

## Chapter 22: International Comparisons: incidence, prevalence markers of quality of care, and survival

### Summary

- Amongst developed countries, the UK has a relatively low acceptance rate for RRT, with a low proportion due to diabetic nephropathy.
- The percentage of prevalent patients in the UK on peritoneal dialysis is in the upper quartile.
- The prevalence of renal transplant patients in the UK is near the median for Europe.
- Biochemical markers of quality of care in the UK are comparable with the USA and Australia and better than New Zealand.
- Two year survival of incident patients in the UK is around the European average.
- Death rates of point prevalent RRT patients in the UK are better than those in the USA.

### Problems of international comparison

When making international comparisons of renal replacement therapy it is essential to ensure that the data sets are truly comparable. There are two main types of data used; data sets from national registries and data sets from sample studies, such as the Dialysis Outcomes and Practice Pattern Study (DOPPS). There are problems associated with both types of data set. Registries may have complete or near complete coverage of their country or region, but often lack detail (e.g. co-morbidity) and depend on the rigour of individual renal units to ensure the accuracy of the data. Not all renal units are mobilised or motivated for accurate data collection. The UK Renal Registry is now

accumulating a useful volume of detailed data, including some co-morbidity data. Sample studies such as DOPPS are often well-funded and enthusiastically pursued, and record detailed data, but are open to sampling errors, which may be important when it comes to interpretation.

The DOPPS Study was originally set up to study the influence of practice patterns on renal replacement therapy outcomes, and not to make international comparisons. A series of valuable papers have recently been published, especially on the relationship of practice to outcomes. However, despite the original intentions, the Study has published some international comparisons.<sup>1</sup> There are major differences in the data on outcomes published by DOPPS and results found from the UK Renal Registry, which deserve evaluation. The differences are due to an inevitable modality sampling bias in the DOPPS Study.

The DOPPS Study is not a general study of dialysis practice, but of haemodialysis practice in particular. The haemodialysis population in any country is a selected population, dependent on the prevailing and historical use of alternative therapies (peritoneal dialysis) and transplant rates. Thus, in the five European DOPPS countries (France, Germany, Italy, Spain, UK) the proportion of prevalent patients on haemodialysis varies from 33% in the UK to 71% in Germany. The respective figures for peritoneal dialysis are 18% and 4%, and for renal transplantation the range is from 47% in the UK to 21% in Italy (Table 22.1a).

In Chapter 4 of this report it is demonstrated that patients starting peritoneal dialysis are very different from those starting haemodialysis. Peritoneal dialysis patients are much younger, are fitter with less co-morbidity and are twice as likely to receive a renal transplant within 2 years of starting dialysis.

**Table 22.1a. Percentage of patients on each modality in European DOPPS countries dialysis**

Country	HD	Home HD	PD	Transplant
France		Not available		
Germany	71	-	4	24
Italy	70	-	9	21
Spain	52	-	5	43
UK	33	2	18	47

**Table 22.1b. Percentage of dialysis patients on each modality in European DOPPS countries**

Country	HD	Home HD	PD
France	87	3	10
Germany	93	1	5
Italy	89	-	11
Spain	91	-	9
UK	63	3	34

The haemodialysis population is thus a relatively selected group of patients not fit for transplantation or not yet transplanted. It is not surprising that the survival of a point-prevalent sample of haemodialysis patients from the UK, as reported by DOPPS, is less than that of a sample of patients from Germany or Italy, where over 70% of patients

are treated by haemodialysis, with a low use of peritoneal dialysis and renal transplantation. When DOPPS attempted to allow for these factors the differences in outcome ceased to be significant.

In contrast with the DOPPS results, the results in this chapter show that survival for renal replacement therapy patients in the UK is at least as good as for other European countries, and significantly better than in the USA.

The data used for international comparisons in this chapter are all derived from large national or renal registries.

### **International comparative incidence data**

The estimated UK annual acceptance rate has slowly risen to 103.0 p.m.p., inclusive of 2.0 p.m.p. paediatric patients, over the last 5 years (Table 22.2) (see Chapter 3, National Renal Review).

**Table 22.2. Annual incidence rates of RRT by country, per million population**

Country	Incidence			% diabetic
	2000	2001	2002	
USA	337	334	334	44
Taiwan	311	331	-	35
Japan	252	252	262	38
Germany	175	184	174	36
Belgium (French)	-	-	170	17
Czech Republic	151	163	157	35
Canada	143	152	-	34
Greece	157	164	151	27
Italy	131	136	-	17
Austria	133	136	132	34
Denmark	-	-	130	26
Hungary	129	130	-	21
Spain	132	127	126	22
Uruguay	126	-	-	18
Sweden	126	124	125	25
New Zealand	110	119	115	45
Netherlands	93	100	-	16
<b>UK</b>	<b>89*</b>	<b>95</b>	<b>103</b>	<b>20</b>
Poland	-	-	99	24
Australia	92	97	94	26
Finland	95	90	92	33
Norway	89	95	92	12
Turkey	52	-	-	23

\*Adults only.

### Criteria in establishing data sets

International comparisons are subject to the problems of different definitions and levels of ascertainment. It is not clear whether the small number of paediatric patients is included in the figures for all countries. In many countries there is uncertainty about the earliest date recorded – in the UK it is the first RRT, in the USA it is the 90<sup>th</sup> day of RRT. In the other European countries there is considerable variation between these extremes: it is often the date at which a patient is transferred to the renal service, although dialysis or haemofiltration may have been occurring for some weeks before. The later the date, the lower the incidence and early mortality, as the initial 90-day high mortality will be lost.

Some countries show a very similar pattern to the UK with a rate around 90-100 p.m.p., with/without a small upward trend – this group includes several Northern European countries (Finland, Netherlands, Norway) and Australia. Sweden and New Zealand, which might be expected to have this pattern, have higher rates. Southern European countries, which have lower rates of cardiovascular disease and longer life expectancy than the UK, have higher rates of RRT (Italy, Greece, Spain). One might spec-

ulate that the competing risk of cardiovascular disease, with earlier death in the UK, is a significant factor contributing to these differences.

Germany and Austria both have high rates, Germany higher than Austria. The more developed South-East Asian countries, and the USA, have the highest rates, with small upward trends.

There are complex factors that may affect RRT acceptance rates including demography, the incidence and progression rates of chronic kidney disease, competing health risks (largely cardiovascular), health care access and referral/acceptance patterns.

Diabetic nephropathy is the major contributor to the incidence of RRT in the developed world. The proportion of patients with diabetic nephropathy in the UK is relatively low for developed countries (Table 22.2). This accounts for some of the differences in incidence observed. The reasons for this are not fully understood. The USA has a higher incidence of diabetics starting on renal replacement therapy each year than total incidence rate of all patients starting RRT in the UK.

The variation in take-on rate in different age groups is shown in Table 22.3.

**Table 22.3. Age specific annual incidence of renal replacement therapy, p.m.p., by country**

Country	Age range				
	0-19	20-44	45-64	65-74	75+
Australia	8.7	47.2	142.8	344.8	255.4
Austria	6.0	53.8	208.3	441.0	355.8
Canada	11.7	51.3	199.3	567.2	611.2
Finland	8.7	49.2	140.3	339.2	145.9
Greece	8.1	39.1	185.5	491.8	621.7
Netherlands	10.8	43.8	132.0	359.9	241.2
N. Zealand	7.0	62.7	251.3	289.5	172.9
Norway	9.4	33.0	128.1	365.3	237.4
Sweden	5.7	51.5	145.2	406.2	398.5
Taiwan	8.8	104.3	648.9	1,487.5	1,771.5
<b>UK</b>	<b>9.7</b>	<b>42.3</b>	<b>123.7</b>	<b>299.3</b>	<b>274.0</b>
USA	16.0	132.0	534.0	1,271.0	1,349.0
Uruguay	9.5	61.9	184.9	435.0	636.3

## Prevalent patients

The changing prevalence of RRT over three years in selected countries is shown in Table 22.4 and the distribution of modality for dialysis patients is in Table 22.5.

The prevalence of a functioning transplant is shown in Table 22.6.

## Comparison of biochemical and haematological results

Some comparative data on biochemical and haematological variables are shown in Table 22.7. These USA data are from the Centre for Medicare & Medicaid Services, 2002 Annual Report of Clinical Performance Measures Project. The Australia and New Zealand data are from the Australia and New Zealand Dialysis and Transplant Registry Report, 2003.

**Table 22.4. Prevalence rates of RRT, p.m.p., by country**

Country	Prevalence		
	2000	2001	2002
Japan	1,576	1,642	-
Taiwan	1,439	1,423	-
USA	1,360	1,403	-
Spain	871	880	950
Germany	870	919	918
Belgium	-	-	877
(Flemish)			
Canada	768	841	-
Italy	804	835	-
Greece	797	815	-
Austria	712	748	781
Sweden	714	735	756
Denmark	638	679	699
Czech Republic	625	663	695
New Zealand	611	652	685
Australia	608	634	658
Norway	581	613	641
Netherlands	621	640	-
<b>UK</b>	<b>540</b>	<b>580</b>	<b>640</b>
Finland	583	609	-
Hungary	517	580	-
Chile	423	473	506
Belgium (French)	-	-	492
Poland	316	353	390
Turkey	275	359	-
Uruguay	782	-	-

**Table 22.5. Percentage dialysis modalities in prevalent patients**

Country	Year	HD	PD	% of HD pts on Home HD
Australia	2002	75	25	14
Austria	2002	92	8	0.3
Belgium	2002	94	6	-
(Flemish)				
Belgium	2001	91	9	1.3
(French)				
Denmark	2002	75	25	0.8
Finland	2001	79	21	2
Germany	2002	95	5	0.8
Greece	2000	89	11	0
Hungary	2001	94	6	0
Italy	2001	90	10	1
Japan	2001	96	4	0
Netherland	2001	68	32	2
NZ	2002	52	48	27
Norway	2002	84	16	0.3
Poland	2002	89	11	0
Spain	2002	90	10	-
Sweden	2001	76	24	3
<b>UK</b>	<b>2002</b>	<b>73</b>	<b>27</b>	<b>3</b>
Uruguay	2000	94	6	-
USA	2001	91	9	0.4

**Table 22.6. Prevalence of a functioning transplant**

Country	Prevalence p.m.p.
Norway	436.9
Spain	408.5
Austria	407.4
Sweden	377.6
USA	375.4
Finland	353.2
Netherlands	317.2
<b>UK</b>	<b>290.0</b>
Canada	289.8
Australia	273.3
New Zealand	264.7
Czech Republic	240.0
Germany	230.2
Hungary	153.8
Greece	139.4
Chile	126.9
Uruguay	104.9
Poland	97.9
Bulgaria	43.4
Russia	17.1

**Table 22.7. Comparative data on indicators of quality of care – England & Wales, USA, Australia, and New Zealand**

	<b>E &amp; W</b>	<b>USA</b>	<b>Australia</b>	<b>N. Zealand</b>
Median URR	71%	71.4 (n=8416)	73%	68%
% patients with URR > 65%	78%	82 (n=8416)	86%	63%
% Hb ≥ 10	82% HD, 88% PD	91 (n=1341)	-	-
% Hb ≥ 11	63% HD, 73% PD	73 (n=1341)	66%	37%
Median ferritin	420 HD, 249 PD	600 (n=1280)	-	-
% ferritin > 100	94% HD, 85% PD	92% (n=1280)	90%	86%
Albumin median HD BCG	38	35.7 (n=1340)	-	-
Albumin median HD BCP	34	32.1 (n=1340)	-	-

### ***One and two-year survival of incident patients***

#### ***All European Registry Countries***

These data are taken from the European Renal Registry report.

The survival of incident patients in the first 2 years in the UK is very close to the European average (Tables 22.8 and 22.9). The use of the 90-day starting point avoids some of the potential errors associated with the variability of the first date recorded. By excluding the initial 3-month high mortality period for all countries, the comparisons are more valid.

### ***Death rates of point prevalent renal replacement therapy patients – UK and USA***

Death rates of point prevalent RRT patients in different age groups, established on RRT in the UK and USA, are shown in Table 22.10. The figures for dialysis patients alone are shown in Table 22.11. In both cases the death rates in the UK are significantly better than in the USA. The USA data are from the USRDS Annual Report 2002.

**Table 22.8. All European Registry Countries – Adjusted Survival of Incident RRT Patients**

	<b>1 year survival from 90 days (95% CI)</b>	<b>2 year survival from 90 days (95% CI)</b>
0-19	96.4 (95.1 - 97.8)	95.1 (93.5 - 96.6)
20-44	95.5 (95.1 - 96.0)	92.0 (91.4 - 92.7)
45-64	88.6 (88.1 - 89.1)	79.8 (79.2 - 80.4)
65-74	79.2 (78.5 - 79.9)	63.1 (62.3 - 64.0)
75+	70.6 (69.6 - 71.6)	50.4 (49.3 - 51.6)
Male	87.3 (86.9 - 87.6)	76.7 (76.2 - 77.2)
Female	87.6 (87.2 - 88.1)	77.6 (77.0 - 78.2)
Diabetes	82.4 (81.7 - 83.1)	66.7 (65.8 - 67.7)
Non DM	88.3 (88.0 - 88.6)	79.0 (78.6 - 79.5)
All	87.4 (87.1 - 87.7)	77.0 (76.6 - 77.4)

Adjusted for age, gender and primary diagnosis

**Table 22.9. UK, England/Wales Adjusted Survival of Incident RRT Patients**

	1 year survival from 90 days	2 year survival from 90 days
	(95% CI)	(95% CI)
0-19	Not available	Not available
20-44	95.4 (94.0 - 96.8)	91.7 (89.9 - 93.6)
45-64	88.3 (86.8 - 89.9)	80.3 (78.4 - 82.3)
65-74	77.0 (74.6 - 79.5)	61.1 (58.3 - 64.0)
75+	72.4 (69.0 - 76.0)	51.3 (47.6 - 55.4)
Male	88.0 (86.9 - 89.1)	77.8 (76.3 - 79.3)
Female	85.4 (83.8 - 87.1)	75.3 (73.3 - 77.4)
Diabetes	82.7 (80.0 - 85.5)	65.6 (62.1 - 69.2)
Non DM	88.0 (87.1 - 89.0)	79.3 (78.0 - 80.5)
All	87.1 (86.2 - 88.0)	77.0 (75.8 - 78.2)

Adjusted for age, gender and primary diagnosis

**Table 22.10. Death rates per 1000 years exposed, point prevalent RRT patients, USA and UK**

Age	UK deaths	USA deaths	UK Registry/USA
	Per 1000 pat.yrs.	Per 1000 pat.yrs.	
20-44	30	56	0.53
45-64	71	136	0.52
65+	218	340	0.64
Total	104	179	0.58

**Table 22.11. Death rates per 1000 years exposed, point prevalent dialysis patients, USA and UK**

Age	UK deaths	USA deaths	UK Registry/USA
	Per 1000 pat. yrs	Per 1000 pat.yrs.	
20-44	87	94	0.92
45-64	140	179	0.78
65+	262	360	0.73
Total	196	239	0.82

## Reference

1. Rayner HC, Pisoni RL, Bommer J, et al. Mortality and hospitalization in haemodialysis patients in five European countries: results from the Dialysis Outcomes and Practice Patterns Study (DOPPS). *Nephrol Dial Transplant*, 2004. 19:108-120