
UK Renal Registry 14th Annual Report: Chapter 2 UK RRT Prevalence in 2010: national and centre-specific analyses

Clare Castledine^a, Anna Casula^a, Damian Fogarty^{ab}

^aUK Renal Registry, Bristol, UK; ^bQueens University, Belfast, UK

Key Words

Comorbidity · Diabetes · Dialysis · End stage renal disease · End stage renal failure · Established renal failure · Ethnicity · Haemodialysis · Peritoneal dialysis · Prevalence · Primary Care Trust · Renal replacement therapy · Transplantation · Treatment modality

Summary

- There were 50,965 adult patients receiving RRT in the UK on 31st December 2010. The UK prevalence of RRT was 832 pmp, an increase of 3% from 2009. The reported prevalence in 2000 was 523 pmp.
- Growth rate from 2009 to 2010 for prevalent patients was an increase of 1.5% for haemodialysis (HD), a fall of 3.2% for peritoneal dialysis (PD) and an increase of 5.4% with a functioning transplant.
- The number of patients receiving home HD increased by 23%, from 636 patients to 780 patients since 2009.
- The median age of prevalent patients was 57.9 years (HD 66.3 years, PD 61.7 years and transplant 51.2 years). In 2000 the median age was 55 years.
- Prevalence rates in males exceeded those in females: the peak prevalence rate for males was in the 75–79 years age-group at 2,765 pmp almost double that of the peak for females. Peak prevalence rate in females was in the 70–74 age-group at 1,406 pmp.
- The most common identifiable renal diagnosis was biopsy-proven glomerulonephritis (16.0%), followed by diabetes (14.9%).
- Transplantation continued as the most common treatment modality (48%), HD was used in 44% and PD 8% of RRT patients.
- Prevalence rates in patients aged >85 years have doubled between 2005 and 2010 (420 pmp age related to 856 pmp). There was 30 fold variation in prevalence rates in patients aged >80 years suggesting there is uncertainty regarding the risks and benefits of RRT in the elderly.
- There were national, regional and dialysis centre level variations in prevalence rates. A significant factor in this variation was the ethnic mix of local populations, but a large amount of the variation remains unexplained. Assessment of conservatively managed stage 5 CKD patients might explain more of this variation.

Introduction

This chapter presents data on all adult patients on RRT in the UK at the end of 2010. The UK Renal Registry (UKRR) received data returns for 2010 from all five renal centres in Wales, all six in Northern Ireland and all 52 in England. Data from all nine centres in Scotland were obtained from the Scottish Renal Registry. Data on children and young adults can be found in chapter 5.

These analyses of prevalent RRT patients are performed annually to aid clinicians and policy makers in planning future RRT requirements in the UK. It is important to understand national, regional and centre level variation in numbers of prevalent patients as part of the planning process. In addition, knowledge about variation in case mix is also reported to improve understanding of where resources should be focussed to improve equity of provision of RRT in the UK.

The term established renal failure (ERF) used within this chapter is synonymous with the terms end stage renal failure (ESRF) and end stage renal disease (ESRD), which are in more widespread international usage. Patient groups have disliked the term 'end stage' which formerly reflected the inevitable outcome of this disease.

Methods

These analyses relate to the prevalent RRT cohort in the UK in 2010. The cohort was defined as all adult patients receiving RRT on the UKRR database on 31st December 2010. Population estimates were obtained from the UK Office of National Statistics (ONS) [1].

The number of prevalent RRT patients was calculated for the UK as a whole and for each UK country, using UKRR data from all renal centres. Crude prevalence rates were calculated per million population (pmp) and standardised prevalence ratios were calculated as detailed in appendix D: Methodology used for Analyses (www.renalreg.com/report-area/report-2011/appendix-D.pdf) for Primary Care Trusts (PCT) in England, Health & Social Care Areas in Northern Ireland, Local Health Boards in Wales and Health Boards in Scotland. These areas will be referred to in this report as 'PCT/HBs'. Briefly, data from all areas were used to calculate overall age and gender specific prevalence rates. The age and gender breakdown of the population in each PCT/HB were obtained from the mid-2010 population estimate based on 2001 Census data from the ONS [1]. The population breakdown and the overall prevalence rates were used to calculate the expected age and gender specific prevalence numbers for each PCT/HB. The age and gender standardised prevalence ratio was the observed prevalence number divided by the expected prevalence number. A ratio

below 1 indicated that the observed rate was less than expected given the area's population structure. This was statistically significant at the 5% level if the upper confidence limit was less than 1. Analyses were done for each of the last 6 years and as the prevalent numbers for one year can be small for smaller areas, a combined years' analysis was also done. To enable assessment of whether a centre was an outlier in this regard, funnel plots for smaller and larger populations have been included (appendix D: figures D3, D4) which show the 95% confidence intervals around the national average prevalence. The proportion of non-Whites in each PCT/HB was obtained from the ONS [1].

Prevalent patients on RRT in 2010 were examined by time on RRT, age group, gender, ethnic origin, primary renal disease, presence of diabetes and treatment modality. (2009 Report appendix H: Coding (www.renalreg.com/report-area/report-2011/appendix-H.pdf)). Some centres electronically upload ethnicity coding to their renal information technology (IT) system from the hospital Patient Administration System (PAS). Ethnicity coding in these PAS systems is based on self-reported ethnicity and uses a different coding system to those centres not linked to PAS [2]. For the remaining centres, ethnicity coding is performed by clinical staff and recorded directly into the renal IT system (using a variety of coding systems). For all these analyses, data on ethnic origin were grouped into Whites, South Asians, Blacks, Chinese and Others as described in appendix H: Coding (www.renalreg.com/report-area/report-2011/appendix-H.pdf). Time on RRT was defined as median time on treatment and was calculated from the most recent start date. Patients without an accurate start date were excluded from this calculation. Analyses were done for the UK as a whole, by UK country, at centre level and split by treatment modality when appropriate. Chi-squared test, Fisher's exact test, linear regression and Kruskal Wallis tests were used as appropriate to test for significant differences between groups. The data were analysed using SAS 9.2.

Results

Prevalent patient numbers and changes in prevalence

The number of patients for each country (table 2.1) was calculated by adding the patient numbers in each renal centre and these differ marginally from those quoted elsewhere when patients are allocated to geographical areas by their individual postcodes, as some centres treat patients across national boundaries.

There were 50,965 adult patients and 870 paediatric patients receiving RRT in the UK at the end of 2010, giving a UK population prevalence of 832 pmp (table 2.1) compared with 794 pmp in 2009 [3]. Prevalence rates increased in all four of the UK countries in 2010. For the first time there were no significant differences in prevalence rates between the four countries. PD prevalence remained similar to last year in England and Scotland, a change from the pattern of falling prevalence

Table 2.1. Prevalence of RRT in the UK on 31/12/2010 (including children <18 years)

	England	N Ireland	Scotland	Wales	UK
All UK centres	43,412	1,478	4,330	2,615	51,835
Total estimated population, mid-2010 (millions)*	52.2	1.8	5.2	3.0	62.3
Prevalence rate HD (pmp)	359	402	361	363	360
Prevalence rate PD (pmp)	65	37	54	73	64
Prevalence rate dialysis (pmp)	424	440	415	436	424
Prevalence rate transplant (pmp)	407	382	414	433	408
Prevalence rate total (pmp)	831	822	829	870	832
95% confidence intervals total (pmp)	823–839	780–863	804–854	836–903	825–840

* estimates from ONS web site
pmp = per million population

each year since 1997, and it decreased again in Northern Ireland and Wales. The prevalence of transplanted patients once more increased in the UK. The prevalence rate for each of the UK countries (figure 2.1) shows that Northern Ireland had a higher prevalence rate for patients aged 65+ compared with the other UK countries and that Wales has a higher prevalence rate for patients aged >80 than the other countries. These higher rates were not due to higher numbers of older people in those countries. The prevalence rate in patients aged 80–84 has risen over time from 1,105 per million age related population (pmp) in 2005 to 1,658 pmp in 2010 and in patients aged >85 years from 420 pmp in 2005 to 856 pmp in 2010. This ageing of the prevalent population is more likely to be due to increasing numbers of older patients starting RRT although there is some effect of improving patient survival as well.

Prevalent patients by RRT centre

Both the number of prevalent patients in each renal centre and the distribution of their treatment modalities

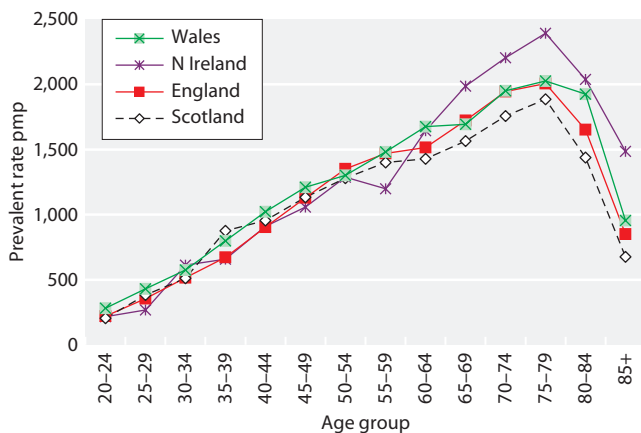


Fig. 2.1. Prevalence rates per million population by age group and UK country on 31/12/2010

varied widely (table 2.2). Many factors including geography, local population density, age distribution, ethnic composition, prevalence of diseases predisposing to kidney disease and the social deprivation index of that population may contribute to this.

Throughout this chapter, haemodialysis refers to all modes of HD treatment, including haemodiafiltration (HDF). Several centres reported significant numbers of patients on HDF, but other centres did not differentiate this treatment type in their UKRR returns.

Where joint care of renal transplant recipients between the referring centre and the transplant centre occurred, the patient was allocated to the centre which last saw the patient, usually the referring centre. Thus the number of patients allocated to a transplant centre is often lower than that recorded by the centre itself and as a converse pre-emptively transplanted patients are sometimes allocated to the transplanting centre rather than the referring centre if no transfer out code has been sent through. Queries and updated information is welcomed by the UKRR at any point during the year if this has occurred.

Changes in prevalence

Overall growth in the prevalent UK RRT population from 2009 to 2010 was 4% (table 2.3) which has been fairly consistent over the last 10–15 years (figure 2.2). Most of the growth in the prevalent RRT population was due to a continued increase in the prevalent RRT population in England and Scotland, with slower growth in the prevalent RRT populations in Wales and Northern Ireland.

The prevalent growth per million population (pmp) disguises the differential growth in RRT modalities (HD, PD and transplant) and is shown in table 2.4. From 2009 to 2010, there was a 1.5% growth of prevalent HD patients, a 5.4% growth in those with a functioning

Table 2.2. Number of prevalent RRT patients by treatment modality and centre on 31/12/2010

Centre	HD	PD	Dialysis	Transplant	RRT	Catchment population (millions)	Rate RRT pmp	(95% CI)
England								
Birmingham Heartlands	426	43	469	163	632	0.72	872	(804–940)
Birmingham QEH*	858	153	1,011	833	1,844	1.62	1,136	(1084–1188)
Basildon	138	25	163	51	214	0.41	524	(454–595)
Bradford	185	37	222	233	455	0.58	786	(714–858)
Brighton	344	87	431	339	770	1.20	644	(599–690)
Bristol*	460	62	522	728	1,250	1.57	796	(752–840)
Cambridge*	349	35	384	604	988	1.27	780	(731–828)
Carlisle	60	13	73	130	203	0.31	646	(557–735)
Carshalton	726	103	829	548	1,377	1.92	719	(681–757)
Chelmsford	123	35	158	80	238	0.47	510	(446–575)
Colchester	120		120		120	**	**	**
Coventry*	358	84	442	402	844	0.87	970	(905–1036)
Derby	220	101	321	138	459	0.65	709	(644–774)
Doncaster	147	24	171	51	222	**	**	**
Dorset	244	55	299	286	585	0.73	806	(741–872)
Dudley	158	62	220	83	303	0.42	730	(648–812)
Exeter	361	77	438	347	785	1.03	764	(710–817)
Gloucester	191	41	232	145	377	0.58	656	(589–722)
Hull	326	67	393	332	725	0.99	735	(681–788)
Ipswich	116	35	151	165	316	0.56	563	(501–625)
Kent	360	71	431	362	793	1.16	682	(635–730)
London Barts*	791	190	981	797	1,778	1.68	1,059	(1009–1108)
London Guys*	565	47	612	1,006	1,618	1.15	1,402	(1334–1470)
London Kings	427	94	521	316	837	0.97	863	(804–921)
London RFree*	677	71	748	891	1,639	1.50	1,090	(1037–1142)
London St. George's*	283	56	339	339	678	0.59	1,158	(1071–1245)
London West*	1,329	37	1,366	1,496	2,862	2.23	1,285	(1238–1332)
Leeds*	496	98	594	789	1,383	1.65	840	(796–884)
Leicester*	795	169	964	844	1,808	2.32	780	(744–816)
Liverpool Aintree	152	7	159		159	0.29	548	(463–633)
Liverpool RI*	386	85	471	767	1,238	1.20	1,033	(975–1090)
Manchester Hope	364	124	488	349	837	1.42	589	(549–629)
Manchester RI*	481	88	569	983	1,552	1.47	1,057	(1004–1109)
Middlesbrough	286	22	308	403	711	1.01	703	(651–754)
Newcastle*	270	54	324	564	888	1.11	803	(750–856)
Norwich	319	54	373	242	615	0.79	775	(714–837)
Nottingham*	416	88	504	468	972	1.14	854	(801–908)
Oxford*	381	110	491	872	1,363	1.68	811	(768–854)
Plymouth*	134	46	180	279	459	0.48	965	(877–1053)
Portsmouth*	481	102	583	750	1,333	2.00	665	(630–701)
Preston	504	63	567	401	968	1.51	640	(600–681)
Reading	260	86	346	290	636	0.80	790	(729–852)
Sheffield*	611	66	677	577	1,254	1.49	842	(796–889)
Shrewsbury	201	22	223	114	337	0.39	861	(769–953)
Stevenage	385	36	421	185	606	1.09	557	(513–601)
Southend	126	18	144	68	212	0.32	671	(581–761)
Stoke	295	73	368	267	635	0.90	708	(653–763)
Sunderland	176	33	209	160	369	0.59	626	(562–690)
Truro	153	29	182	153	335	0.41	813	(726–901)
Wirral	186	37	223		223	0.52	428	(372–484)
Wolverhampton	315	72	387	131	518	0.61	854	(781–928)
York	152	24	176	161	337	0.51	667	(596–738)

Table 2.2. Continued

Centre	HD	PD	Dialysis	Transplant	RRT	Catchment population (millions)	Rate RRT pmp	(95% CI)
Northern Ireland								
Antrim	129	11	140	77	217	0.30	723	(627–820)
Belfast*	234	30	264	418	682	0.55	1,233	(1141–1326)
Derry	61	2	63	48	111	0.18	629	(512–746)
Newry	109	9	118	59	177	0.28	625	(533–718)
Tyrone	95	9	104	41	145	0.18	822	(688–955)
Ulster	93	2	95	17	112	0.30	373	(304–442)
Scotland								
Aberdeen	201	30	231	231	462	**		
Airdrie	183	11	194	132	326	**		
Dumfries & Galloway	53	8	61	57	118	**		
Dundee	173	26	199	186	385	**		
Dunfermline	135	26	161	102	263	**		
Edinburgh*	274	51	325	388	713	**		
Glasgow*	627	53	680	810	1,490	**		
Inverness	87	23	110	120	230	**		
Kilmarnock	152	42	194	90	284	**		
Wales								
Bangor	87	26	113		113	0.25	452	(369–535)
Cardiff*	496	103	599	918	1,517	1.45	1046	(994–1099)
Clwyd***	70	16	86	56	142	0.20	710	(593–827)
Swansea	361	51	412	183	595	0.80	744	(684–804)
Wrexham	77	22	99	124	223	0.30	743	(646–841)
England	18,667	3,311	21,978	20,682	42,660			
N Ireland	721	63	784	660	1,444			
Scotland	1,885	270	2,155	2,116	4,271			
Wales	1,091	218	1,309	1,281	2,590			
UK	22,364	3,862	26,226	24,739	50,965			

Centres prefixed 'L' are London centres

Transplant patients are often followed up by two centres but are assigned throughout his report to the centre which last saw the patient. This may result in some discrepancy in transplant numbers particularly in Oxford/Reading and Clywd/Liverpool RI

The numbers of patients calculated for each country quoted above differ marginally from those quoted elsewhere when patients are allocated to areas by their individual postcodes, as some centres treat patients from across national boundaries

* Transplant centres

** Doncaster and Colchester were not established main renal centres when the catchment population work was undertaken and this work also did not include Scotland

Blank cells indicate no patients on that treatment modality

*** There was a large decrease in prevalent patient numbers in 1 centre (Clwyd) from 2009–2010 which was a data extraction issue. These missing patients have been inserted into tables 2.1–2.3 but do not feature in any of the other analyses

transplant and a decline in patients on PD of 3.2%. During the period 2005 to 2010 there was a 4.1% pmp growth in HD, 5.9% pmp fall in PD, and 4.6% pmp growth in prevalent transplant patients in the UK (table 2.4).

There were large variations between centres as well as countries. From 2009 to 2010 growth increased by more than 16.3% in Colchester and 16.8% in Doncaster largely due to relocation of patients from Cambridge to Colchester and from Sheffield to Doncaster (table 2.3). Smaller centres will show relatively large percentage

changes in prevalence in either direction due to only small fluctuations in incidence numbers or numbers of deaths, particularly when growth in one year only is examined. The decline in prevalent patients on PD was evident at 38 of the 72 renal centres (data not shown) in the UK and PD numbers declined slightly across all the 4 UK countries. The prevalence rate per million population for each centre was calculated using a derived catchment population. This was calculated from the postcode of each prevalent patient in 2007 and the population within that postcode assigned to the renal

Table 2.3. Number of prevalent patients on RRT by centre 2006–2010

Centre	Date					% change 2009–2010	% annual change 2006–2010
	2006	2007	2008	2009	2010		
Abrdn	434	452	456	444	462	4.1	1.6
Airdrie	233	230	245	310	326	5.2	8.8
Antrim	200	200	220	213	217	1.9	2.1
B Heart	578	578	597	623	632	1.4	2.3
B QEH	1,557	1,626	1,714	1,820	1,844	1.3	4.3
Bangor	103	98	112	110	113	2.7	2.3
Basldn	187	209	218	211	214	1.4	3.4
Belfast	751	748	726	675	682	1.0	−2.4
Bradfd	365	395	414	422	455	7.8	5.7
Brightn	659	686	722	720	770	6.9	4.0
Bristol	1,203	1,234	1,247	1,231	1,250	1.5	1.0
Camb	906	935	927	939	988	5.2	2.2
Cardff	1,333	1,438	1,372	1,429	1,517	6.2	3.3
Carlis	188	202	205	202	203	0.5	1.9
Carsh	1,102	1,165	1,249	1,301	1,377	5.8	5.7
Chelms	159	194	207	224	238	6.3	10.6
Clwyd	89	155	146	143	142	−0.7	12.4
Colchr	84	100	118	104	120	15.4	9.3
Covnt	675	717	745	791	844	6.7	5.7
D & Gall	77	77	113	116	118	1.7	11.3
Derby	301	301	389	404	459	13.6	11.1
Derry	40	69	101	114	111	−2.6	29.1
Donc ^a		109	154	190	222	16.8	26.8
Dorset	406	452	515	553	585	5.8	9.6
Dudley	263	259	275	290	303	4.5	3.6
Dundee	365	376	370	389	385	−1.0	1.3
Dunfn	156	220	220	237	263	11.0	13.9
Edinb	701	720	695	697	713	2.3	0.4
Exeter	630	664	708	725	785	8.3	5.7
Glasgw	1,553	1,605	1,568	1,442	1,490	3.3	−1.0
Glouc	319	326	325	358	377	5.3	4.3
Hull	610	672	696	723	725	0.3	4.4
Inverns	200	207	212	222	230	3.6	3.6
Ipswi	284	285	294	311	316	1.6	2.7
Kent	546	627	714	731	793	8.5	9.8
Klmarnk	215	214	263	271	284	4.8	7.2
L Barts	1,416	1,473	1,526	1,635	1,778	8.7	5.9
L Guys	1,324	1,395	1,447	1,611	1,618	0.4	5.1
L Kings	669	712	784	774	837	8.1	5.8
L Rfree	1,383	1,437	1,510	1,542	1,639	6.3	4.3
L St.G	595	575	624	658	678	3.0	3.3
L West ^b	2,156	2,162	2,570	2,721	2,862	5.2	7.3
Leeds	1,380	1,379	1,342	1,327	1,383	4.2	0.1
Leic c	1,500	1,594	1,660	1,735	1,808	4.2	4.8
Liv Ain	99	115	130	145	159	9.7	12.6
Liv RI	1,338	1,274	1,200	1,223	1,238	1.2	−1.9
M Hope	718	759	758	782	837	7.0	3.9
M RI	1,504	1,402	1,424	1,451	1,552	7.0	0.8
Middlbr	640	687	682	705	711	0.9	2.7
Newc	905	902	901	884	888	0.5	−0.5
Newry	148	148	164	173	177	2.3	4.6
Norwch	437	495	567	587	615	4.8	8.9
Nottm	923	971	954	971	972	0.1	1.3
Oxford ^c	1,266	1,328	1,318	1,337	1,363	1.9	1.9

Table 2.3. Continued

Centre	Date					% change 2009–2010	% annual change 2006–2010
	2006	2007	2008	2009	2010		
Plymth	412	421	443	457	459	0.4	2.7
Ports	1,143	1,182	1,268	1,298	1,333	2.7	3.9
Prestn	832	857	875	941	968	2.9	3.9
Redng	530	552	578	620	636	2.6	4.7
Sheff ^a	1,232	1,175	1,217	1,216	1,254	3.1	0.4
Shrew	259	285	325	331	337	1.8	6.8
Stevng	606	548	580	581	606	4.3	0.0
Sthend	187	195	204	205	212	3.4	3.2
Stoke	588	590	603	639	635	-0.6	1.9
Sund	271	344	343	368	369	0.3	8.0
Swanse	503	545	602	605	595	-1.7	4.3
Truro	291	288	297	316	335	6.0	3.6
Tyrone	160	149	136	141	145	2.8	-2.4
Ulster	61	89	97	113	112	-0.9	16.4
Wirral	206	219	216	224	223	-0.4	2.0
Wolve	451	449	491	491	518	5.5	3.5
Wrexm ^d	210	213	223	218	223	2.3	1.5
York	223	231	276	305	337	10.5	10.9
England	36,506	37,732	39,546	40,953	42,660	4.2	4.0
N Ireland	1,360	1,403	1,444	1,429	1,444	1.0	1.5
Scotland	3,934	4,101	4,142	4,128	4,271	3.5	2.1
Wales	2,238	2,449	2,455	2,505	2,590	2.9	3.6
UK	44,038	45,685	47,587	49,015	50,965	4.0	3.7

^a Doncaster previously a satellite of Sheffield

^b Hammersmith and Charing Cross amalgamated with St Mary's

^c Oxford transferred Northamptonshire local authority to Leicester

Transplant patients are often followed up by two centres but are assigned throughout his report to the centre which last saw the patient. This may result in some differences in transplant figures particularly in Oxford/Reading and Clywd/Liverpool RI

centre where that patient was treated. Centre prevalence rates showed marked variation; from 373 pmp in Tyrone to 1,402 pmp at London Guy's. The long-term (1997–2010) UK prevalence pattern by treatment modality is shown in figure 2.2. The steady growth in transplant

numbers was maintained but the increase in haemodialysis patient numbers was associated with a slow contraction in home-based therapies, particularly PD in more recent years.

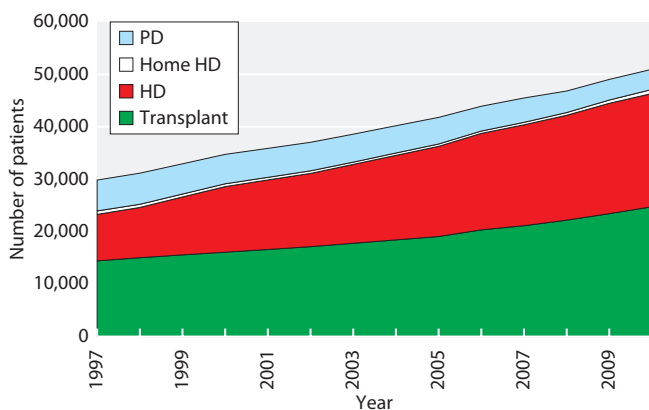


Fig. 2.2. Growth in prevalent patients by treatment modality at the end of each year 1997–2010

Prevalence of RRT in Primary Care Trusts (PCT) in England, Health and Social Care Areas in Northern Ireland (HB), Local Health Boards in Wales (HB) and Health Boards in Scotland (HB)

The need for RRT depends on many factors such as predisposing conditions but also social and demographic factors such as age, gender, social deprivation and ethnicity. Hence comparison of crude prevalence rates by geographical area can be misleading. This section, as in previous reports, uses age and gender standardisation to compare RRT prevalence rates. The ethnic minority profile is also provided to help understand the differences in standardised prevalence ratios (SPR). The impact of social deprivation was analysed in the 2003 UKRR Report [4].

Table 2.4. Change in RRT prevalence rates pmp 2005–2010 by modality

Year	Prevalence					% growth in prevalence pmp				
	HD pmp	PD pmp	Dialysis pmp	Transplant pmp	RRT pmp	HD	PD	Dialysis	Tx	RRT
2005	293	84	377	317	694					
2006	311	78	389	336	724	6.0	−7.4	3.1	6.0	4.4
2007	323	76	399	346	746	3.9	−2.1	2.7	3.2	2.9
2008	342	69	411	363	774	5.8	−9.0	2.9	4.9	3.8
2009	354	64	417	377	794	3.5	−7.8	1.6	3.7	2.6
2010	359	62	421	397	818	1.5	−3.2	0.8	5.4	3.0
Average annual growth 2005–2010						4.1	−5.9	2.2	4.6	3.3

* Differences in the figures for dialysis and RRT prevalence and the sum of the separate modalities are due to rounding

There were substantial variations in the crude PCT/HB prevalence rate pmp, from 489 pmp (Shetland, population 22,500) to 1,810 pmp (Brent, population 256,500). There were similar variations in standardised prevalence ratios (ratio of observed: expected prevalence rate given the age/gender breakdown of the PCT/HB) from 0.54 (Isle of Wight, population 140,200) to 2.45 (Brent) (table 2.5). Confidence intervals are not presented for the rates per million population for 2010 but figures D3 and D4 in appendix D (www.renalreg.com/report-area/report-2011/appendix-D.pdf) can be used to determine if a PCT/HB falls within the range representing the 95% confidence limit of the national average prevalence rate. The annual standardised prevalence ratios were inherently more stable than the annual standardised incidence ratios (chapter 1).

Factors associated with variation in standardised prevalence ratios in Primary Care Trusts (PCT) in England, Health and Social Care Areas (HB) in Northern Ireland, Local Health Boards in Wales (HB) and Health Boards in Scotland (HB)

Geographical considerations and ethnicity were the major factors underlying the variation in SPRs (table 2.5). In 2010, there were 56 PCT/HBs with a significantly low SPR, 72 with a 'normal' SPR and 48 with a significantly high SPR. The areas with high and low SPRs have been consistent over the last few years. They tend to reflect the demographics of the regions in question such that urban, ethnically diverse populations especially when coupled with areas of deprivation have the highest prevalence rates of renal replacement therapy. Mean SPRs were significantly higher in the 58 PCT/HBs with an ethnic minority population greater than 10% than in those with lower ethnic minority populations ($p < 0.0001$). The SPR (correlation coefficient $r = 0.82$

$p < 0.001$) was positively correlated with ethnicity. In 2010 for each 10% increase in ethnic minority population, the age standardised prevalence ratio increased by 0.20 and this would result in increased prevalent patient numbers. In figure 2.3, the relationship between the ethnic composition of a PCT/HB and its SPR is demonstrated.

Only 6 of the 119 PCT/HBs with ethnic minority populations of less than 10% had high SPRs: Abertawe Bro Morgannwg University, Aneurin Bevan, Belfast, Cwm Taf, Plymouth and Rotherham. Forty-two of the 58 PCT/HBs with ethnic minority populations greater than 10% had high SPRs (72%), whereas only 2 had low SPRs (Medway and Surrey). Medway and Surrey have lower socio-economic deprivation than many areas with higher than average ethnic minority populations which might explain their unexpectedly lower rates. Not all PCT/HBs with high (>15%) ethnic minority populations also had higher than expected RRT prevalence rates; Westminster and Kensington had rates similar to average (1.03 and 0.93 respectively 2005–2010) possibly due to lower levels of social deprivation in these areas. The standardised prevalence ratios in each region of England and in Wales, Northern Ireland and Scotland are presented in table 2.6. North East England, North West England, East of England, South East England, South Central and South West England have lower than expected prevalence rates of RRT given the age and gender of their populations and this pattern has been similar for the last 5 years. West Midlands, London and Wales have higher than expected prevalence rates of RRT given the age and gender of their populations and again this pattern has remained similar for the last 5 years. Scotland and Northern Ireland previously had higher than expected prevalence rates but in more recent years are similar to their expected

Table 2.5. Prevalence of RRT and standardised prevalence ratios in PCT/HB areas

PCT/HB = PCT in England, Health and Social Care Areas in Northern Ireland, Local Health Boards in Wales and Health Boards in Scotland
 O/E = standardised prevalence ratio. Ratio of observed:expected rate of RRT given the age and gender breakdown of the area

LCL = lower 95% confidence limit

UCL = upper 95% confidence limit

pmp = per million population

Blank cells = no data returned to the UKRR for that year

Areas with significantly low prevalence ratios in 2010 are italicised in greyed areas, those with significantly high prevalence ratios in 2010 are bold in greyed areas

% non-White = percentage of the PCT/HB population that is non-White, from 2001 census (revised by ONS to 2007 for England)

UK area	Name	Total population	2005 O/E	2006 O/E	2007 O/E	2008 O/E	2009 O/E	2010			Crude rate pmp	O/E	% non-White
								O/E	95% LCL	95% UCL			
North East	<i>County Durham</i>	510,800	0.94	0.91	0.89	0.86	0.85	0.85	0.77	0.94	726	0.88	2.5
	Darlington	100,600	0.94	0.78	0.85	0.89	0.91	0.85	0.67	1.07	716	0.87	3.3
	<i>Gateshead</i>	192,000	0.97	0.93	0.86	0.83	0.85	0.85	0.72	1.00	719	0.88	3.8
	Hartlepool	91,400	0.96	0.98	0.88	0.92	0.91	0.85	0.66	1.08	700	0.91	2.6
	Middlesbrough	142,100	1.02	1.06	1.04	1.06	1.06	1.07	0.89	1.28	816	1.05	8.6
	<i>Newcastle</i>	292,200	0.91	0.89	0.93	0.96	0.92	0.86	0.74	1.00	626	0.91	9.7
	North Tyneside	198,400	1.09	1.07	1.00	0.95	0.96	0.97	0.84	1.13	832	1.00	3.6
	<i>Northumberland</i>	312,100	0.88	0.82	0.81	0.78	0.76	0.72	0.62	0.82	660	0.79	2.2
	Redcar and Cleveland	137,300	0.98	1.01	1.00	0.98	0.97	0.92	0.77	1.11	808	0.98	3.0
	South Tyneside	154,100	0.97	0.99	0.99	0.94	1.00	0.93	0.78	1.11	785	0.97	4.8
	<i>Stockton-on-Tees Teaching</i>	192,600	0.78	0.88	0.82	0.81	0.80	0.79	0.66	0.94	644	0.81	4.7
Sunderland Teaching	283,400	1.03	0.97	0.94	0.96	0.95	0.94	0.83	1.07	783	0.96	3.3	
North West	<i>Ashton, Leigh and Wigan</i>	307,200	0.60	0.67	0.86	0.79	0.81	0.82	0.72	0.94	690	0.77	2.9
	Blackburn with Darwen Teaching	140,000	1.16	1.20	1.40	1.30	1.31	1.27	1.07	1.51	921	1.28	22.7
	<i>Blackpool</i>	140,200	0.71	0.60	0.76	0.79	0.85	0.80	0.65	0.97	692	0.76	3.7
	Bolton Teaching	266,500	0.80	0.82	1.08	1.05	0.96	1.06	0.93	1.21	844	0.97	12.3
	Bury	183,500	0.43	0.46	0.88	0.83	0.91	0.88	0.74	1.04	714	0.75	8.5
	<i>Central and Eastern Cheshire</i>	457,200			0.82	0.78	0.79	0.75	0.67	0.84	661	0.79	3.4
	<i>Central Lancashire</i>	459,200	0.77	0.73	0.80	0.82	0.85	0.84	0.75	0.93	697	0.80	6.7
	<i>Cumbria Teaching</i>	494,400	0.77	0.76	0.75	0.74	0.71	0.71	0.63	0.79	649	0.74	2.0
	East Lancashire Teaching	381,200	0.90	0.93	1.07	1.02	0.98	0.96	0.85	1.07	787	0.98	9.4
	Halton and St Helens	296,700	0.88	0.94	0.97	0.90	0.92	0.94	0.82	1.07	779	0.92	2.1
	Heywood, Middleton and Rochdale	205,000			1.01	1.03	1.06	1.01	0.87	1.18	795	1.03	12.6
	Knowsley	149,200	1.24	1.19	1.14	1.08	1.03	0.95	0.79	1.14	751	1.09	2.8
	Liverpool	445,300	1.16	1.15	1.10	1.11	1.11	1.08	0.97	1.19	813	1.12	8.3
	Manchester Teaching	498,800			1.06	1.13	1.16	1.20	1.09	1.33	762	1.14	23.4
	<i>North Lancashire Teaching</i>	329,100	0.71	0.69	0.77	0.73	0.74	0.71	0.62	0.82	638	0.73	4.2
	Oldham	219,600	0.51	0.62	0.94	0.94	0.93	0.92	0.79	1.08	715	0.82	12.2
	Salford	229,100	0.59	0.62	0.78	0.83	0.82	0.87	0.74	1.02	659	0.76	7.7
	<i>Sefton</i>	272,800	0.94	0.92	0.88	0.85	0.84	0.87	0.76	1.00	773	0.88	2.6
	<i>Stockport</i>	284,700			0.86	0.87	0.82	0.85	0.74	0.97	724	0.85	6.4
	Tameside and Glossop	250,700			1.03	0.99	0.97	1.00	0.87	1.14	810	1.00	5.9
Trafford	217,100			0.77	0.74	0.76	0.88	0.75	1.03	719	0.79	11.2	
Warrington	199,100	0.81	0.82	0.90	0.88	0.94	0.86	0.73	1.01	713	0.87	3.5	
Western Cheshire	234,300	0.95	0.94	0.93	0.93	0.95	0.98	0.86	1.13	862	0.95	3.1	
<i>Wirral</i>	308,800	1.09	1.05	0.97	0.90	0.85	0.82	0.72	0.94	703	0.94	2.8	
Yorkshire and the Humber	Barnsley	227,500	1.14	1.12	1.06	1.06	1.10	1.14	1.00	1.30	958	1.10	2.7
	Bradford and Airedale Teaching	512,700	1.23	1.14	1.16	1.15	1.12	1.19	1.08	1.30	862	1.16	25.0
	Calderdale	202,800	1.06	1.09	1.11	1.07	1.06	1.08	0.93	1.25	883	1.08	9.8
	Doncaster	290,900	1.05	1.06	0.97	0.97	0.98	0.96	0.84	1.09	804	1.00	4.3
	<i>East Riding of Yorkshire</i>	338,500	0.80	0.81	0.79	0.81	0.83	0.79	0.70	0.90	736	0.81	3.0
	Hull Teaching	263,800	1.00	0.99	1.03	0.96	1.00	0.99	0.86	1.13	747	1.00	5.8
	Kirklees	409,900	1.15	1.18	1.11	1.04	1.04	1.06	0.95	1.18	827	1.09	16.0

Table 2.5. Continued

UK area	Name	Total population	2005 O/E	2006 O/E	2007 O/E	2008 O/E	2009 O/E	2010			Crude rate pmp	% non-White	
								O/E	95% LCL	95% UCL		O/E	O/E
Yorkshire and the Humber	<i>Leeds</i>	798,700	0.98	0.99	0.93	0.88	0.86	0.88	0.80	0.96	647	0.92	11.8
	North East Lincolnshire	158,800	0.98	1.02	1.01	1.01	0.99	0.99	0.84	1.18	831	1.00	3.1
	<i>North Lincolnshire</i>	157,500	0.90	0.95	0.91	0.88	0.76	0.73	0.60	0.89	641	0.85	3.2
	<i>North Yorkshire and York</i>	802,100	0.80	0.79	0.79	0.78	0.80	0.79	0.73	0.86	696	0.79	3.7
	Rotherham	254,300	1.21	1.11	1.11	1.14	1.11	1.15	1.01	1.30	963	1.14	5.2
	Sheffield	555,700	1.06	1.08	1.08	1.07	1.07	1.10	1.00	1.20	842	1.08	12.2
	<i>Wakefield District</i>	325,500	0.87	0.90	0.85	0.82	0.82	0.84	0.73	0.95	704	0.85	4.3
East Midlands	<i>Bassetlaw</i>	112,100	0.83	0.81	0.96	0.89	0.81	0.80	0.64	0.99	705	0.85	3.1
	Derby City	247,100	1.08	1.07	1.02	1.09	1.17	1.15	1.01	1.31	886	1.10	15.0
	<i>Derbyshire County</i>	729,900	0.84	0.84	0.88	0.88	0.86	0.84	0.77	0.91	741	0.86	3.2
	Leicester City	306,800	1.80	1.74	1.74	1.77	1.78	1.81	1.64	2.00	1,245	1.77	38.2
	<i>Leicestershire County and Rutland</i>	687,200	0.92	0.91	0.90	0.89	0.87	0.88	0.81	0.96	755	0.90	7.7
	<i>Lincolnshire Teaching</i>	705,000	0.83	0.79	0.78	0.78	0.77	0.79	0.72	0.86	712	0.79	3.3
	<i>Northamptonshire Teaching</i>	687,600	0.92	0.89	0.90	0.91	0.90	0.89	0.81	0.97	727	0.90	7.4
	Nottingham City	306,300	1.23	1.22	1.16	1.17	1.20	1.28	1.13	1.45	846	1.21	18.7
	Nottinghamshire County Teaching	668,000	1.06	1.03	1.01	0.98	0.95	0.94	0.86	1.02	808	0.99	5.1
West Midlands	Birmingham East and North	409,300	1.62	1.63	1.54	1.58	1.55	1.49	1.36	1.64	1,087	1.57	23.8
	Coventry Teaching	315,700	1.24	1.20	1.19	1.20	1.24	1.29	1.15	1.44	953	1.23	19.6
	Dudley	307,500	0.97	0.92	0.93	0.90	0.96	0.94	0.83	1.07	810	0.94	8.5
	Heart of Birmingham Teaching	285,100	2.40	2.40	2.37	2.39	2.41	2.38	2.16	2.63	1,414	2.39	61.8
	<i>Herefordshire</i>	179,400	0.91	0.87	0.86	0.77	0.81	0.76	0.64	0.90	713	0.83	2.4
	North Staffordshire	211,900			0.88	0.88	0.92	0.87	0.75	1.02	774	0.89	3.5
	Sandwell	292,900	1.50	1.51	1.48	1.55	1.60	1.57	1.42	1.75	1,222	1.54	21.8
	<i>Shropshire County</i>	293,400	0.92	0.90	0.90	0.95	0.92	0.86	0.76	0.98	791	0.91	3.0
	Solihull	206,300	1.03	1.08	0.97	0.92	0.98	0.93	0.80	1.08	795	0.98	9.0
	South Birmingham	342,200	1.49	1.41	1.34	1.37	1.38	1.33	1.20	1.48	991	1.38	17.9
	<i>South Staffordshire</i>	611,300			0.92	0.92	0.88	0.88	0.80	0.96	769	0.90	4.7
	Stoke on Trent	248,000			1.12	1.08	1.11	1.11	0.97	1.27	899	1.11	7.1
	Telford and Wrekin	162,400	0.79	0.87	1.03	1.02	1.07	1.05	0.89	1.24	844	0.98	6.6
	Walsall Teaching	256,800	1.34	1.30	1.27	1.32	1.29	1.36	1.21	1.53	1,102	1.32	14.7
	Warwickshire	536,200	1.08	1.03	1.03	0.99	1.01	1.02	0.93	1.12	884	1.03	6.7
	Wolverhampton City	239,300	1.32	1.26	1.20	1.23	1.24	1.18	1.04	1.35	944	1.24	23.8
<i>Worcestershire</i>	557,300	0.88	0.84	0.83	0.83	0.85	0.85	0.77	0.93	754	0.85	4.4	
East of England	<i>Bedfordshire</i>	416,300	0.83	0.86	0.81	0.82	0.82	0.84	0.74	0.94	687	0.83	9.3
	<i>Cambridgeshire</i>	616,400	0.91	0.91	0.87	0.83	0.85	0.87	0.80	0.96	714	0.87	7.4
	<i>Hertfordshire</i>	1,107,500	0.73	0.80	0.81	0.90	0.90	0.90	0.84	0.97	727	0.85	9.9
	Great Yarmouth and Waveney	214,700	0.42	0.43	0.51	0.78	0.85	0.90	0.78	1.05	829	0.67	3.5
	Luton	198,900	1.19	1.18	1.22	1.27	1.25	1.25	1.07	1.44	880	1.23	31.5
	<i>Mid Essex</i>	374,500	0.79	0.83	0.87	0.84	0.85	0.82	0.72	0.92	692	0.83	5.1
	<i>Norfolk</i>	764,800	0.93	0.94	0.93	0.90	0.87	0.83	0.77	0.90	754	0.90	3.9
	<i>North East Essex</i>	329,500				0.78	0.78	0.80	0.71	0.92	698	0.79	6.4
	Peterborough	173,600	0.99	1.04	1.05	0.98	1.05	1.03	0.88	1.22	789	1.03	13.0
	<i>South East Essex</i>	338,200	0.93	0.95	0.93	0.93	0.92	0.87	0.77	0.98	751	0.92	5.7
	South West Essex	410,000	0.92	0.93	0.94	0.96	0.95	0.96	0.86	1.07	759	0.95	7.6
	<i>Suffolk</i>	601,900	0.84	0.84	0.85	0.82	0.83	0.83	0.76	0.91	726	0.83	5.7
<i>West Essex</i>	286,400	0.84	0.80	0.75	0.69	0.71	0.74	0.64	0.86	615	0.75	7.9	
London	Barking and Dagenham	179,700	1.10	1.11	1.15	1.13	1.21	1.30	1.11	1.52	863	1.17	23.7
	Barnet	348,000	1.11	1.22	1.41	1.45	1.43	1.51	1.37	1.66	1,141	1.37	29.4
	Bexley	228,300	1.12	1.18	1.19	1.20	1.23	1.26	1.11	1.43	1,007	1.20	13.0
	Brent Teaching	256,300		1.36	2.04	2.25	2.33	2.45	2.24	2.68	1,810	2.11	53.5

Table 2.5. Continued

UK area	Name	Total population	2005 O/E	2006 O/E	2007 O/E	2008 O/E	2009 O/E	2010				% non-White	
								O/E	95% LCL	95% UCL	Crude rate pmp		
London	Bromley	312,400	1.00	0.99	0.96	1.00	0.98	1.01	0.89	1.14	826	0.99	11.9
	Camden	235,500	0.94	1.02	1.10	1.16	1.19	1.23	1.07	1.42	832	1.12	24.9
	City and Hackney Teaching	231,000		1.38	1.43	1.35	1.43	1.51	1.33	1.72	983	1.43	35.7
	Croydon	345,400	1.16	1.14	1.32	1.32	1.38	1.38	1.25	1.53	1,051	1.29	34.5
	Ealing	318,300	1.41	1.47	1.61	1.92	1.92	1.96	1.79	2.15	1,426	1.74	40.7
	Enfield	295,000	1.48	1.47	1.43	1.43	1.40	1.42	1.27	1.59	1,064	1.44	28.0
	Greenwich Teaching	228,100	1.14	1.16	1.18	1.26	1.30	1.44	1.26	1.64	1,000	1.26	26.1
	Hammersmith and Fulham	169,800	1.23	1.24	1.22	1.25	1.33	1.32	1.13	1.55	919	1.27	21.0
	Haringey Teaching	225,100	1.50	1.53	1.56	1.61	1.61	1.63	1.45	1.85	1,137	1.58	33.1
	Harrow	230,300			1.53	1.70	1.79	1.86	1.67	2.07	1,442	1.73	44.7
	Havering	236,100			0.80	0.81	0.81	0.79	0.68	0.93	661	0.80	8.8
	Hillingdon	266,200	0.96	1.04	0.94	1.31	1.31	1.34	1.19	1.51	988	1.16	25.9
	Hounslow	236,700	1.33	1.25	1.26	1.48	1.50	1.57	1.39	1.77	1,120	1.41	37.8
	Islington	193,900	1.33	1.45	1.35	1.28	1.27	1.36	1.18	1.58	908	1.34	22.9
	Kensington and Chelsea	169,500			0.79	0.96	0.96	1.00	0.85	1.19	791	0.93	22.6
	Kingston	169,000			1.05	1.16	1.13	1.11	0.94	1.31	817	1.12	19.9
	Lambeth	284,400	1.35	1.36	1.66	1.65	1.72	1.68	1.50	1.87	1,122	1.58	32.0
	Lewisham	266,400	1.63	1.66	1.69	1.65	1.74	1.70	1.52	1.90	1,179	1.68	34.4
	Newham	240,200	1.68	1.78	1.81	1.84	1.91	2.16	1.93	2.41	1,341	1.88	57.0
	Redbridge	270,300	1.23	1.22	1.19	1.32	1.37	1.45	1.29	1.63	1,058	1.31	40.9
	Richmond and Twickenham	190,800			0.63	0.70	0.76	0.77	0.64	0.92	597	0.72	11.7
	Southwark	287,100	1.52	1.53	1.63	1.67	1.69	1.74	1.56	1.94	1,174	1.64	34.1
Sutton and Merton	403,000			1.12	1.15	1.19	1.21	1.09	1.34	908	1.17	20.8	
Tower Hamlets	238,100	1.12	1.16	1.24	1.29	1.42	1.48	1.29	1.70	882	1.30	22.8	
Waltham Forest	227,400		1.38	1.57	1.55	1.50	1.59	1.40	1.80	1,095	1.52	36.6	
Wandsworth	289,200			1.37	1.38	1.44	1.43	1.27	1.61	954	1.41	19.7	
Westminster	253,400			0.92	1.00	1.07	1.09	0.95	1.25	789	1.03	27.8	
South East Coast	Brighton and Hove City	258,400	0.86	0.87	0.87	0.88	0.87	0.86	0.74	1.00	646	0.87	8.7
	<i>East Sussex Downs and Weald</i>	<i>336,100</i>	<i>0.82</i>	<i>0.78</i>	<i>0.80</i>	<i>0.74</i>	<i>0.71</i>	<i>0.70</i>	<i>0.62</i>	<i>0.80</i>	<i>652</i>	<i>0.76</i>	<i>4.9</i>
	Eastern and Coastal Kent	742,200			0.86	0.92	0.93	0.96	0.89	1.04	818	0.92	5.3
	<i>Hastings and Rother</i>	<i>179,700</i>	<i>0.82</i>	<i>0.79</i>	<i>0.75</i>	<i>0.78</i>	<i>0.73</i>	<i>0.79</i>	<i>0.67</i>	<i>0.94</i>	<i>735</i>	<i>0.78</i>	<i>5.2</i>
	Medway	256,600			0.84	0.88	0.88	0.87	0.75	1.01	686	0.87	7.5
	Surrey	1,114,400	0.76	0.77	0.86	0.87	0.89	0.88	0.83	0.95	738	0.84	8.3
	West Kent	685,100			0.86	0.89	0.89	0.86	0.79	0.94	720	0.88	6.8
	West Sussex	800,000	0.76	0.76	0.80	0.82	0.82	0.83	0.76	0.90	733	0.80	5.8
South Central	Berkshire East	406,500	1.01	1.07	1.19	1.19	1.20	1.19	1.08	1.32	903	1.15	18.9
	Berkshire West	471,500	0.96	1.03	1.12	1.12	1.13	1.04	0.94	1.15	808	1.07	10.1
	Buckinghamshire	512,100	0.97	0.97	0.95	0.93	0.92	0.91	0.82	1.00	756	0.94	10.4
	Hampshire	1,297,200	0.76	0.79	0.78	0.80	0.81	0.80	0.75	0.86	692	0.79	4.2
	<i>Isle of Wight National Health Service</i>	<i>140,200</i>	<i>0.64</i>	<i>0.62</i>	<i>0.57</i>	<i>0.57</i>	<i>0.53</i>	<i>0.54</i>	<i>0.43</i>	<i>0.68</i>	<i>514</i>	<i>0.57</i>	<i>3.6</i>
	Milton Keynes	247,000	0.90	0.85	0.90	0.92	0.89	0.91	0.78	1.05	684	0.90	12.7
	Oxfordshire	624,200	1.05	1.04	0.96	0.92	0.89	0.89	0.81	0.98	710	0.96	8.1
	Portsmouth City Teaching	207,200	1.05	0.99	0.97	0.97	0.93	0.91	0.77	1.08	652	0.97	8.0
Southampton City	239,800	0.93	0.89	0.89	0.93	0.92	0.98	0.84	1.14	688	0.93	11.4	
South West	Bath and North East Somerset	179,800	0.94	0.92	0.91	0.84	0.85	0.84	0.71	1.01	684	0.88	5.8
	<i>Bournemouth and Poole Teaching</i>	<i>310,800</i>	<i>0.88</i>	<i>0.86</i>	<i>0.89</i>	<i>0.88</i>	<i>0.85</i>	<i>0.83</i>	<i>0.73</i>	<i>0.95</i>	<i>701</i>	<i>0.87</i>	<i>5.0</i>
	Bristol	441,100	1.29	1.30	1.22	1.26	1.22	1.20	1.08	1.32	850	1.25	11.6
	Cornwall and Isles of Scilly	537,900	1.02	1.04	0.99	0.97	0.97	0.94	0.86	1.03	861	0.99	2.8
	Devon	749,700	0.81	0.83	0.84	0.86	0.88	0.87	0.80	0.94	800	0.85	3.3
	Dorset	404,900	0.86	0.82	0.83	0.85	0.85	0.83	0.75	0.93	810	0.84	3.5

Table 2.5. Continued

UK area	Name	Total population	2005 O/E	2006 O/E	2007 O/E	2008 O/E	2009 O/E	2010			Crude rate pmp	% non-White O/E	
								O/E	95% LCL	95% UCL			
	Gloucestershire	593,600	0.91	0.92	0.88	0.82	0.85	0.83	0.75	0.91	716	0.86	4.7
	North Somerset	212,100	1.04	0.99	0.91	0.92	0.86	0.83	0.71	0.97	745	0.92	3.6
	Plymouth Teaching	258,900	1.08	1.18	1.14	1.12	1.12	1.16	1.02	1.32	896	1.14	4.4
	Somerset	525,500	0.89	0.88	0.83	0.81	0.82	0.85	0.77	0.94	773	0.85	3.2
	South Gloucestershire	264,900	1.05	1.04	0.99	0.97	0.91	0.97	0.85	1.11	800	0.99	5.0
	Swindon	206,900	0.91	0.93	0.87	0.86	0.87	0.91	0.78	1.07	720	0.89	7.1
	Torbay	134,400	0.89	0.86	0.79	0.92	0.88	0.94	0.78	1.13	871	0.88	3.1
	Wiltshire	459,800	0.70	0.71	0.73	0.75	0.73	0.73	0.65	0.82	626	0.73	3.4
Wales	Betsi Cadwaladr University	678,500	1.04	0.99	0.95	0.94	0.91	0.88	0.81	0.96	778	0.95	1.0
	Powys Teaching	131,100	1.01	0.95	0.90	0.89	0.95	0.88	0.73	1.06	839	0.93	0.9
	Hywel Dda	374,800	1.04	1.02	0.97	1.02	0.96	0.90	0.81	1.01	816	0.98	1.0
	Abertawe Bro Morgannwg University	504,800	1.26	1.25	1.27	1.21	1.23	1.27	1.17	1.38	1,076	1.25	1.6
	Cwm Taf	290,600	1.42	1.47	1.52	1.44	1.40	1.32	1.18	1.48	1,087	1.43	1.1
	Aneurin Bevan	561,300	1.20	1.16	1.18	1.11	1.09	1.12	1.03	1.22	942	1.14	1.9
	Cardiff and Vale University	466,100	1.17	1.18	1.17	1.07	1.08	1.07	0.97	1.18	800	1.12	6.7
Scotland	Ayrshire & Arran	366,900	1.13	1.19	1.12	1.14	1.08	1.08	0.98	1.20	959	1.12	0.7
	Borders	113,000	0.82	0.82	0.93	0.96	1.00	1.06	0.88	1.28	982	0.94	0.6
	Dumfries and Galloway	148,100	1.06	0.99	0.89	0.92	0.92	0.90	0.75	1.07	851	0.94	0.7
	Fife	364,800	0.98	0.94	0.93	0.93	0.95	0.96	0.86	1.08	814	0.95	1.3
	Forth Valley	293,100	0.96	0.92	0.97	0.94	0.92	0.94	0.82	1.07	781	0.94	1.1
	Grampian	550,500	0.97	0.93	0.91	0.90	0.93	0.95	0.86	1.04	796	0.93	1.6
	Greater Glasgow & Clyde	1,204,100	1.28	1.22	1.18	1.13	1.09	1.06	1.00	1.13	850	1.15	3.4
	Highland	310,700	1.05	1.01	1.00	0.98	1.00	0.98	0.87	1.10	895	1.00	0.8
	Lanarkshire	562,700	1.05	1.01	0.96	0.96	0.93	0.96	0.88	1.05	794	0.98	1.2
	<i>Lothian</i>	<i>837,000</i>	<i>0.95</i>	<i>0.93</i>	<i>0.92</i>	<i>0.89</i>	<i>0.87</i>	<i>0.85</i>	<i>0.78</i>	<i>0.92</i>	<i>671</i>	<i>0.90</i>	<i>2.8</i>
	Orkney	19,800	1.16	1.16	0.95	1.14	1.09	0.99	0.63	1.58	909	1.08	0.4
	Shetland	22,500	0.54	0.44	0.65	0.45	0.54	0.57	0.31	1.02	489	0.53	1.1
	Tayside	402,400	1.16	1.14	1.09	1.02	1.07	1.05	0.94	1.16	905	1.09	1.9
	Western Isles	26,500	0.53	0.50	0.84	0.75	0.71	0.76	0.49	1.20	717	0.69	0.6
Northern Ireland	Belfast	335,700	1.38	1.38	1.37	1.31	1.21	1.21	1.09	1.36	915	1.30	1.1
	Northern	458,600	1.22	1.23	1.17	1.12	1.07	1.02	0.92	1.13	796	1.13	0.6
	Southern	357,700	1.15	1.07	1.01	1.02	1.00	1.01	0.89	1.14	732	1.04	0.4
	South Eastern	347,100	1.12	1.08	1.02	1.01	0.97	0.90	0.79	1.02	714	1.01	0.7
	Western	299,900	1.12	1.17	1.15	1.12	1.15	1.11	0.98	1.26	824	0.93	0.5

rates. Yorkshire and East Midlands previously met expected prevalence rates but these have fallen to lower than expected in the last 2 years. There was marked variation (30-fold) in prevalence rates in over 80 year olds between PCT/HBs.

Case mix in prevalent RRT patients

Time on RRT

Table 2.7 shows the median time, in years, since starting RRT of prevalent RRT patients on 31/12/2010. Median time on RRT for all prevalent patients was 5.6 years. (For patients who recovered for >90 days and then subsequently restarted RRT the median time from

the start of RRT was calculated from the most recent start date.) Patients with functioning transplants had survived a median of 10.3 years on RRT whilst the median time on RRT of HD and PD patients was significantly less (3.2 and 2.0 years respectively $p < 0.001$). The median time on RRT increased for both transplant and haemodialysis patients over the past 6 years (additional 0.7 and 0.5 years respectively) but not for peritoneal dialysis patients.

Age

The median age of prevalent UK patients on RRT at 31st December 2010 was slightly higher (57.9 years)

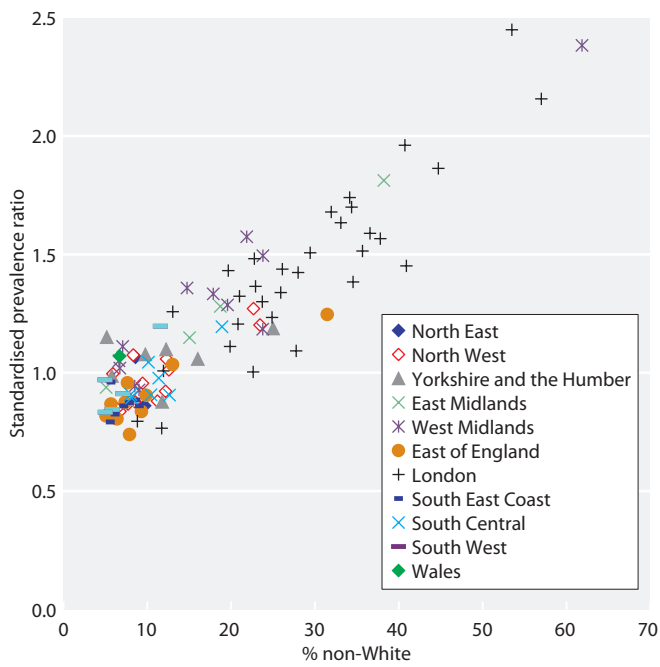


Fig. 2.3. Ethnicity and standardised prevalence ratios for all PCT/HB areas by percentage non-White on 31/12/2010 (excluding areas with <5% ethnic minorities)
 PCT/HB = Primary Care Trusts in England, Health and Social Care areas in Northern Ireland, Local Health Boards in Wales and Health Boards in Scotland
 SPR = standardised prevalence ratio

compared with 2009 (57.7 years) (table 2.8) and significantly higher than in 2005 when it was 55 years. There were marked differences between modalities; the median age of HD patients (66.3 years) was greater

Table 2.7. Median time on RRT of prevalent patients on 31/12/2010

Modality	N	Median time treated (years)
Haemodialysis	21,939	3.2
Peritoneal dialysis	3,788	2.0
Transplant	23,836	10.3
All RRT	49,563	5.6

Median time on RRT was calculated from the most recent start date. Patients with an initial treatment modality of transferred in or transferred out were excluded from the calculation of median time on RRT, since their treatment start date is not accurately known

than those on PD (61.7 years) and substantially higher than those of transplanted patients (51.2 years). About half of the UK prevalent RRT population were in the age group 40–64 years of age, with Northern Ireland and Wales having a higher proportion (16.8% and 16.7% respectively) of patients older than 75+ years compared with England (15.2%) and Scotland (13.5%) (table 2.9). Furthermore there existed a wide range between centres in the proportion of patients aged over 75 (range 9% in Manchester Royal Infirmary to 35% in Ulster) and over 85 (0.5% in Carlisle and 6.4% in Gloucester).

There were wide inter-centre variations in the median age of patients on RRT. Ulster had the highest median age (69.4 years), whilst London Guys and Manchester Royal Infirmary had the lowest median ages (53.2 years each) (table 2.8). The median age of the non-White dialysis population was lower than the White dialysis

Table 2.6. Standardised rate ratio of RRT for each Strategic Health Authority in England and for Wales, Scotland and Northern Ireland in 2010

UK Area	Total population	O/E	95% LCL	95% UCL	Crude rate pmp
North East England	2,607,000	0.87	0.83	0.91	726.1
North West England	6,969,700	0.90	0.88	0.92	737.5
Yorkshire and the Humber	5,298,700	0.96	0.93	0.99	775.3
East Midlands	4,450,000	0.95	0.92	0.99	795.7
West Midlands	5,455,000	1.12	1.09	1.15	919.5
East of England	5,832,700	0.87	0.85	0.90	731.2
London	7,824,900	1.45	1.42	1.48	1,042.2
South East Coast	4,372,500	0.86	0.83	0.89	732.3
South Central England	4,145,700	0.90	0.87	0.93	727.7
South West England	5,280,300	0.89	0.87	0.92	775.3
Wales	3,007,200	1.06	1.02	1.10	899.5
Scotland	5,222,100	0.98	0.95	1.01	818.6
Northern Ireland	1,799,000	1.04	0.99	1.10	794.3

O/E = observed/expected prevalence rate ratio given the age/gender breakdown of each region

Table 2.8. Median age of prevalent RRT patients by treatment modality in renal centres on 31/12/2010

Centre	Median age				Centre	Median age			
	HD	PD	Transplant	RRT		HD	PD	Transplant	RRT
Abrdn	65.8	54.1	51.8	56.2	L Rfree	64.3	64.3	50.4	56.1
Airdrie	61.7	55.5	49.6	56.0	L St.G	68.3	63.6	52.3	59.7
Antrim	68.7	71.2	50.1	64.3	L West	66.4	63.1	52.5	58.0
B Heart	66.6	58.3	52.9	62.3	Leeds	67.8	60.1	50.7	56.7
B QEH	65.1	57.7	50.4	56.6	Leic	66.5	65.4	51.4	59.2
Bangor	65.7	63.6		65.7	Liv Ain	63.7	63.8		63.8
Basldn	66.2	69.5	48.1	63.4	Liv RI	62.2	54.3	50.6	54.0
Belfast	63.7	54.5	50.2	53.9	M Hope	61.4	57.9	49.5	56.0
Bradfd	62.1	44.0	49.9	53.4	M RI	61.7	55.2	49.3	53.2
Brightn	70.6	65.9	52.6	61.5	Middlbr	68.4	57.3	51.4	57.6
Bristol	67.4	59.0	52.3	57.5	Newc	63.6	61.5	52.9	56.8
Camb	71.5	65.0	51.5	57.7	Newry	66.1	64.3	52.4	61.3
Cardff	67.9	62.8	50.6	56.8	Norwch	70.9	66.2	51.8	63.3
Carlis	68.3	60.3	52.5	57.5	Nottm	66.6	60.5	49.0	57.1
Carsh	68.9	63.8	50.6	61.1	Oxford	66.9	63.3	50.3	55.7
Chelms	70.1	64.5	57.1	63.4	Plymth	69.1	67.0	53.7	58.8
Clwyd	63.9	58.8	55.5	61.4	Ports	65.8	63.8	51.7	57.2
Colchr	68.1			68.1	Prestn	64.4	60.2	52.0	58.7
Covnt	66.4	64.5	50.1	57.6	Redng	69.7	60.4	54.5	59.9
D & Gall	68.7	66.9	49.1	60.0	Sheff	64.7	62.0	51.5	58.5
Derby	69.6	64.1	53.7	63.0	Shrew	67.9	61.5	52.9	62.2
Derry	64.8	52.7	52.0	59.5	Stevng	65.1	56.2	49.9	59.1
Donc	66.9	61.0	55.3	63.4	Sthend	69.8	60.8	53.6	63.6
Dorset	70.4	70.4	56.1	63.5	Stoke	66.9	65.5	49.1	59.1
Dudley	66.5	57.6	58.2	61.2	Sund	63.1	50.6	52.0	56.7
Dundee	70.3	61.3	51.9	62.1	Swanse	70.4	63.1	54.6	64.5
Dunfn	66.3	65.9	50.5	59.6	Truro	72.4	71.5	55.0	63.7
Edinb	62.0	59.8	50.2	55.2	Tyrone	68.6	58.0	45.2	62.7
Exeter	72.7	64.2	51.1	62.2	Ulster	72.2	48.8	54.4	69.4
Glasgw	63.1	57.9	51.3	55.6	Wirral	65.0	55.1		63.9
Glouc	73.0	61.4	53.7	64.2	Wolve	66.8	61.4	50.1	60.9
Hull	65.6	62.5	50.5	57.4	Wrexm	67.2	67.6	51.5	57.0
Inverns	71.7	63.3	47.1	55.1	York	64.2	61.4	50.9	57.4
Ipswi	66.3	63.7	52.3	58.9	England	66.3	61.7	51.2	57.9
Kent	70.2	66.3	52.2	61.4	N Ireland	67.1	57.9	50.2	58.9
Klmarnk	65.9	62.2	49.3	60.0	Scotland	64.5	59.6	50.6	56.7
L Barts	60.5	58.8	48.9	54.2	Wales	68.4	63.6	51.7	59.7
L Guys	61.0	61.3	49.7	53.2	UK	66.3	61.7	51.2	57.9
L Kings	63.4	60.2	51.1	56.8					

Blank cells – no patients for that treatment modality

population (60 vs. 66 years). The differing age distributions of the transplant and dialysis populations are illustrated in figure 2.4, demonstrating that the age peak for prevalent dialysis patients is around 27 years later than for prevalent transplant patients.

In the UK on 31st December 2010, 62% of patients aged under 65 years on RRT had a functioning transplant (table 2.14) compared with only 24% aged 65 years and over. This was similar in all four UK countries.

Gender

Standardising the age of the UK RRT prevalent patients by using the age and gender distribution of the UK population by PCT/HB (from ONS mid-2010 population estimates), allowed estimation of crude prevalence rates by age and gender (figure 2.5). This shows a progressive increase in prevalence rate with age, peaking at 2,007 pmp (a slight increase from 1,912 pmp in 2009) in the age-group 70–74 years before showing a reducing

Table 2.9. Percentage of prevalent RRT patients in each age group by centre on 31/12/2010

Centre	N	Percentage of patients			
		18–39 years	40–64 years	65–74 years	75+ years
Abrdn	462	18.8	51.5	18.0	11.7
Airdrie	326	18.7	51.5	17.2	12.6
Antrim	217	12.4	38.7	28.1	20.7
B Heart	632	11.4	43.8	24.1	20.7
B QEH	1,844	16.3	50.8	18.0	15.0
Bangor	113	7.1	40.7	26.5	25.7
Basldn	214	14.5	39.7	21.5	24.3
Belfast	682	17.4	54.7	15.4	12.5
Bradfd	455	22.2	48.4	18.0	11.4
Brightn	770	13.0	45.1	21.4	20.5
Bristol	1,250	16.1	51.0	19.1	13.8
Camb	987	16.6	50.4	17.3	15.7
Cardff	1,517	16.3	53.0	17.9	12.8
Carlisle	203	13.3	54.2	23.6	8.9
Carsh	1,377	12.6	46.4	22.4	18.7
Chelms	238	9.7	45.8	20.2	24.4
Clwyd ^a	130	7.7	55.4	19.2	17.7
Colchr	121	8.3	33.9	23.1	34.7
Covnt	844	13.6	51.4	20.0	14.9
D & Gall	118	13.6	52.5	16.1	17.8
Derby	459	11.5	43.4	24.6	20.5
Derry	111	12.6	52.3	19.8	15.3
Donc	222	12.2	42.3	24.3	21.2
Dorset	585	11.1	42.1	25.6	21.2
Dudley	303	8.9	49.8	23.8	17.5
Dundee	385	13.8	44.9	22.1	19.2
Dunfn	263	14.4	44.9	22.8	17.9
Edinb	713	17.5	54.8	17.8	9.8
Exeter	785	11.5	44.8	18.9	24.8
Glasgw	1,490	16.4	54.2	17.6	11.8
Glouc	377	9.8	42.7	22.5	24.9
Hull	725	15.3	51.7	19.6	13.4
Inverns	230	16.1	50.9	15.7	17.4
Ipswi	316	13.0	53.8	21.2	12.0
Kent	793	12.6	45.8	22.7	18.9
Klmarnk	284	10.6	51.8	18.7	19.0
L Barts	1,778	17.8	56.4	16.3	9.6
L Guys	1,618	20.5	54.4	14.9	10.3
L Kings	837	14.0	52.3	18.5	15.2
L Rfree	1,639	19.0	49.7	17.1	14.2
L St.G	678	13.7	50.9	18.9	16.5
L West	2,862	12.9	53.1	20.6	13.3
Leeds	1,383	17.8	50.7	18.5	13.0
Leic	1,808	13.2	51.2	20.1	15.5
Liv Ain	159	11.9	41.5	22.0	24.5
Liv RI	1,238	17.6	56.9	15.6	9.9
M Hope	837	16.7	53.4	19.2	10.6
M RI	1,552	19.3	57.1	14.8	8.8
Middlbr	711	13.8	51.3	19.7	15.2
Newc	888	16.2	54.6	18.6	10.6
Newry	177	16.4	42.9	26.6	14.1
Norwch	615	12.4	41.8	23.6	22.3
Nottm	972	18.6	48.9	18.5	14.0
Oxford	1,363	16.9	53.2	17.2	12.6
Plymth	459	13.5	49.9	22.2	14.4

Table 2.9. Continued

Centre	N	Percentage of patients			
		18–39 years	40–64 years	65–74 years	75+ years
Ports	1,333	14.8	53.4	18.2	13.7
Prestn	968	13.6	51.3	19.8	15.2
Redng	636	13.4	47.3	20.0	19.3
Sheff	1,254	13.2	52.2	18.9	15.8
Shrew	337	11.3	45.1	23.7	19.9
Stevng	606	13.9	47.4	21.5	17.3
Sthend	212	10.8	43.9	22.6	22.6
Stoke	635	15.7	46.8	20.0	17.5
Sund	369	13.3	56.9	19.0	10.8
Swanse	595	9.6	41.7	24.2	24.5
Truro	335	11.6	41.8	21.5	25.1
Tyrone	145	17.9	37.2	23.4	21.4
Ulster	112	8.9	28.6	27.7	34.8
Wirral	223	9.9	43.5	23.3	23.3
Wolve	518	11.0	46.7	21.6	20.7
Wrexm	223	16.1	47.5	19.3	17.0
York	337	20.5	45.4	16.6	17.5
England	42,660	15.0	50.5	19.3	15.2
N Ireland	1,444	15.6	46.9	20.8	16.8
Scotland	4,271	16.2	52.0	18.3	13.5
Wales	2,578	13.9	49.5	19.9	16.7
UK	50,953	15.1	50.5	19.3	15.1

^a 10 PD and 2 HD patients from Clwyd are not included in this table

prevalence rate in age-groups over 80 years. Crude prevalence rates in males exceeded those of females for all age-groups, peaking in age-group 75–79 years at 2,765 pmp and for females in age-group 70–74 years at 1,406 pmp. Survival of males and females on RRT has been described in chapter 6.

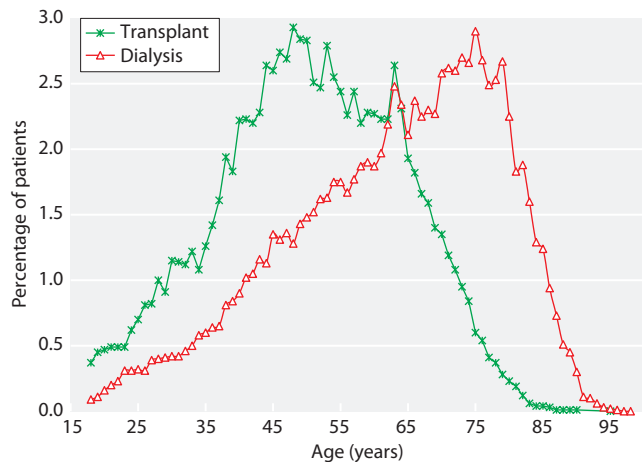


Fig. 2.4. Age profile of prevalent RRT patients by modality on 31/12/2010

Ethnicity

Forty-nine of the 72 centres (68%) provided ethnicity data that were at least 90% complete (table 2.10) and this was an improvement compared with 2009. Ethnicity completeness for prevalent RRT patients improved in the UK from 83.3% in 2009 to 87.4% in 2010 with

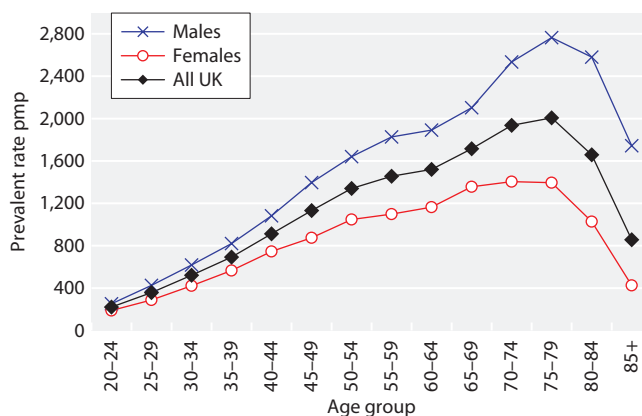


Fig. 2.5. Prevalence rate of RRT patients per million population by age and gender on 31/12/2010

Table 2.10. Ethnicity of prevalent RRT patients by centre on 31/12/2010

Centre	N	Percentage of patients					
		White	Black	Asian	Chinese	Other	Missing
Abrdn	462	45.7	0.0	0.4	0.4	0.2	53.2
Airdrie	326	31.3	0.0	0.9	0.3	0.0	67.5
Antrim	217	99.1	0.0	0.9	0.0	0.0	0.0
B Heart	632	61.9	6.3	29.9	0.6	1.3	0.0
B QEH	1,844	65.0	9.3	22.1	1.1	2.4	0.1
Bangor	113	62.8	1.8	0.0	0.0	0.0	35.4
Basldn	214	89.7	7.0	2.3	0.0	0.9	0.0
Belfast	682	96.2	0.1	0.6	0.1	0.0	2.9
Bradfd	455	54.1	3.1	36.9	0.0	1.1	4.8
Brightn	770	49.0	1.3	0.6	0.1	0.5	48.4
Bristol	1,250	89.2	4.3	3.6	0.5	1.4	1.0
Camb	988	91.6	1.5	3.6	0.2	0.8	2.2
Cardff	1,517	70.7	0.9	2.5	0.4	0.5	24.9
Carlisle	203	98.0	0.0	0.5	0.0	0.0	1.5
Carsh	1,377	69.6	8.3	11.0	1.7	2.7	6.7
Chelms	238	89.1	2.1	2.5	1.3	2.1	2.9
Clwyd	130	68.5	0.0	0.0	0.8	0.0	30.8
Colchr	120	52.5	1.7	1.7	0.8	0.8	42.5
Covnt	844	80.2	3.2	12.9	0.5	0.1	3.1
D & Gall	118	11.9	0.0	0.0	0.0	0.0	88.1
Derby	459	80.0	3.3	9.4	0.2	1.1	6.1
Derry	111	99.1	0.0	0.0	0.9	0.0	0.0
Donc	222	97.7	0.5	1.4	0.5	0.0	0.0
Dorset	585	97.1	0.3	0.9	0.5	1.2	0.0
Dudley	303	86.1	2.6	8.9	0.7	1.7	0.0
Dundee	385	49.1	0.0	0.8	0.0	0.3	49.9
Dunfn	263	21.3	0.0	0.0	0.0	0.4	78.3
Edinb	713	7.4	0.0	0.3	0.1	0.0	92.1
Exeter	785	94.1	0.5	0.1	0.3	0.3	4.7
Glasgw	1,490	7.4	0.1	1.1	0.1	0.0	91.2
Glouc	377	95.5	2.4	1.6	0.3	0.3	0.0
Hull	725	48.7	0.4	0.3	0.0	0.4	50.2
Inverns	230	41.7	0.0	0.4	0.0	0.0	57.8
Ipswi	316	91.5	2.5	2.5	0.3	0.3	2.8
Kent	793	88.3	0.8	2.0	0.1	0.5	8.3
Klmarnk	284	6.3	0.0	0.0	0.4	0.0	93.3
L Barts	1,778	41.0	30.6	26.1	1.7	0.3	0.3
L Guys	1,618	53.3	22.4	2.7	1.2	0.7	19.7
L Kings	837	50.7	33.0	10.5	1.7	0.6	3.6
L Rfree	1,639	50.0	20.6	18.5	1.6	7.5	1.7
L St.G	678	51.2	20.9	8.6	1.8	6.0	11.5
L West	2,862	45.4	18.1	31.4	1.0	3.8	0.2
Leeds	1,383	75.1	3.5	12.7	0.0	1.6	7.2
Leic	1,808	74.6	3.3	16.6	0.3	1.0	4.1
Liv Ain	159	56.6	0.6	0.6	0.6	1.3	40.3
Liv RI	1,238	80.1	2.1	1.0	1.1	0.7	15.0
M Hope	837	82.8	1.3	13.9	0.4	1.3	0.4
M RI	1,552	77.4	7.7	11.0	1.0	0.1	2.7
Middlbr	711	95.1	0.4	3.4	0.1	0.1	0.8
Newc	888	95.4	0.2	3.0	0.5	0.9	0.0
Newry	177	99.4	0.0	0.0	0.6	0.0	0.0
Norwch	615	83.3	0.3	1.0	0.7	0.2	14.6
Nottm	972	87.4	5.3	5.9	0.0	1.3	0.0
Oxford	1,363	81.1	3.2	7.3	0.7	2.2	5.4
Plymth	459	96.1	0.4	0.2	0.4	0.9	2.0

Table 2.10. Continued

Centre	N	Percentage of patients					
		White	Black	Asian	Chinese	Other	Missing
Ports	1,333	92.7	1.2	3.0	0.7	1.1	1.3
Prestn	968	85.4	0.7	13.0	0.0	0.6	0.2
Redng	636	72.6	6.3	18.4	0.6	1.9	0.2
Sheff	1,254	92.6	1.4	3.7	0.4	1.6	0.2
Shrew	337	96.1	1.2	2.1	0.0	0.6	0.0
Stevng	606	72.1	8.4	17.3	0.5	1.7	0.0
Sthend	212	84.4	1.9	0.9	2.4	0.5	9.9
Stoke	635	71.8	0.3	2.8	0.2	1.3	23.6
Sund	369	95.9	1.4	1.4	0.3	0.3	0.8
Swanse	595	98.0	0.3	1.2	0.0	0.2	0.3
Truro	335	76.1	1.8	0.0	0.3	0.0	21.8
Tyrone	145	98.6	0.7	0.7	0.0	0.0	0.0
Ulster	112	98.2	0.0	0.9	0.9	0.0	0.0
Wirral	223	92.8	0.4	1.8	1.8	1.8	1.3
Wolve	518	72.4	8.7	17.4	0.4	0.0	1.2
Wrexm	223	98.7	0.0	0.4	0.0	0.0	0.9
York	337	87.5	0.6	0.6	0.0	0.3	11.0
England	42,660	73.2	7.7	10.9	0.7	1.5	6.0
N Ireland	1,444	97.6	0.1	0.6	0.3	0.0	1.4
Scotland	4,271	19.9	0.0	0.7	0.2	0.1	79.2
Wales	2,578	79.0	0.7	1.8	0.3	0.3	17.9
UK	50,953	69.7	6.5	9.3	0.6	1.3	12.6

Appendix H ethnicity coding

94% ethnicity completeness in England in 2010. Ethnicity completeness is generally slightly worse in prevalent HD patients with the best ethnicity completeness recorded for prevalent transplant patients, this may relate to the fact that the intensive work-up for transplantation may increase the recording of data.

In 2010, 17.7% of the prevalent UK RRT population (with assigned ethnicity) were from ethnic minorities (20.8% in England). The proportions in Wales, Scotland and Northern Ireland were very small, although there was a high level of missing ethnicity data in Scotland. This compared with approximately 12% [1] of the UK general population who were designated as belonging to an ethnic minority. The number of patients reported to the UKRR as receiving RRT and belonging to an ethnic minority has doubled in the last 5 years which may be due to improvements in coding of ethnicity as well as increasing incidence of ERF and increased referral rates in these populations.

Amongst the centres with more than 50% returns, there was wide variation between centres with respect to the proportion of patients from ethnic minorities, ranging from 0.5% in one centre (Carlisle) to over 50% in London Barts (58.7%) and London West (54.4%). Three centres have over 40% of prevalent patients from

ethnic minorities, Bradford (41.1%), London Kings (45.8%), London Royal Free (48.3%). Centres with an ethnic minority population greater than 10% had higher numbers of prevalent patients on RRT, both on dialysis and with functioning transplants. Fifty-seven percent of transplanting centres had an ethnic minority population greater than 10% compared with 25% of non-transplanting centres.

As would be expected, ethnicity also impacted the median age of the prevalent cohort. Those centres with an ethnic minority population of >10% had a slightly lower median age (57 years vs. 59 years).

Primary renal diagnosis

Data for primary renal diagnosis (PRD) were not sent in 2.5% of patients (3.3% in 2009) and there remained a marked inter-centre difference in completeness of data returns. Where centres had $\geq 50\%$ primary renal diagnosis data not sent they were excluded from the following analyses. The UKRR is also concerned about some centres with very high rates of primary renal diagnosis uncertain (EDTA codes 00 and 10). It is accepted that there will inevitably be a number of patients with uncertain aetiology and that the proportion of these patients will vary between clinicians and centres as the definitions

Table 2.11. Primary renal diagnosis in prevalent RRT patients by age and gender on 31/12/2010

Primary diagnosis ^a	N	% all patients	Inter-centre range %	age <65		age ≥65		M:F ratio
				N	%	N	%	
Aetiology uncertain/GN (not biopsy proven) ^b	10,044	20.5	6.2–38.1	5,820	18.1	4,224	25.1	1.6
GN (biopsy proven) ^b	7,834	16.0	1.1–22.8	6,008	18.7	1,826	10.8	2.2
Pyelonephritis	5,733	11.7	6.3–18.8	4,329	13.5	1,404	8.3	1.2
Diabetes	7,282	14.9	8.2–25.4	4,451	13.9	2,831	16.8	1.6
Polycystic kidney	4,720	9.7	1.7–16.8	3,242	10.1	1,478	8.8	1.1
Hypertension	2,802	5.7	0.5–14.9	1,576	4.9	1,226	7.3	2.4
Renal vascular disease	1,697	3.5	0.3–12.9	338	1.1	1,359	8.1	2.0
Other	7,576	15.5	5.0–39.4	5,525	17.2	2,051	12.2	1.3
Not sent	1,244	2.5	0.1–48.8	795	2.5	449	2.7	1.6

^a Appendix H: ERA-EDTA coding

^b GN–glomerulonephritis

Excluded centres with ≥40% primary renal diagnosis aetiology uncertain/glomerulonephritis (not biopsy proven) (Wirral and Liv RI) as well as centres with ≥50% primary renal diagnosis not sent (L RFree)

of renal vascular disease, hypertensive nephropathy and chronic glomerulonephritis (GN) without tissue diagnosis remain relatively subjective. However, some centres with very high rates of uncertain diagnosis appear to also have fewer patients with the more objective diagnoses such as polycystic kidney disease or biopsy-proven GN. It is believed that the software in these centres defaults any missing data to ‘uncertain’ (EDTA code 00). This issue has been raised with the centres and software suppliers in 2010 and although not completely resolved for the current data collection, the situation has improved markedly. As a result, two centres with ≥40% ‘uncertain’ diagnosis (Wirral, Liverpool RI) have been excluded from the inter-centre analysis and the UK and national totals have been adjusted. The three centres with a high rate of primary renal diagnosis uncertain and data not sent have also been excluded from other analyses where PRD is included in the case-mix adjustment. There was wide inter-centre variation in the proportion of primary renal diagnoses not sent in the RRT prevalent population but this is improving in most centres. There were 4 centres with >15% not sent (Brighton 16.6%, Colchester 48.8%, Truro 16.4%, London Royal Free 50.2%). Uncertain primary renal diagnosis also ranged widely between centres and 6 centres had >30% uncertain diagnosis (Bangor 31%, Cambridge 31%, Doncaster 34%, Ipswich 32%, Liverpool RI 38%, Manchester Hope 33%).

Biopsy-proven glomerulonephritis remained the most common specific primary renal diagnosis in the 2010 prevalent cohort at 16.0% (table 2.11), although 20.5% of patients had an uncertain diagnostic code. Diabetes accounted for 14.9% of renal disease in the prevalent

patients on RRT, although it was more common in the ≥65-year age-group compared to the younger group (16.8% vs. 13.9%). This contrasted with the pattern seen in incident patients where diabetes is the predominant specific diagnostic code in 24% of new RRT patients. This reflects the different ages and survival of patients with these diagnoses; it is the younger fitter patients who survive longest and contribute highly to the prevalent numbers. Younger patients (age <65 years) are more likely to have a specific diagnosis and far less likely to have renal vascular disease or hypertension as the cause of their renal failure.

The male:female ratio was greater than unity for all primary renal diagnoses. The gender imbalance may be influenced by the presence of factors such as hypertension, atheroma and renal vascular disease, which are more common in males, more common with increasing age and which may increase the rate of progression of kidney disease. As would be expected from the mode of inheritance, autosomal dominant polycystic kidney disease (ADPKD) was a major exception with the ratio approximating unity and this was similar in the incident cohort.

Diabetes

Diabetes included all prevalent patients with type 1 or type 2 diabetes as primary renal diagnosis (ERA-EDTA coding) and did not include patients with diabetes as a comorbidity. This analysis did not differentiate between type 1 and type 2 diabetes as this distinction was not made in the data submitted by some centres.

The number of prevalent patients with diabetes as a primary renal diagnosis increased to 7,282 in 2010,

Table 2.12. Median age, gender ratio and treatment modality in diabetic and non-diabetic prevalent RRT patients on 31/12/2010

	Diabetic patients	Other PRD
N	7,282	40,406
M:F ratio	1.57	1.54
Median age on 31/12/10	61	57
Median age at start of RRT	56	47
Median years on RRT	3.4	6.5
% HD	61	40
% PD	10	7
% transplant	30	52

Excluded centres with $\geq 40\%$ primary renal diagnosis aetiology uncertain/glomerulonephritis (not biopsy proven) (Wirral, Liv RI) as well as centres with $\geq 50\%$ primary renal diagnosis not sent (L RFree)

Diabetic patients are patients with a primary renal disease code of diabetes

Non-diabetic patients are calculated as all patients excluding diabetic patients and patients with a missing primary renal disease code

representing 14.9% of all prevalent patients (compared to 12.0% in 2004) (tables 2.12 and 2.13). The median age at start of RRT for patients with diabetes was 9 years higher compared with patients without diabetes, although the median age at the end of 2010 for diabetic patients was only 3.5 years higher. This reflected reduced survival for patients with diabetes compared with patients without diabetes on RRT. Median time on RRT for patients with diabetes was less compared with patients without diabetes (3.4 years vs. 6.5 years) and this difference in survival between diabetics and non-diabetics has not changed over the last 5 years. Patients with diabetes starting RRT in Scotland were 4 years younger and in Northern Ireland 3 years older compared with the UK average age of diabetic patients starting RRT.

Diabetes as the primary renal diagnosis also influenced the modality distribution. The predominant mode of treatment for patients with diabetes was HD (61%). The percentage of patients with a functioning transplant was much lower in prevalent patients with

Table 2.13. Age relationships in diabetic and non-diabetic patients and modality in prevalent RRT patients on 31/12/2010

	<65		≥ 65	
	Diabetic patients	Other PRD	Diabetic patients	Other PRD
N	4,451	26,838	2,831	13,568
% HD	47.2	28.7	81.8	63.6
% PD	9.7	6.3	9.6	9.0
% transplant	43.1	65.0	8.7	27.3

Excluded centres with $\geq 40\%$ primary renal diagnosis aetiology uncertain/glomerulonephritis (not biopsy proven) (Wirral, Liv RI) as well as centres with $\geq 50\%$ primary renal diagnosis not sent (L RFree)

Diabetic patients are patients with a primary renal disease code of diabetes

Non-diabetic patients are calculated as all patients excluding patients with diabetes and patients with a missing primary renal disease code

diabetes than in prevalent patients without diabetes (30% vs. 52%). However this has increased since 2004 when only 26% of patients with diabetes had a functioning transplant. As would be expected, this difference was even more pronounced for older patients with diabetes (age ≥ 65 years) (table 2.13), with only 8.7% of older prevalent patients with diabetes having a functioning transplant compared with 27.3% of their non-diabetic peers. In Northern Ireland, only 21% of prevalent patients with diabetes had a functioning transplant compared with the UK average of 30% although Northern Ireland diabetic patients were older. More prevalent patients without diabetes were on home dialysis therapies (home HD and PD 18.5%) compared with prevalent patients with diabetes (15.1%).

Modalities of treatment

Transplantation was the most common treatment modality (48%) for prevalent RRT patients in 2010, followed closely by centre-based HD (44%) in either

Table 2.14. Treatment modalities by age in UK countries on 31/12/2010

Country	<65 years				≥ 65 years			
	N	% HD	% PD	% transplant	N	% HD	% PD	% transplant
England	27,965	31.6	6.9	61.4	14,695	66.8	9.4	23.8
N Ireland	902	35.1	3.9	61.0	542	74.5	5.2	20.3
Scotland	2,913	32.9	5.7	61.4	1,358	68.2	7.7	24.2
Wales	1,634	27.7	6.9	65.4	944	67.4	10.2	22.5
UK	33,414	31.6	6.7	61.6	17,539	67.2	9.1	23.7

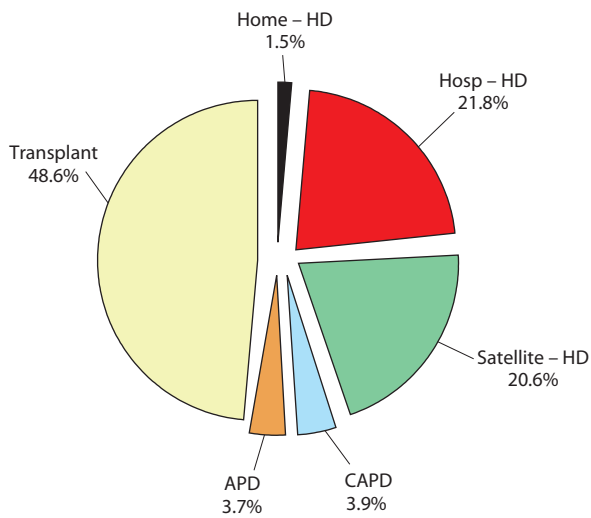


Fig. 2.6. Treatment modality in prevalent RRT patients on 31/12/2010

hospital centre (22%) or satellite unit (21%) (figure 2.6). Home therapies made up the remaining 9% of treatment therapies, largely PD in its different formats (8%) which was similar to 2009. Home therapies are now being used by 17.6% of prevalent dialysis patients (2.9% home HD and 14.7% PD). The proportion on continuous ambulatory peritoneal dialysis (CAPD) and automated PD (APD) was 3.9% and 3.7% respectively, though the proportion on APD may be an under-estimate due to centre coding issues which mean the UKRR cannot always distinguish between these therapies. The term CAPD has been used for patients receiving non-disconnect as well as disconnect CAPD systems, because

the proportion of patients using non-disconnect systems was very small. The number of patients on home HD has stopped falling, rising 23% since 2009 (636 to 780 patients).

As mentioned earlier, treatment modality was related to patient age. Younger patients (age <65 years), were more likely to have a functioning transplant (61.6%) when compared with patients aged over 65 years (23.7%) (table 2.14). HD was the principal modality in the older patients (67.2%).

Figure 2.7 shows the effect of age on modality distribution. With increasing age beyond 64 years, transplant prevalence reduced, whilst HD prevalence increased. The proportion of each age group treated by PD remained fairly stable across the age spectrum.

The proportion of prevalent dialysis patients receiving HD, ranged from 68.5% in Derby to 100% in Colchester (table 2.15).

The number of centres with no prevalent HD patients reported as being treated at satellite units decreased in 2010, although some of these centres were unable to record these data in their renal IT systems. Overall the proportion of dialysis patients treated in a satellite haemodialysis centre has increased to 40% this year compared to 36% in 2009 and 35% in 2007. Although there are satellite units in Scotland, the data are not provided to distinguish between main centre and satellite unit haemodialysis except for the Glasgow renal centre. In 2010, the number of centres that had more than 50% of their HD activity taking place in satellite units increased to 27 (table 2.15 and figure 2.8). There was also wide variation between centres in the proportion of PD patients on APD treatment, ranging from 0 to



Fig. 2.7. Treatment modality distribution by age in prevalent RRT patients on 31/12/2010

* Transplant in age group 85+, N = 29

Table 2.15. Percentage of prevalent dialysis patients by dialysis modality by centre on 31/12/2010

Centre	N	Haemodialysis				Peritoneal dialysis	
		Total	Home	Hospital	Satellite	CAPD	APD
Abrdn ^a	231	87.0	2.6	84.4	0.0	6.9	6.1
Airdrie ^a	194	94.3	0.0	94.3	0.0	2.1	3.6
Antrim ^b	140	92.1	2.1	90.0	0.0	0.7	6.4
B Heart	469	90.8	3.6	80.2	7.0	7.7	1.5
B QEH	1,011	84.9	2.9	15.8	66.2	6.5	8.6
Bangor	113	77.0	9.7	52.2	15.0	6.2	16.8
Basldn	163	84.7	0.0	84.1	0.6	7.4	8.0
Belfast ^b	264	88.6	4.9	83.7	0.0	1.1	9.9
Bradfd	222	83.3	0.0	70.7	12.6	2.3	14.4
Brightn	431	79.8	6.0	40.1	33.6	9.1	11.1
Bristol	522	88.1	5.6	14.9	67.6	6.7	5.2
Camb	384	90.9	2.6	41.7	46.6	0.0	0.0
Cardff	599	82.8	5.5	17.9	59.4	13.5	3.7
Carlis	73	82.2	0.0	61.6	20.6	9.6	8.2
Carsh	829	87.6	1.2	36.4	49.9	3.7	8.7
Chelms	158	77.9	0.0	77.9	0.0	13.9	8.2
Clwyd ^c	74	91.9	1.4	90.5	0.0	6.8	1.4
Colchr	120	100.0	0.0	100.0	0.0	0.0	0.0
Covnt	442	81.0	0.5	80.5	0.0	19.0	0.0
D & Gall ^a	61	86.9	0.0	86.9	0.0	6.6	6.6
Derby	321	68.5	14.3	54.2	0.0	25.6	5.9
Derry ^b	63	96.8	1.6	95.2	0.0	0.0	3.2
Donc	171	86.0	0.0	50.9	35.1	1.8	12.3
Dorset	299	81.6	1.0	21.7	58.9	8.4	10.0
Dudley	220	71.8	0.9	47.7	23.2	17.3	10.9
Dundee ^a	199	86.9	0.0	86.9	0.0	1.5	11.6
Dunfn ^a	161	83.9	0.0	83.9	0.0	2.5	13.7
Edinb ^a	325	84.3	2.2	82.2	0.0	4.9	10.8
Exeter	438	82.4	0.7	16.0	65.8	8.9	8.7
Glasgw ^a	680	92.2	4.1	88.1	0.0	3.2	4.6
Glouc	232	82.3	0.0	82.3	0.0	4.3	13.4
Hull	393	83.0	2.3	37.9	42.8	6.1	10.9
Inverns ^a	110	79.1	3.6	75.5	0.0	16.4	4.6
Ipswi	151	76.8	2.7	62.9	11.3	11.3	11.9
Kent	431	83.5	2.8	26.2	54.5	16.5	0.0
Klmarnk ^a	194	78.4	3.6	74.7	0.0	3.6	18.0
L Barts	981	80.6	0.8	27.7	52.1	8.0	11.4
L Guys ^d	612	92.3	5.9	27.6	58.8	3.1	4.6
L Kings	521	82.0	0.0	31.5	50.5	6.1	11.9
L Rfree	748	90.5	1.3	15.9	73.3	1.6	7.9
L St.G	339	83.5	2.1	44.3	37.2	3.8	12.4
L West	1,366	97.3	0.8	23.6	72.9	1.1	1.6
Leeds	594	83.5	2.5	17.9	63.1	4.9	11.6
Leic	964	82.5	2.3	18.2	62.0	5.8	11.7
Liv Ain	159	95.6	4.4	10.1	81.1	1.3	3.1
Liv RI	471	82.0	3.8	39.1	39.1	6.6	11.5
M Hope	488	74.6	3.3	36.7	34.6	20.1	5.3
M RI	569	84.5	12.1	29.9	42.5	3.7	11.8
Middlbr	308	92.9	2.9	28.6	61.4	6.8	0.3
Newc	324	83.3	4.6	78.7	0.0	2.2	14.2
Newry ^b	118	92.4	4.2	88.1	0.0	0.0	6.8
Norwch	373	85.5	4.0	48.8	32.7	10.7	3.5
Nottm	504	82.5	4.2	44.4	33.9	7.9	9.5
Oxford	491	77.6	3.7	36.0	37.9	7.7	14.7
Plymth	180	74.4	2.2	72.2	0.0	18.9	6.7

Table 2.15. Continued

Centre	N	Haemodialysis				Peritoneal dialysis	
		Total	Home	Hospital	Satellite	CAPD	APD
Ports	583	82.5	0.5	20.1	61.9	17.5	0.0
Prestn	567	88.9	4.8	20.3	63.8	2.7	8.5
Redng	346	75.1	0.3	64.2	10.7	24.9	0.0
Sheff	677	90.3	7.1	35.9	47.3	9.8	0.0
Shrew	223	90.1	2.7	49.3	38.1	9.9	0.0
Stevng	421	91.5	2.4	40.4	48.7	8.6	0.0
Sthend	144	87.5	2.1	85.4	0.0	12.5	0.0
Stoke	368	80.2	4.4	50.3	25.5	5.2	14.7
Sund	209	84.2	0.5	67.0	16.8	6.7	9.1
Swanse	412	87.6	4.9	51.5	31.3	9.5	2.9
Truro	182	84.1	1.1	46.7	36.3	6.6	9.3
Tyrone ^b	104	91.3	2.9	88.5	0.0	1.0	7.7
Ulster ^b	95	97.9	4.2	93.7	0.0	0.0	2.1
Wirral	223	83.4	1.8	33.6	48.0	4.5	12.1
Wolve	387	81.4	1.3	23.0	57.1	18.6	0.0
Wrexm	99	77.8	3.0	74.8	0.0	21.2	1.0
York	176	86.4	1.1	57.4	27.8	13.6	0.0
England	21,978	84.9	2.8	36.8	45.3	7.9	7.0
N Ireland	784	92.0	3.7	88.3	0.0	0.6	7.0
Scotland	2,155	87.5	2.4	85.1	0.0	4.4	8.2
Wales	1,297	84.0	5.2	40.0	38.7	11.8	4.2
UK	26,214	85.3	2.9	42.5	39.9	7.6	7.0

^a All haemodialysis patients in centres in Scotland are shown as receiving treatment at home or in centre as no data is available regarding satellite dialysis (except Glasgow)

^b There are no satellite centres in Northern Ireland

^c 10 PD and 2 HD patients from Clwyd are not included in this table

^d Data on all patients receiving treatment at one of L Guys satellite centres are not included n = 9

18% (table 2.15). Twelve of the 71 centres with a PD programme had no patients on APD, whilst in four Northern Ireland centres almost all PD patients were on this form of the modality. Cambridge PD patients (n = 39) were all reported as receiving unknown PD and are not included in table 2.15.

Home haemodialysis

The use of home HD as a RRT peaked in 1982 when almost 2,200 patients were estimated to be on this therapy, representing 61% of HD patients reported to the ERA-EDTA registry at that time. The fall in the use of this modality to just 445 patients (2.4% of HD patients) in 2006 was probably due to an increase in the use of renal transplantation and also the expansion of hospital HD provision with the introduction of satellite units. In the last seven years there has been renewed interest in home HD and a target of 15% of HD patients on this modality has been suggested [5]. Equipment changes and patient choice has helped drive this

change. Since 2006 there has been a gradual increase in the proportion of prevalent patients receiving haemodialysis in their own homes so that in 2010 it reached 3.4% of HD patients (n = 780, figure 2.2 and table 2.15). These numbers may be an under-estimate as some centres have been unable to submit data for patients coded as home HD and work is on-going to address this.

In 2010, the percentage of dialysis patients receiving home HD varied from 0% in 13 centres, to greater than 5% in 8 centres, namely Bangor 9.7%, Brighton 6%, Bristol 5.6%, Cardiff 5.5%, Derby 14.3%, London Guys 5.9%, Manchester RI 12.1% and Sheffield 7.1% (table 2.15).

The increase in home HD patients was mainly due to an increase in Wales plus the Northern Ireland renal centres in Belfast, Derry and Ulster. Improved coding of patients on home HD in Wales resulted in an increase in the number of prevalent patients returned to the UKRR, in particular the 2008 numbers were an underestimate of the true number of patients in Cardiff

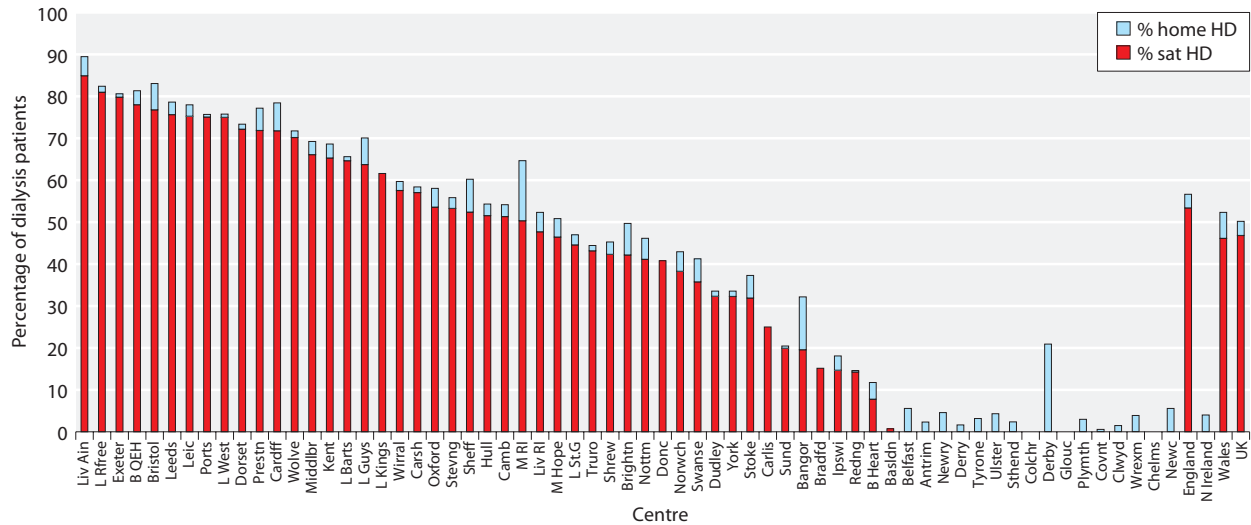


Fig. 2.8. Percentage of prevalent haemodialysis patients treated with satellite or home haemodialysis by centre on 31/12/2010
 * Scottish centres excluded as information on satellite HD was not available (except Glasgow)

on this treatment modality. Of the 15 centres with no patients recorded to be on home haemodialysis in 2009, four centres (Manchester Hope 3.3%, Portsmouth 0.5%, Southend 2.1%, Stevenage 2.4%) subsequently reported patients on this modality in 2010. Notable increases in the proportion of prevalent dialysis patients on home HD in 2010 compared with 2009 [3], were seen at Bangor (9.7% vs. 4.6%) and Derby (14.3% vs. 4.2%). In 19 centres, the proportion of prevalent dialysis patients on home HD decreased slightly in 2010 compared with the previous year.

Change in modality

The relative proportion of RRT modalities in prevalent patients has changed dramatically over the past decade. The main features are depicted in figure 2.9, which describes a sustained decrease in the proportion of patients treated by PD after 2000. Possible explanations for this change include recently published evidence indicating that the equivalent survival demonstrated between HD and PD was only maintained for the first 2–3 years [6] and recent concerns regarding the risk of encapsulating peritoneal sclerosis which might result in patients being switched from PD to HD after a fixed time interval. Analysis of UKRR data has shown that this is not the explanation as the vintage of PD patients has not changed substantially over the last 8 years. The reduction in prevalent PD patients was due to a decrease in the number of new patients who were started on peritoneal dialysis in 2009 and 2010 and also to the

declining proportion of patients starting RRT on peritoneal dialysis since 2001. The determinants of this pattern may be multi-factorial and include: an increase in HD capacity with the proliferation of satellite units, the effect of patient or physician choice regarding the treatment modality at start of RRT, the general health and fitness of patients starting RRT some of whom may be deemed less capable of undertaking PD independently and the rise in the number of patients receiving a live related transplant who may otherwise have gone onto PD. With the advent of assisted PD (more commonly used in France) [7] in conjunction with the increasing age of PD patients, there may be potential for some reversal or slowing in this decline. The proposed

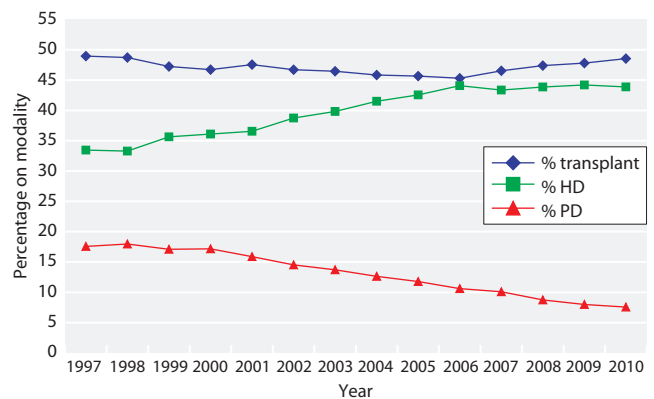


Fig. 2.9. Modality changes in prevalent RRT patients from 1997–2010

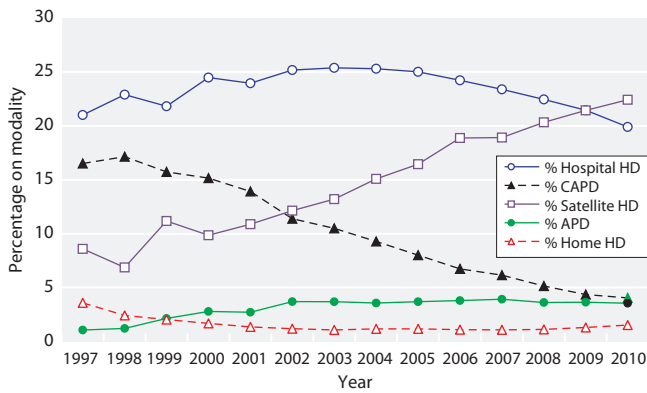


Fig. 2.10. Detailed dialysis modality changes in prevalent RRT patients from 1997–2010

* Scottish centres excluded as information on satellite HD was not available

introduction of dialysis tariffs in England may well result in further changes to the types of treatment patients receive in England.

The proportion of patients treated with HD was still increasing, although at a slower rate, and it may have begun to plateau from 2007 onwards. The proportion of patients with a functioning transplant had been on a slight downward trend but this has reversed since 2007, probably due to continued increases in living organ and non-heart beating donation [8].

Figure 2.10 depicts in more detail the modality changes in the prevalent dialysis population during this time and highlights a sustained reduction in the proportion of patients treated by CAPD. There was a sustained increase in the proportion of prevalent HD

patients treated at satellite units with a steady decline in hospital centre haemodialysis since 2004.

International comparisons

Prevalence rates in the UK are similar to those in most other Northern European countries but lower than in Southern Europe and Belgium and far lower than in the USA (figure 2.11).

Summary

There continued to be growth across the UK in prevalent patients on RRT with regional and centre level variation. For the first time this year there was no real difference in prevalence rates between the four nations of the UK. In general, areas with large ethnic minority populations had higher standardised prevalence ratios. There were increasing numbers of patients on HD and with a functioning transplant and falling numbers on PD. The prevalence rate in the over 80 year olds has doubled since 2005. There have been substantial increases in home HD use in some areas although several centres are still unable to offer this modality.

Conflicts of interest: none

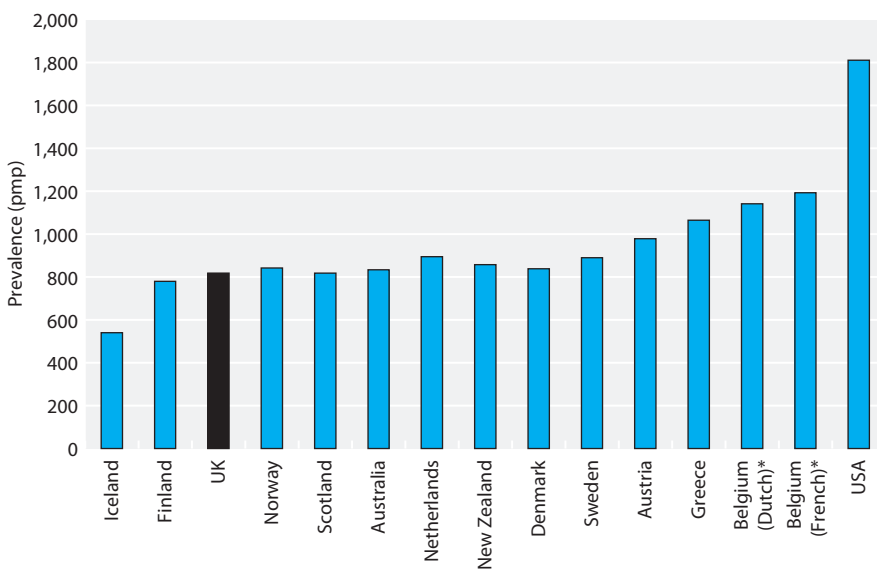


Fig. 2.11. RRT Prevalence rates (pmp) by country in 2010

* Data from USRDS, ERA-EDTA Registry and ANZDATA

References

- 1 Office for National Statistics. www.statistics.gov.uk
- 2 Office of the national statistics. The classification of ethnic groups. www.statistics.gov.uk
- 3 Byrne C, Steenkamp R, Castledine C, Ansell D, Feehally J. UK Renal Registry report 2008. UK Renal Registry Bristol; Chapter 4: p 41–67
- 4 Ansell D, Feest T. The sixth annual report. Chapter 17: Social deprivation on renal replacement therapy. Bristol, UK Renal Registry, 2003
- 5 NICE 2002. Technology appraisal No 48. National Institute Clinical Excellence. www.nice.org.uk
- 6 McDonald SP, Marshall MR, Johnson DW, Polkinghorne KR. Relationship between Dialysis Modality and Mortality. *J Am Soc Nephrol*. 2009; 20(1):155–63
- 7 Couchoud C, Stengel B, Landais P, Aldigier J-C, de Cornelissen F, Dabot C, et al. The renal epidemiology and information network (REIN): a new registry for end-stage renal disease in France. *Nephrol Dial Transplant*. 2006;21(2):411–8
- 8 NHS Blood and Transplant activity report 2009/2010. Transplant activity in the UK. http://www.organdonation.nhs.uk/ukt/statistics/transplant_activity_report/current_activity_reports/ukt/activity_report_2009_10.pdf