

Chapter 4 All patients receiving Renal Replacement Therapy in 1997

4:1 Introduction

At the end of 1997 the Renal Registry had details of 5111 patients receiving renal replacement therapy in 9 renal units. Of these patients 216 were within the first 90 days of treatment. Figures quoted in this chapter are the status on 31st December 1997 unless specified otherwise.

Many patients present in imminent need of renal replacement therapy without having been prepared for dialysis. As a result, temporary treatments are often given initially, the most common being haemodialysis via a central venous catheter. This early period does not reflect the overall treatment policy and pattern of the renal units. When considering the modalities of therapy, only patients who have been established on renal replacement therapy for 90 days have been considered.

The relative proportions of patients receiving dialysis therapy and transplant follow-up are shown for the whole registry, but not for individual renal units. Some centres do not transplant locally, but refer their patients to other centres. The practice as to when these patients are transferred back to the parent centre for follow-up varies widely from 4 weeks post transplant to an indefinite period. Thus transplanting renal units may appear to have a greater proportion of their renal failure patients transplanted. In addition the transplant units have an apparent relatively young population on renal replacement therapy, as transplant patients have a lower median age than dialysis patients. Therefore, for comparisons between renal units only dialysis patients will be considered. When the Registry has wider and more contiguous coverage of the UK, the data will be analysed by postcode and region, allowing study of access to transplantation.

4:2 Age and sex distribution

The median age of the patients currently alive (the "stock") recorded at the Registry is 53. The median age calculated at their start of ESRF treatment was 45.

The age distributions of the whole population and of individual modalities of treatment are illustrated in figure 4.1

24% of the stock were age 65 or more and 15% were 70 or more, similar to the 14% aged over 70 of the 1995 Renal Survey. This is much lower than the figures for new patients with 43% aged over 65 and 29% over 70.

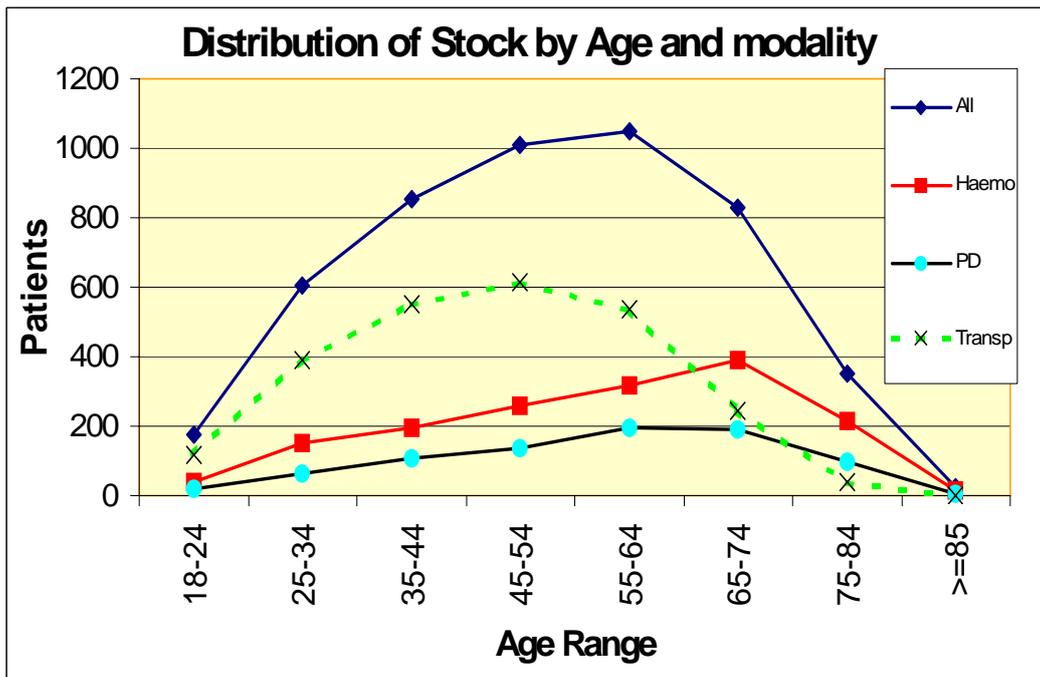


Figure 4.1 Age distribution of patient stock by modality of treatment

The median age of transplanted patients was 48 years with a range between renal units from 45 to 51. The median age of both peritoneal dialysis and haemodialysis patients was 59 years, but there was a great variation between renal units. Four units appear to have younger patients on HD and 5 units had younger patients on PD. These variations are illustrated in figures 4.2 and 4.3.

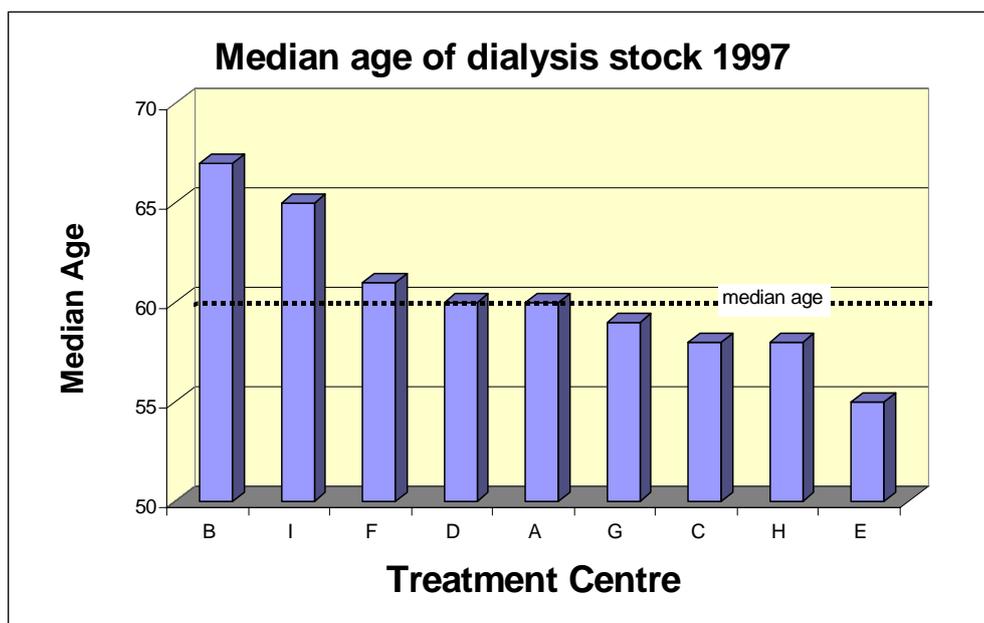


Figure 4.2 Median age of dialysis patients in rank order,

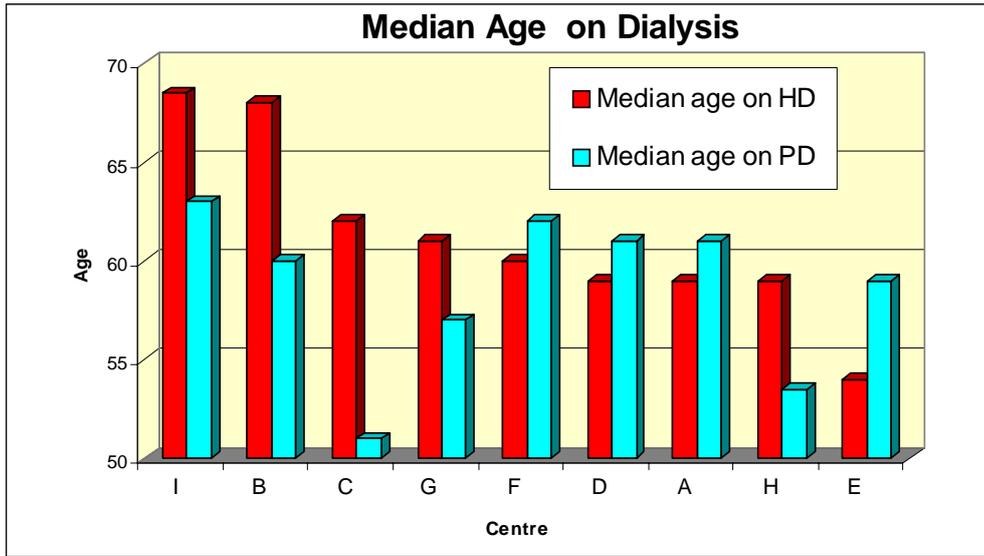


Figure 4.3 Median age by unit for PD and HD.

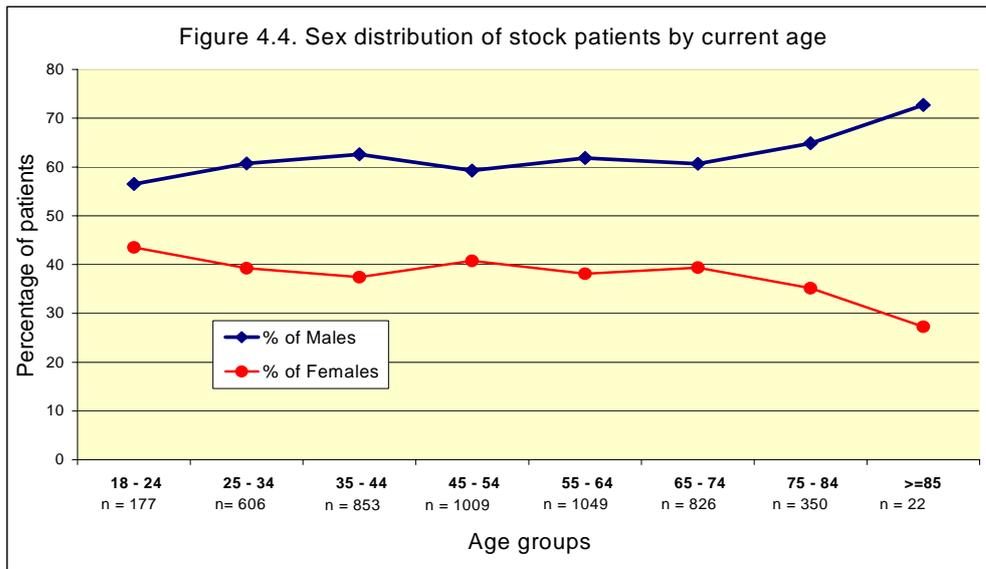


Figure 4.4 Age and sex distribution

The age distribution by sex is illustrated in figure 4.4.

The overall male: female ratio for the stock is 1.6:1. This appears to increase above the age of 74.

4.3 Primary renal diagnosis

The primary renal diagnosis of the stock of patients on 31/12/97 is shown in table 4.1. The differential sex distribution by diagnosis is illustrated in figure 4.5.

Diagnosis	All pats*	Age <65	Age ≥ 65	M:F
Aetiology uncertain	19.2	17.1	30.6	1.6
Glomer. not proven	5.4	5.9	2.5	1.8
Glomerulonephritis	15.4	16.9	7.9	2.4
Pyelonephritis	16.9	17.2	15.4	1.1
Diabetes	8.9	8.9	9.1	1.8
Renal Vascular disease	2.8	1.5	9.3	1.8
Hypertension	6.0	6.1	5.4	2.7
Polycystic Kidney	9.5	10.4	6.0	1.1
Not Sent	0.9	0.5	1.7	2.4
Other	15.1	15.5	12.1	1.4
All Patients				1.6
All Patients Total	4895	3996	771	

- The total for 'all patients' includes those whose start date of ESRF treatment is unknown.

Table 4.1 Percentage diagnoses of stock, and by age at start of RRT

Figure 4.5. Sex distribution of stock by diagnosis

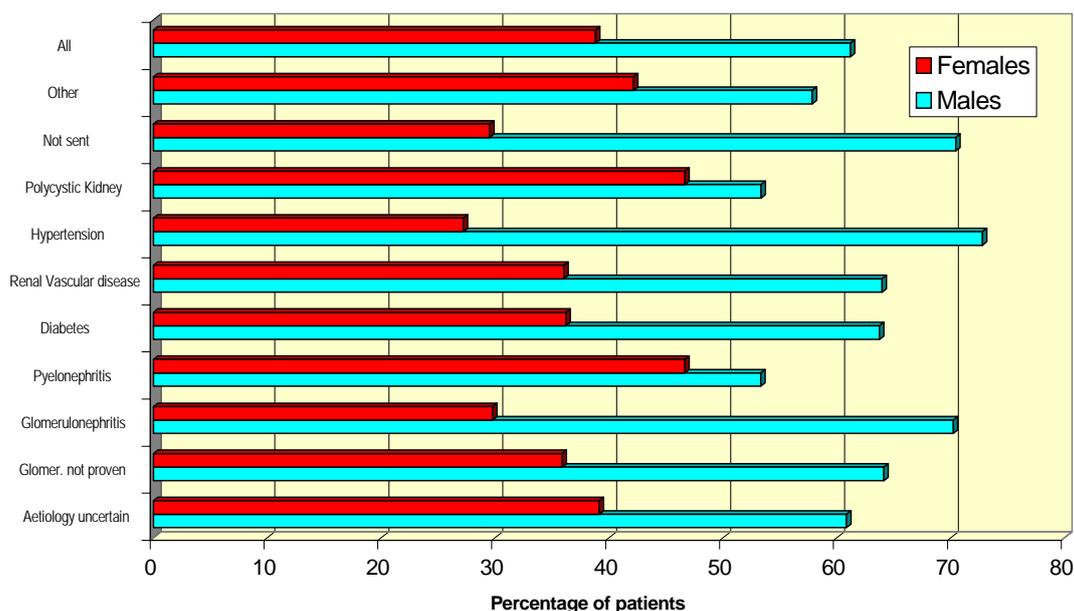


Figure 4.5 Sex distribution by diagnosis

Only 9% of the stock are diabetic compared with 17% of those starting renal replacement therapy in 1997. The inter-unit variation was from 7% to 11%. The relatively lower proportion of diabetics in the stock compared with new patients, reflects a combination of the poorer prognosis for diabetic patients, and historical attitude of a lower acceptance rate of diabetic patients.

The median age of the diabetic stock was 49 years for type I diabetics and 65 for type II diabetics. The median age at which these diabetic patients started renal replacement

therapy was 43 and 62 respectively. The median length of time on treatment for diabetics was 3.3 years for type I and 2.3 years for type II, this short length of time for type II reflects both the recent increase in acceptance of type II diabetics and their older age group with increased mortality.

4:4 Modalities of treatment

The treatment modalities of the stock of patients are illustrated in figure 4.6.

Satellite centres have been defined as dialysis centres physically separate from the main centre, where the main centre still has responsibility for the patients and usually there is no medical on-site cover during the dialysis. Some centres are linked to 4 or 5 satellite units. These facilities may be shared with adjoining regional renal units.

Automated Peritoneal Dialysis (APD) is defined as use of a cycling peritoneal dialysis machine on 6 or 7 nights per week, with or without the use of CAPD during the day. Less frequent cycling is considered as Intermittent Peritoneal Dialysis (IPD).

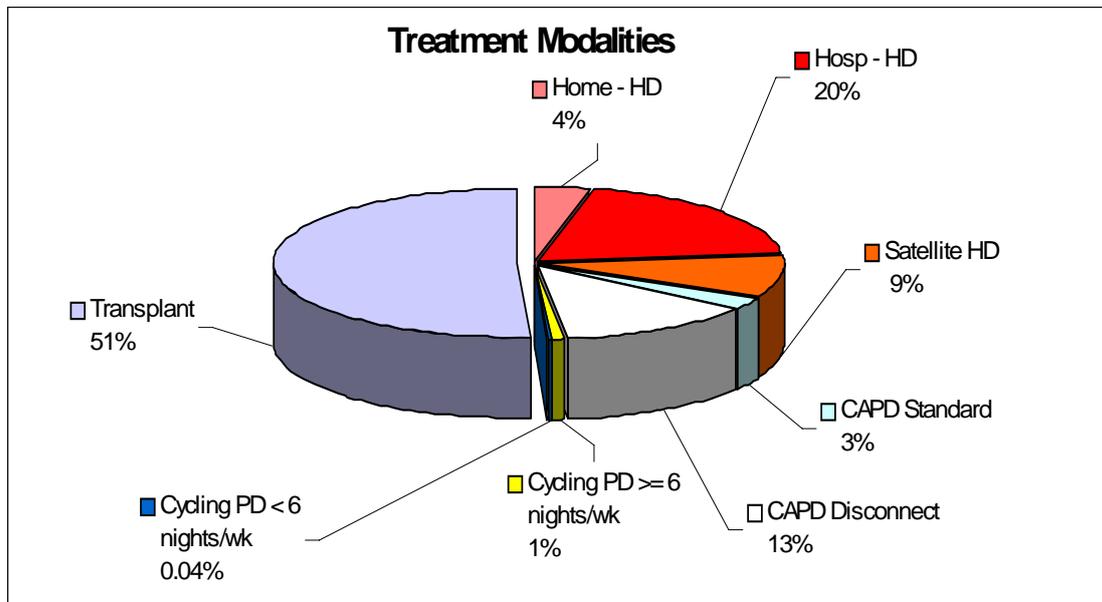


Figure 4.6 Treatment of modalities of stock patients

	All	HD		PD		Transplant	
	No.	%	No.	%	No.	%	No.
All Patients	4895	32	(1586)	17	(815)	51	(2494)
Age < 65	3696	26	(963)	14	(523)	60	(2210)
Age > 65	1199	52	(623)	24	(292)	24	(284)
All Diabetes *	436	38	(166)	28	(120)	34	(150)
Type I diabetes *	304	31	(95)	27	(82)	42	(127)
Type II diabetes *	132	54	(71)	29	(38)	17	(23)
Non – diabetics *	4415	32	(1403)	15	(680)	53	(2332)
Male	2996	33	(986)	16	(481)	51	(1526)
Female	1899	31	(598)	18	(334)	51	(967)

* excludes patients where no diagnosis sent

Table 4.2 Treatment modalities of stock patients

Details of treatment modalities are given in table 4.2. There was no difference between the sexes in the modality distribution. A chi-squared test showed that patients aged 65 and over receive significantly different treatments from younger patients ($X^2 = 475.8$, d.f.=2, $p<0.001$). This is entirely due to the low transplant rate in the elderly.

The overall ratio of haemodialysis to all forms of peritoneal dialysis was 1.9:1. There was wide variation between the units from 1.0 to 3.7 as illustrated in figure 4.7. The ratio does not appear to differ with age.

Using a chi-squared test, diabetics had a significantly different distribution of modality from the non-diabetic population ($X^2=66.5$, d.f = 2, $p<0.001$). Looking in more detail, type II diabetics are similar to the older population from which they are largely drawn, but type I diabetics differ from the under 65 non-diabetic population: they are much less likely to have a transplant (42% vs 62%), and if on dialysis are more likely to be on peritoneal dialysis (46% vs 33%).

Figure 4.7 The percentage of dialysis patients on haemodialysis

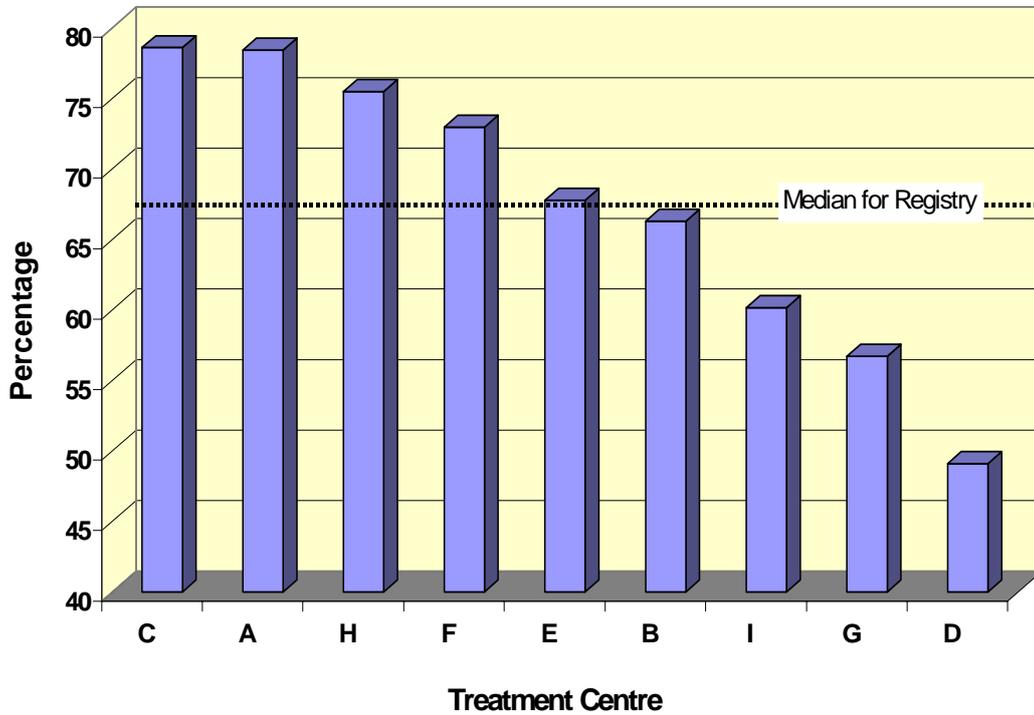


Figure 4.7 Percentage of dialysis patients on haemodialysis by Centre

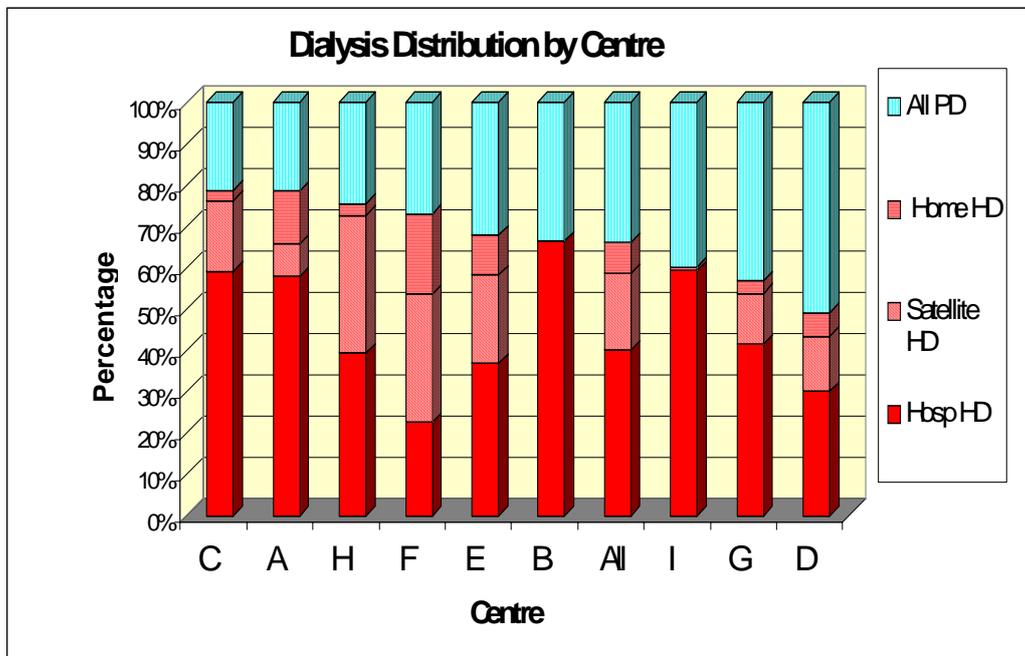


Figure 4.8 Dialysis modalities by centre ordered by total percentage on haemodialysis

The overall distribution of dialysis modalities and the variation between renal units is illustrated in figure 4.8. Further details are given in table 4.3

	All No.	Haemodialysis						Peritoneal dialysis							
		Hosp		Satellite		Home		Disconnect		Standard		APD		IPD	
		%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Age < 65	1486	36	(542)	17	(252)	11	(169)	28	(414)	5	(70)	3	(39)	0	(0)
Age ≥ 65	915	46	(421)	21	(190)	1	(12)	24	(218)	7	(61)	1	(11)	0	(2)
All Diabetes *	286	41	(118)	16	(46)	1	(2)	35	(101)	4	(11)	3	(8)	0	(0)
Type I diabetes*	177	41	(72)	13	(23)	0	(0)	40	(70)	4	(7)	3	(5)	0	(0)
Type II diabetes*	109	42	(46)	21	(23)	2	(2)	28	(31)	4	(4)	3	(3)	0	(0)
Non – diabetics*	2083	40	(829)	19	(395)	9	(179)	25	(520)	6	(120)	2	(38)	0	(2)
Male	1467	40	(583)	18	(268)	9	(135)	25	(369)	5	(80)	2	(31)	0	(1)
Female	932	41	(379)	19	(173)	5	(46)	28	(263)	5	(51)	2	(19)	0	(1)
All Patients	2401	40	(963)	18	(442)	8	(181)	26	(632)	5	(131)	2	(50)	0	(2)

* excludes patients where no diagnosis sent

Table 4.3 Details of dialysis modalities of the stock of patients

4:4.2 Transplantation

51% of all ESRF patients had a functioning renal transplant, 60% of those were aged under 65. In England in 1993 the total figure was 53%, and in 1995 it was 52%. The percentage alive with a functioning graft does not simply reflect transplant activity. The figure reflects the combination of :- past transplant activity, graft survival, patient survival, and rate of take on of new patients for renal replacement therapy. Thus, in 1994 the US had only 27% of its stock with a functioning graft, but had a much higher transplant rate of 44 per million population per year compared with the UK rate of 30 per million population per year. The low proportion of functioning grafts in the US is due to the very high acceptance rate of new patients at 253 per million population per year compared with 82 per million population per year in England in 1995, and 109 per million population per year in Wales. If the acceptance rate for renal replacement therapy in the UK continues to rise without a concomitant increase in the supply of donor organs a continuing reduction in the proportion of the stock transplanted is to be expected.

Two hundred and sixty five patients under follow up in participating units were transplanted in 1997. Details are given in tables 4.4 and 4.5. The median age was 49, compared with 59 for the dialysis population from which they were drawn. They did not differ by sex or primary diagnosis from the general stock.

No. transplanted	Median age	No. of men	% men
265	49	171	65

Table 4.4 Patients Transplanted during 1997

Only those on treatment for ESRF within participating units are included in the above figures. Patients transferring in from non-registry units specifically for transplantation

are excluded. Patients from registry units transferring to non-registry transplant units for transplantation are included.

Diagnosis	Number	Percentage
Aetiology uncertain	49	19.4
Glomer. not proven	9	3.6
Glomerulonephritis	38	15.1
Pyelonephritis	37	14.7
Diabetes	21	8.3
Renal Vascular disease	4	1.6
Hypertension	15	6
Polycystic Kidney	33	13.1
Not sent	2	0.8
Other	44	17.5

Table 4.5 Diagnoses of stock patients transplanted in 1997.

4:4.3 Haemodialysis

The median age of home haemodialysis patients was considerably younger than both other HD groups at 48. The median age of 62 for all satellite patients, was similar to hospital dialysis patients at 61. Not all centres had satellite dialysis facilities. For Centres with these facilities, comparing the median age of hospital and satellite patients, 4 centres had older patients on satellite dialysis and 2 centres had younger patients on satellite dialysis.

The use of home dialysis in the renal units ranged from 0 to 27% of all HD patients, with 11% of all HD patients on home treatment. In the 1995 Renal Review home dialysis accounted for 13% of HD patients, having fallen from 20% in 1993 . 14% of men on haemodialysis, were at home compared with 8% of women.

4:4.4 Peritoneal dialysis

The Renal Association standards document recommends *the use of disconnect systems should be standard unless contraindicated. Automated peritoneal dialysis should be available as clinically indicated and not constrained by financial considerations.*

Of all PD patients, 78% were on a disconnect system (Figure 4.10) This is the same as the figure for England in the 1995 Renal Review. The types of PD used varied widely between centres. One centre uses no disconnect PD, while 4 centres no longer use CAPD standard. The use of automated cycling PD (APD) was 6% for all centres, but ranges between centres from 0 to 19% . Units report that financial restrictions and not clinically determined decisions limit the use of disconnect and cycling systems.

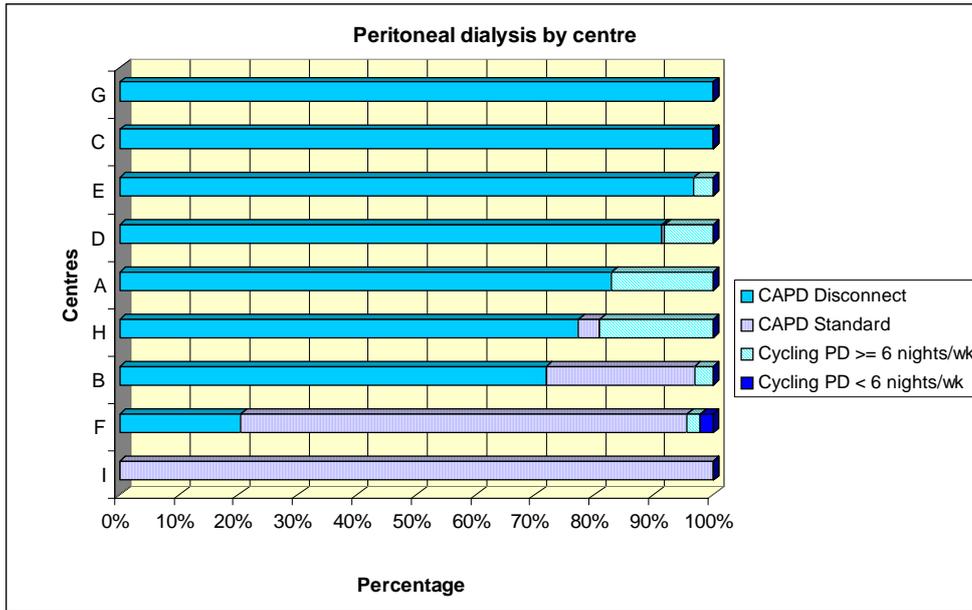


Figure 4.9 Distribution of types of PD by Centre ordered by Disconnect PD.

4:4.5 Trends in dialysis modalities

	England		Registry		Wales	Scotland	
	1993	1995	1996	1997	1995	1991	1996
Total on dialysis	9045	10988	2344	2401	735	-:-	
% on haemodialysis	52	56	64	66	57	49	67

Table 4.6 Trends in dialysis modalities.

Some figures with regard to trends in modalities of dialysis are shown in table 4.6 . The HD:PD ratio in England was 1.0:1 in 1993, 1.3:1 in 1995, and 1.9:1 in the registry in 1997:1. In Scotland the ratio was 1:1 in 1991 and 2:1 in 1996. Despite the fact that several units have reported to us a severe restriction in availability of haemodialysis facilities, limiting their ability to place all people they consider suitable on haemodialysis, there is a continued trend to more haemodialysis. The proportion of dialysis patients in the UK receiving peritoneal dialysis is still higher than that in most other developed countries (figure 4.11).

Percentage of dialysis patients on peritoneal dialysis by country
(1995 unless stated otherwise)

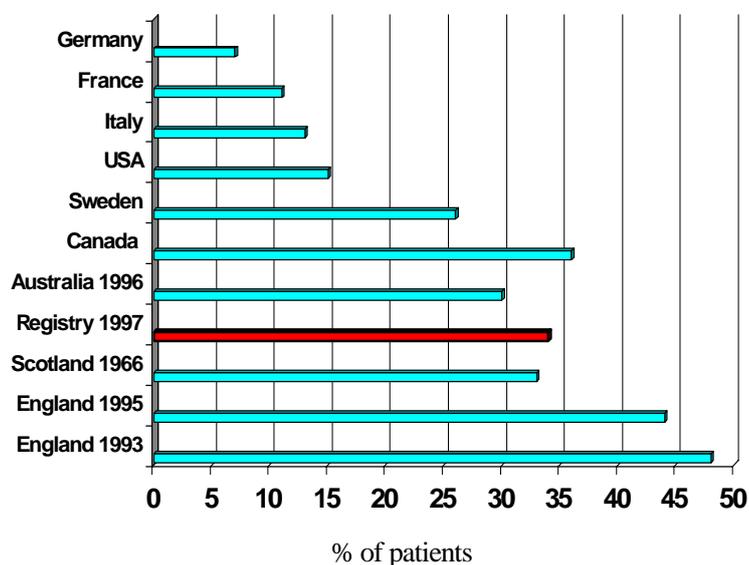


Figure 4.10 Proportion of dialysis patients on peritoneal dialysis in different countries

The use of satellite dialysis is expanding.. In 1993 in England 20% of dialysis stations were at satellite units, by 1995 33% were at satellite units. The number of satellite units rose from 36 to 60. In unit F in 1997 the minority of haemodialysis patients received treatment at the main unit.

The use of APD has not yet made a major impact overall, but is significant in some individual centres.

4:5 Deaths from the stock of patients alive on 1/1/97.

The death rate within year was calculated separately for the patients established on dialysis and with a functioning transplant on 1st January 1997. Only patients established for 90 days on renal replacement therapy on that date were included. As there is an increased death rate in the first six months following transplantation, patients were only included in the analysis if they had not received a transplant between 1st July 1996 and 31st December 1996. For the same reason patients who received a transplant within the year were censored at the time of transplantation.

The sample criteria thus became:

1. Patients who had been receiving renal replacement therapy for more than 90 days on 1/1/97.
2. Patients who had a transplant between 1/7/96 and 31/12/96 were excluded

3. Patients who transferred into a Registry centre were excluded if information was not available to confirm that they had not received a transplant between 1/7/96 and 31/12/96.
4. The few patients who recovered renal function in 1997 were excluded.
5. Patients who transferred out of a Registry centre to a non-Registry centre were censored at that date
6. A transplant patient whose transplant failed was censored at the time of restarting dialysis, and dialysis patients who received a transplant were censored at the time of transplant.
7. Patients who died, received a transplant, or transferred out on 1/1/97 were included and were counted as being at risk for one day.
8. Patients who died on the day of the transplant were censored on this day, rather than counted as a dialysis death.

Analysis of the death rate from centre I showed it to be 50% lower than other centres. On discussion with this centre it was found that not all deaths had been logged on their computer system. Patients from this centre were therefore excluded from this analysis.

The number of patients on the registry is currently too small to allow stratification by diagnosis, or by age bands smaller than above and below age 65.

The results are given in Table 4.7

	No. of patients	No. of deaths	Deaths per 100 patient years
All dialysis patients	2215	370	19.4
Dialysis patients <65	1395	138	11.3
Dialysis patients ≥ 65	820	232	33.5
Transplant ¹	2092	38	1.9
Transplant ²	2092	45	2.2

Transplant ¹ - patients censored at time of return to dialysis.

Transplant ² - patients not censored at time of return to dialysis.

Table 4.7 Deaths during 1997 of the patients alive 1/1/97

The one year death rate for patients established on dialysis on 1/1/97 who had not had a transplant in the past six months was 19.4 per 100 patient years. The figure quoted for the Australian registry is 15.6, but this may not be comparable as their report does not give precise details as to how the figure was calculated. American figures exclude patients dying from non-dialysis related causes e.g trauma and AIDS, and do not have the same inclusion criteria. The quoted American figure for 1996 is 22%. The EDTA death rate figure for the EEC is 14.4% with a range of 12.1% to 23.5% although inclusion and exclusion criteria will vary from country to country.

On analysis of the survival experience of patients by centre, there was no significant difference between the centres in the 1997 one year survival using log rank test ($X^2 = 3.87$, d.f. = 7, $p = 0.7949$).

There is the expected higher death rate amongst the more elderly patients, by a factor of three.

The one year death rate for patients with a transplant established for at least six months on 1/1/97, censoring patients who subsequently changed to dialysis at the time of change, was 1.9 per 100 patient years. It could be argued that this technique omits some deaths occurring shortly after the transfer to dialysis which should be accounted as related to the failing transplant. A calculation was therefore made including those patients whose transplant failed within year and later died on dialysis. The death rate then rises to 2.2%.

There were insufficient data to analyse death rates within six months of transplantation as a longer period of follow-up is needed to assess the patients transplanted in the second half of 1997. This analysis will be included in the next Registry report.

As the Registry develops, there will be sufficient numbers of patients registered to study survival with correction for age, gender, co-morbidity, etc.