 18% (13% in March 2002).

Twenty seven percent of patients received dialysis with high flux dialysers (24% in March 2002) and 2% of patients received mid flux dialysis. Use of haemophan decreased from 22% in 2002 to 13% in March 2003.

The trend to larger surface area dialysers continues.

### NEW ZEALAND

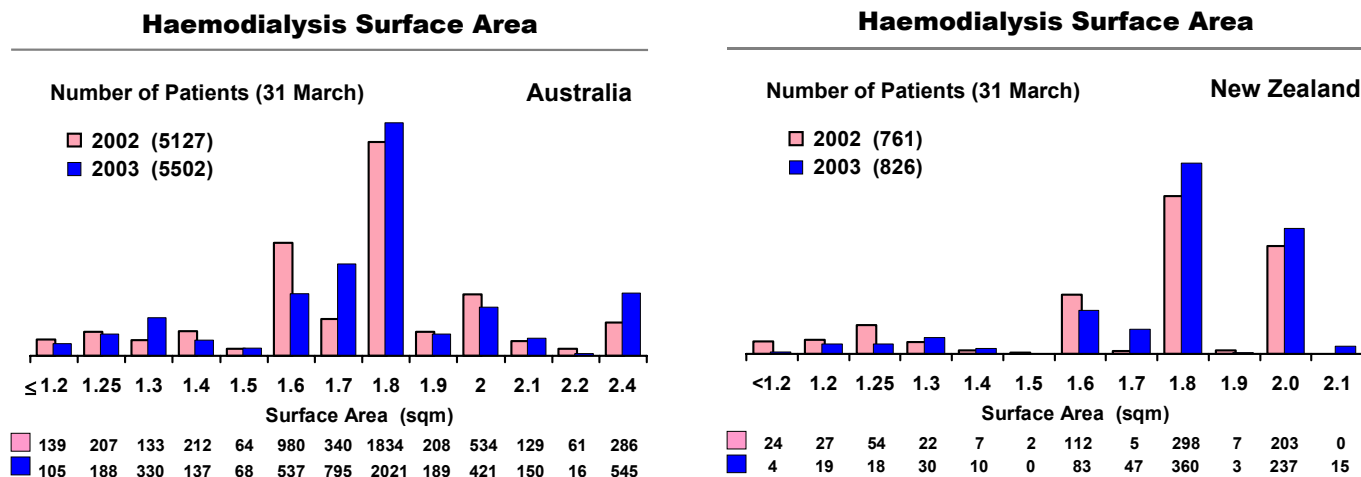
Figures 5.17-5.18.

Haemophan increased from 34% in March 2002 to 37% in March 2003, while low flux polysulphone decreased to 46% from 52% in March 2002. Only 7% (61 patients) were reported as receiving high flux dialysis.

Figure 5.17

Dialyser Membrane Type		Flux	Square Metres					Total
			<1.0	1.0-1.4	1.5-1.7	1.8-1.9	>1.9	
<b>Australia</b>								
Cellulose Acetate	Low	0	23	14	1	7	45 (<1%)	
Cellulose Triacetate	High	0	0	6	186	3	195 (4%)	
Cellulose Triacetate	Low	0	1	2	0	0	3 (<1%)	
Cuprophane	Low	0	2	37	0	0	39 (<1%)	
Cuprophane	Mid	0	0	1	4	15	20 (<1%)	
Diacetate	Low	0	20	0	0	1	21 (<1%)	
Exebrane	High	0	0	20	91	9	120 (2%)	
Exebrane	Mid	0	0	11	63	0	74 (1%)	
Haemophan	Low	3	32	257	26	412	730 (13%)	
Polyacrylonitrile	High	0	0	0	1	0	1 (<1%)	
Polyamide Haemodiafiltration	High	0	61	57	0	52	170 (3%)	
Polyamix	Low	0	208	561	0	0	769 (14%)	
Polycarbonate/Poly/Copolymer	Low	0	1	0	2	0	3 (<1%)	
Polyethersulfone	High	0	0	21	0	0	21 (<1%)	
Polysulphone	High	1	125	0	710	155	991 (18%)	
Polysulphone	Low	19	186	247	1114	390	1956 (36%)	
Polysulphone-Helixone	High	0	0	0	12	0	12 (<1%)	
Polysynthane	Low	0	78	166	0	88	332 (6%)	
<b>Total</b>		<b>23</b>	<b>737</b>	<b>1400</b>	<b>2210</b>	<b>1132</b>	<b>5502 (100%)</b>	
<b>New Zealand</b>								
Cellulose Acetate	Low	0	0	1	0	0	1 (<1%)	
Cuprophane	Low	0	1	7	0	0	8 (1%)	
Haemophan	Low	0	8	58	4	237	307 (37%)	
Polyamide Hemodiafiltration	High	0	8	10	0	15	33 (4%)	
Polyamix	Low	0	26	36	0	0	62 (8%)	
Polycarbonate/Poly/Copolymer	Low	0	1	0	3	0	4 (<1%)	
Polysulphone	High	0	16	0	12	0	28 (3%)	
Polysulphone	Low	3	18	18	344	0	383 (46%)	
<b>Total</b>		<b>3</b>	<b>78</b>	<b>130</b>	<b>363</b>	<b>252</b>	<b>826 (100%)</b>	

Figure 5.18



Very few patients in Australia now have a Hb level <90 gm/l; whereas in New Zealand, more restrictive legislation means that 21% of patients still have a Hb level <90 gm/L. Despite national guidelines, 16% of patients have Hb levels >130 gm/l.

**Figure 5.19**

**Patients Having EPO  
Haemoglobin and Ferritin Levels  
Alive on Dialysis at 31-Mar-2003**

Haemoglobin	Ferritin Levels					Total
	00-49	50-99	100-199	200-499	500-on	
<b>Australia</b>						
<89	12 (5%)	13 (4%)	40 (6%)	99 (4%)	153 (6%)	<b>317 (5%)</b>
90-109	72 (28%)	101 (27%)	204 (29%)	662 (28%)	732 (29%)	<b>1771 (29%)</b>
110-129	112 (44%)	179 (49%)	325 (45%)	1150 (49%)	1218 (49%)	<b>2984 (48%)</b>
130-149	54 (21%)	67 (18%)	137 (19%)	409 (17%)	361 (15%)	<b>1028 (17%)</b>
> 150	6 (2%)	9 (2%)	9 (1%)	33 (2%)	21 (1%)	<b>78 (1%)</b>
<b>Total</b>	<b>256 (100%)</b>	<b>369 (100%)</b>	<b>715 (100%)</b>	<b>2353 (100%)</b>	<b>2485 (100%)</b>	<b>6178 (100%)</b>
<b>New Zealand</b>						
<89	5 (10%)	12 (16%)	29 (23%)	68 (19%)	72 (25%)	<b>186 (21%)</b>
90-109	20 (40%)	26 (36%)	48 (38%)	170 (47%)	118 (41%)	<b>382 (42%)</b>
110-129	20 (40%)	28 (38%)	41 (32%)	112 (31%)	80 (28%)	<b>281 (31%)</b>
130-149	5 (10%)	7 (10%)	7 (5%)	13 (3%)	16 (6%)	<b>48 (5%)</b>
> 150	0 (0%)	0 (0%)	3 (2%)	2 (<1%)	0 (0%)	<b>5 (1%)</b>
<b>Total</b>	<b>50 (100%)</b>	<b>73 (100%)</b>	<b>128 (100%)</b>	<b>365 (100%)</b>	<b>286 (100%)</b>	<b>902 (100%)</b>

**Figure 5.19a**

**Patients Having EPO  
Haemoglobin and Transferrin Levels  
Alive on Dialysis at 31-Mar-2003**

Haemoglobin	Transferrin Levels				Total
	00-19	20-24	25-29	30-on	
<b>Australia</b>					
<89	123 (8%)	58 (5%)	34 (3%)	97 (4%)	<b>312 (5%)</b>
90-109	537 (36%)	352 (30%)	274 (26%)	569 (26%)	<b>1732 (29%)</b>
110-129	639 (42%)	573 (49%)	529 (50%)	1129 (51%)	<b>2870 (48%)</b>
130-149	196 (13%)	166 (14%)	196 (19%)	409 (18%)	<b>967 (16%)</b>
> 150	16 (1%)	12 (1%)	18 (2%)	26 (1%)	<b>72 (1%)</b>
<b>Total</b>	<b>1511 (100%)</b>	<b>1161 (100%)</b>	<b>1051 (100%)</b>	<b>2230 (100%)</b>	<b>5953 (100%)</b>
<b>New Zealand</b>					
<89	50 (26%)	31 (24%)	18 (14%)	39 (14%)	<b>138 (19%)</b>
90-109	77 (41%)	47 (37%)	58 (44%)	112 (42%)	<b>294 (41%)</b>
110-129	51 (27%)	40 (31%)	43 (33%)	103 (38%)	<b>237 (33%)</b>
130-149	10 (5%)	10 (8%)	10 (8%)	14 (5%)	<b>44 (6%)</b>
> 150	1 (1%)	0 (0%)	3 (2%)	1 (0%)	<b>5 (1%)</b>
<b>Total</b>	<b>189 (100%)</b>	<b>128 (100%)</b>	<b>132 (100%)</b>	<b>269 (100%)</b>	<b>718 (100%)</b>



### UREA REDUCTION RATIO AND PATIENT SURVIVAL

Frequency of dialysis three times per week.  
 Overall, data has not been reported on 12% of Australian patients  
 and 25% of New Zealand patients at 31st March 2003.

**Figure 5.20**

**Urea Reduction Ratio (URR) of Patients Alive on Haemodialysis  
 At 30-Sep-2001 and 31-Mar-2003**

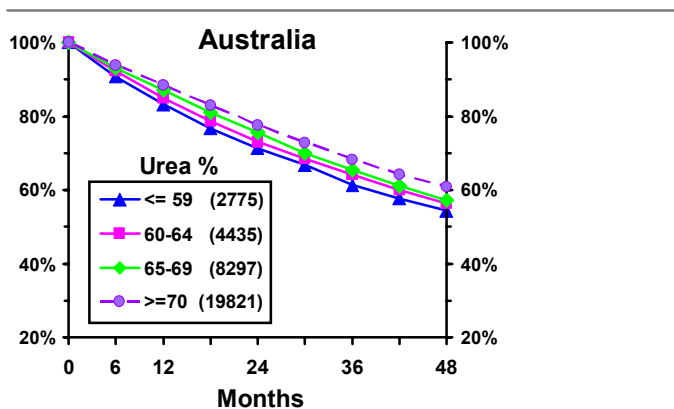
Reported URR	Australia				New Zealand			
	30-Sep-01	31-Mar-02	30-Sep-02	31-Mar-03	30-Sep-01	31-Mar-02	30-Sep-02	31-Mar-03
00-39%	<1%	<1%	<1%	<1%	0%	0%	0%	<1%
40-49%	1%	1%	<1%	1%	2%	2%	2%	2%
50-59%	6%	5%	4%	4%	16%	18%	18%	15%
60-64%	12%	10%	8%	8%	17%	14%	17%	19%
65-69%	23%	20%	20%	20%	25%	24%	25%	24%
70-74%	26%	28%	27%	27%	18%	20%	18%	19%
75-79%	20%	22%	22%	23%	13%	12%	11%	12%
80-100%	14%	15%	18%	17%	9%	9%	9%	9%
<b>Total Pts</b>	<b>3880</b>	<b>4200</b>	<b>4313</b>	<b>4522</b>	<b>516</b>	<b>534</b>	<b>589</b>	<b>596</b>
<b>Median</b>	<b>71</b>	<b>72</b>	<b>73</b>	<b>73</b>	<b>68</b>	<b>68</b>	<b>67</b>	<b>68</b>
<b>25th Percentile</b>	<b>66</b>	<b>67</b>	<b>68</b>	<b>68</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>
<b>75th Percentile</b>	<b>76</b>	<b>77</b>	<b>78</b>	<b>77</b>	<b>73</b>	<b>74</b>	<b>73</b>	<b>73</b>

**Figure 5.21**

Figures 5.2 and 5.3 demonstrate increasing survival with increased URR values for patients dialysing three times per week

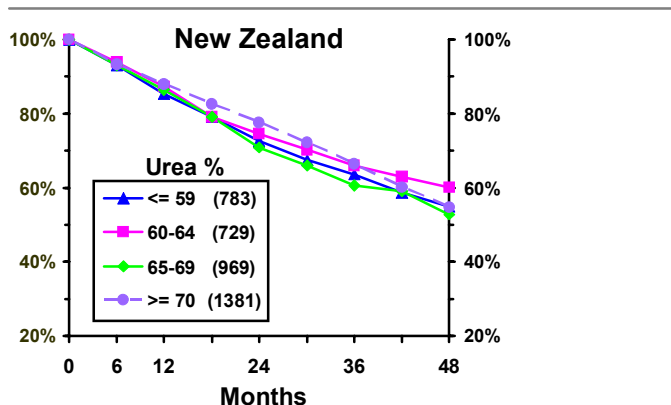
Note: for this analysis, each patient may be counted multiple times according to the number of survey periods they span.

**Urea Reduction Ratio and Patient Survival  
 Dialysis Three Times per Week  
 March 1998 - March 2003**

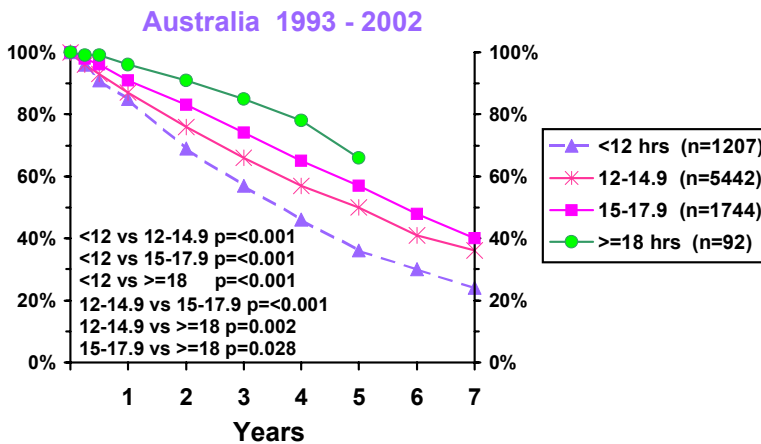


**Figure 5.22**

**Urea Reduction Ratio and Patient Survival  
 Dialysis Three Times per Week  
 March 1998 - March 2003**



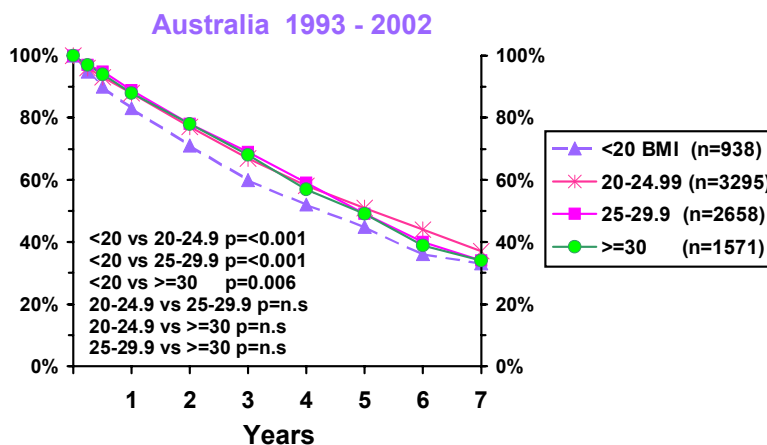
**Haemodialysis Patient Survival  
Related to Hours per Week - Age  $\geq 18$  Years  
Treatment at 90 days**



**Figure 5.23**

This figure demonstrates a clear survival advantage for increased hours of dialysis per week. The line for  $>18$  hours should be interpreted with caution given the small number of patients included.

**Haemodialysis Patient Survival  
Related to B.M.I - Age  $\geq 18$  Years  
Treatment at 90 days**

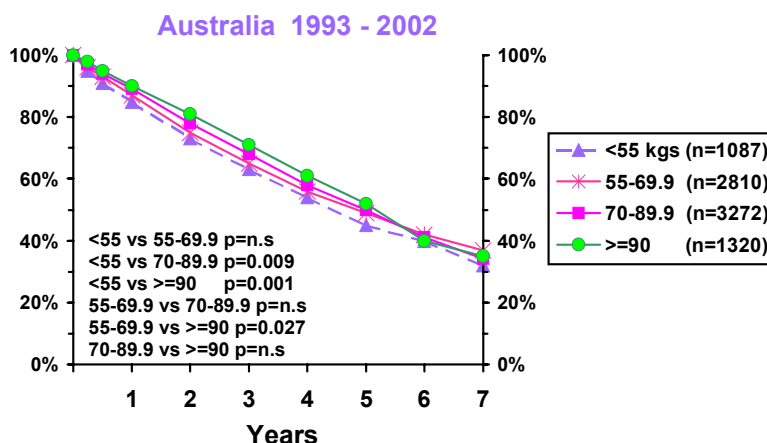


**Figure 5.24**

Unlike the results for peritoneal dialysis patients, there is no survival advantage for higher BMI's in the haemodialysis group. There is a survival disadvantage for the underweight patients, presumably related to malnutrition.

Figures 5.24 and 5.25 show survival of patients who received haemodialysis at 90 days by their BMI at commencement of dialysis.

**Haemodialysis Patient Survival  
Related to Weight - Age  $\geq 18$  Years  
Treatment at 90 days**



**Figure 5.25**

Once again, small body weights are associated with increased mortality. This could relate to age, race, or comorbidities as well as malnutrition and needs further exploration.

US data suggests a survival advantage for larger persons, but is not borne out in this univariate examination of Australian data.



Figure 5.26

Percentage Synthetic Fistulae/Grafts March 2003 Number of Patients (% Patients)			
	No. of Pts.	Diabetic	Non Diabetic
Queensland	895	204 (15.7%)	691 (12.7%)
New South Wales	1744	276 (28.2%)	1468 (26.0%)
Aust. Capital Territory	116	14 (28.8%)	102 (50.9%)
Victoria	1521	277 (8.3%)	1244 (11.7%)
Tasmania	123	29 (6.9%)	94 (9.6%)
South Australia	367	61 (9.8%)	306 (9.8%)
Northern Territory	193	85 (5.9%)	108 (2.8%)
Western Australia	543	146 (9.6%)	397 (12.6%)
<b>Australia</b>	<b>5502</b>	<b>1092 (15.0%)</b>	<b>4410 (17.2%)</b>
<i>March 2002</i>	<i>5128</i>	<i>942 (16.2%)</i>	<i>4186 (17.5%)</i>
<b>New Zealand</b>	<b>826</b>	<b>277 (13.7%)</b>	<b>549 (13.1%)</b>
<i>March 2002</i>	<i>761</i>	<i>240 (17.5%)</i>	<i>521 (16.1%)</i>

Figure 5.27

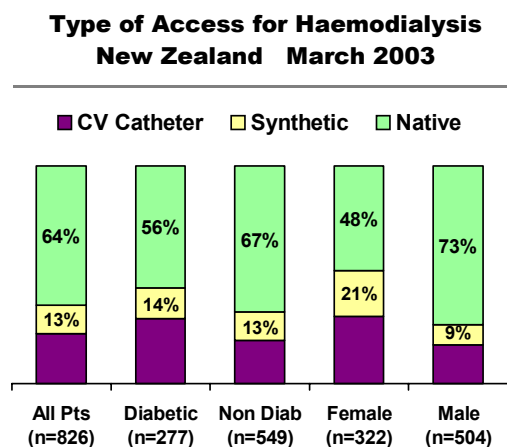
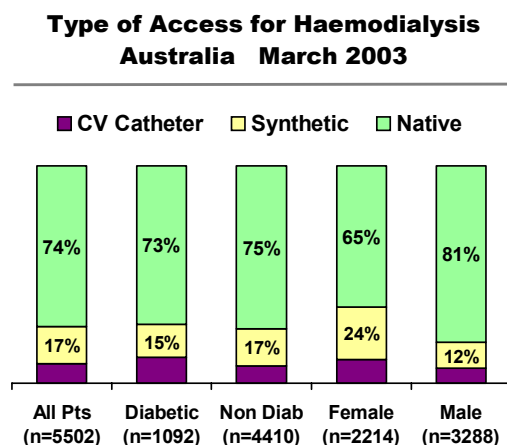


Figure 5.28

Percentage of Non Native Access March 2003 n = Number of Patients				
	Australia (n=5502)		New Zealand (n=826)	
	Grafts	Catheters	Grafts	Catheters
Total HD Population	16.8%	8.9%	13.3%	23.1%
Diabetics	15.0%	11.7%	13.7%	30.3%
Female	23.8%	11.2%	20.8%	30.7%

As expected there is some variation in the prevalence of native haemodialysis access, with lower proportions among people with diabetes and females (figs 5.27 and 5.28).

Figure 5.29

Access Intervention in Previous Six Months March 2003 n = Number of Patients							
	n	Revision of Access			Declotting of Access		
		Native	Grafts	Catheters	Native	Grafts	Catheters
<b>Australia</b>	<b>n=5502</b>	<b>8.2%</b>	<b>24.8%</b>	<b>18.8%</b>	<b>3.4%</b>	<b>16.3%</b>	<b>16.4%</b>
Diabetics	n=1092	9.8%	24.4%	18.8%	3.5%	17.7%	14.8%
Female	n=2214	8.9%	25.0%	17.7%	3.9%	15.9%	12.9%
<b>New Zealand</b>	<b>n=826</b>	<b>6.1%</b>	<b>20.0%</b>	<b>1.6%</b>	<b>3.2%</b>	<b>14.5%</b>	<b>6.3%</b>